

Republic of Kenya

FY2016 Ex-Post Evaluation of Japanese Grant Aid Project

“The Project for Rural Water Supply (Phase II)”

External Evaluators: Yuko Kishino and Yukitoshi Matsumoto, IC Net Limited

## **0. Summary**

The objective of this project is to improve access to safe water in Machakos and Makueni counties by constructing water supply facilities, thereby contributing to improving the hygiene conditions of local residents in line with the development plans and needs of the government of Kenya and the target counties, as well as Japan’s ODA policy at the time of planning of the project.<sup>1</sup> Therefore, the relevance of the project is high.

While some of the target villages and types of facilities have been changed from the original plan, the number of water supply facilities constructed by the project is as planned. Although a few activities of the technical and institutional component were cancelled, they consist a small part of the project as a whole. In addition, the project cost was within the budget, and the project period were within the plan. Therefore, the efficiency of the project is high.

This project improved the access to safe water for approximately 60,000 people in the project sites. It is also found that the current functioning facilities may contribute to reducing water-borne diseases and labor for fetching water among women and children. However, among the 58 facilities in total, 15 are not functioning at the time of ex-post evaluation. While the project’s efforts to establish a foundation for community’s participatory management and maintenance of the facilities did not succeed because of the reform in 2013, skills on maintenance as well as awareness of hygiene and safe water among people in rural areas remain weak. Therefore, the effectiveness and impact of the project are fair.

At the time of ex-post evaluation, the responsible institution for maintenance is drastically changed from the assumption considered at the time of planning. Handing over the responsibilities from the Tanathi Water Service Board to the county governments in Machakos and Makueni, which are now responsible for maintenance of water supply facilities, was not carried out in a precise manner. In addition, the county governments face institutional and financial challenges, whereas the Water Users Associations that are expected to carry out daily management and maintenance of the facilities remain weak in the institutional, financial, and technical aspects. Although some facilities receive support from the county governments in

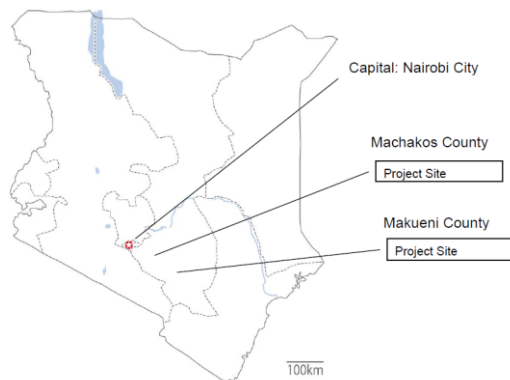
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<sup>1</sup> It had been planned to implement this project as the phase 2/2 of the Project for Rural Water Supply, which was divided into two phases by target areas based on the results of the first Implementation Review Study in 2006. However, because of several unsuccessful tenders, the Phase II Implementation Review Study was carried out twice from 2009, and the project was renamed as the Project for Rural Water Supply (Phase II) and implemented. During the Phase II Implementation Review Study, several changes were made including those in locations, types of facilities, and changes to substitute boreholes as well as an adjustment in the estimated number of people who gain access to safe water through the project. As it is fair to say that the project made a fresh start as a new project, in the ex-post evaluation, the time when the Phase II Implementation Review Study (2009–2011) was carried out is considered the time of planning of the project.

maintenance, the sustainability of the project effects is low at the time of ex-post evaluation.

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

## 1. Project Description



Project Locations



Facility at the Miu Secondary School,  
Mwala, Machakos County

### 1.1 Background

In Kenya, in comparison to urban areas, access to safe water has been severely limited in rural areas where people rely on rainwater, rivers, and natural springs as main water sources. They suffer water shortages and deteriorated water quality, especially during the dry season. Makueni and Machakos counties, the target sites of this project, belong to the arid and semiarid lands (ASAL) in the southern region. There, advanced technologies are required to use underground water sources effectively and develop water supply facilities because of severe difficulties in development due to limited underground water. Additionally, the poverty ratio in both counties is particularly high (60–65%) within the ASAL. Water shortages in both counties have been serious during the dry season, and diseases caused by low-quality water and poor hygiene environment, such as diarrhea, have been prevalent.

Against this background, in 2002, the government of Kenya asked the government of Japan for grant aid assistance to develop groundwater supply facilities, procure equipment, and provide technical support for the maintenance of facilities in four districts—Machakos, Makueni, Kitui, and Mwingi—which were all extremely poor and least served with water in the ASAL.

### 1.2 Project Outline

The objective of this project is to improve access to safe water in Machakos and Makueni

counties by constructing water supply facilities (level 1 and 2<sup>2</sup>), thereby contributing to the improvement of hygiene conditions among the local residents.

G/A Grant Amount / Actual Grant Amount	609 million yen/530 million yen
Exchange of Notes Date /Grant Agreement Date	August 2011 /August 2011
Executing Agency	Ministry of Water and Irrigation (MOWI) Tanathi Water Service Board (TWSB) *At the time of ex-post evaluation, the Ministry of Water and Irrigation of Machakos County, and the Department of Water, Irrigation and Environment of Makueni County are responsible for maintaining the facilities.
Project Completion	May 2013
Main Contractor	Tone Engineering Corporation
Main Consultant	Nippon Koei
Basic Design	May–September 2004
Related Projects	<b>【Technical Corporation Project】</b> The Project on the Development of the National Water Master Plan 2030 (2010–2013) <b>【Grant Aid Project】</b> The Project for Rural Water Supply (2006–2008) [Other donors/agencies] World Bank: Water and Sanitation Services Improvement Project (WaSSIP)

## 2. Outline of the Evaluation Study

### 2.1 External Evaluators

Yuko Kishino, IC Net Limited

Yukitoshi Matsumoto, IC Net Limited

### 2.2 Duration of the Evaluation Study

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

<sup>2</sup> A level 1 facility is equipped with a hand pump. A level 2 facility is equipped with one of the following three sets: windmill pump, submersible pump and generator; submersible pump and commercial power; or submersible pump and solar system.

Duration of the Study: October 2016–October 2017

Duration of the Field Study: January 29–March 1, 2017, May 13–26, 2017

### 2.3 Constraints during the Evaluation Study

Water supply facilities are scattered among 58 villages in 12 sub-counties in the two counties, many of which are constructed in areas with limited accessibility by car. Given the limited amount of time, the ex-post evaluation was able to collect the essential information for all facilities but did not collect detailed information for each facility. In particular, the number of people with access to safe water, which is one of the effect indicators, was estimated based on numbers collected through interviews with actual users of the facilities, as accurate data were not available. Thus, the evaluation of effectiveness is based on rough estimations, and it is necessary to pay close attention to the accuracy of numbers. Additionally, the beneficiary surveys and interviews with the personnel of health clinics near the facilities could not confirm the actual contribution of the project to the reduction of water-borne diseases, which was expected to be an effect of the project. Therefore, the findings from the surveys and interviews were used only for reference to evaluate effectiveness and impact of the project.

## 3. Results of the Evaluation (Overall Rating: C<sup>3</sup>)

### 3.1 Relevance (Rating: ③<sup>4</sup>)

#### 3.1.1 Consistency with the Development Plan of Kenya

One of the goals of the water and sanitation sector of the *Vision 2030*, which was the national development plan at the time of planning (2011), was to achieve universal access to safe water and better sanitation by 2030. The *First Medium-Term Plan* (2008–2012) to achieve the Vision 2030 aimed to improve access to safe water in rural areas to 59%. The Tanathi Water Service Board (TAWSB), the executing agency of the project, set improved access to water within its jurisdiction from 24% to 50% as one of the strategic goals for the five years from 2008.

The *Second Medium-Term Plan* (2013–2017) of the Vision 2030, which was the national development plan at the time of ex-post evaluation, recognized improved access to safe water in partnership with county governments as one of the important issues within the health sector. Additionally, The *Integrated Development Plan* (2013–2017) for Machakos and Makueni counties recognized improved sustainable access to safe water through the development of rural water supply facilities as one of the priorities.

At the time of ex-post evaluation, improved access to safe water in rural areas and the development of rural water supply facilities have been important issues at the national and county levels since the time of planning. Therefore, the project's relevance is high.

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<sup>3</sup> A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

<sup>4</sup> ③: High, ②: Fair, ①: Low

### 3.1.2 Consistency with the Development Needs of Kenya

At the time of planning, the percentage of the population with access to water in the target districts of the projects<sup>5</sup> in Machakos and Makueni Counties was very low (41.5% and 38.2%, respectively). Many people depended on rivers, streams, and natural springs as their water sources. The TAWSB, which was responsible for the rural water supply, also pointed out the major need for education and training regarding the proper and sustainable management and utilization of water supply facilities, given the poor capacity of the management and maintenance of the facility, as well as limited awareness of health and sanitation among people in the community.

At the time of ex-post evaluation, the percentage in rural areas<sup>6</sup> remained low at 44.3%, compared to the national average of 52.6%.<sup>7</sup> Meanwhile, the figures for Machakos and Makueni counties were 36.5% and 35%, respectively, which is even lower than the average for rural areas. Therefore, the development needs for rural water supplies have remained high since the time of planning.

With regard to the selection of the type of water supply facilities, given the estimated pumping amount of water, as well as the ease of maintenance, the installment of hand pumps was considered appropriate at the time of planning. At the time of ex-post evaluation, while some users of the facilities where the beneficiary surveys were carried out complained that hand pumps require more time and labor to fetch water, the selection of hand pump systems can be considered appropriate because power transmission was not common in the target villages, and solar power systems were not very popular at the time of planning.

### 3.1.3 Consistency with Japan's ODA Policy

According to ODA Data by Country provided by the Ministry of Foreign Affairs of Japan (2011), Japan's ODA policy for Kenya aimed to achieve the *Yokohama Action Plan*, which was declared in the 4th Tokyo International Conference on African Development (TICAD IV) in 2008. In addition, environmental protection, including water resource management through improved access to safe water, was set as one of the priority areas for assistance following the *country assistance plan for Kenya* formulated in 2000.

Therefore, relevance of the project to Japan's ODA policy at the time of planning was confirmed.

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<sup>5</sup> It was planned to build water supply facilities in the Makueni, Mbooni East, Nzaui, Mukaa, and Kibwesi districts of Makueni County, and the Masinga, Yatta, Kathiani, Mwala, Machakos, and Kangundo districts of Machakos County.

<sup>6</sup> According to the Kenya National Statistics Bureau, the urban area covers 215 areas that include cities, municipalities, and towns, whereas the rural area covers other areas (2009 Census).

<sup>7</sup> Kenya National Statistics Bureau (2016)

### 3.1.4 Appropriateness of the Project Plan and Approach

#### 3.1.4.1 Technical Assistance

The project provided technical assistance that aimed to establish a foundation for a participatory management and maintenance mechanism to ensure the sustainability and effect of the facilities. As described later, the community's capacity for maintenance, as well as its awareness of sanitation, must be strengthened for the rural water supply facilities to be properly managed, maintained and fully used. To address such issues, the District Water and Sanitation Teams (DWST), which were composed mainly of personnel from the District Water Offices of the TAWSB, were formed in the target districts. The project adopted an integrated approach in which the project capacitated the DWSTs first, and then the teams provided training to community people. The approach was relevant in view of establishing a sustainable mechanism for capacity development for the communities. However, because of the reform in March 2013, responsibility for maintenance of the facilities constructed in the project was transferred from the TAWSB to the county governments<sup>8</sup> although the structure of the DWST was not transferred to the county governments. While the reform was foreseen during the implementation of the project, the details on the water sector were not clear. Thus, it was difficult to modify during the project the content and approach in the technical and institutional component. Therefore, it is fair to say that project planning and the approach have been appropriate.

The project is consistent with the development plan and development needs of Kenya as well as Japan's ODA policy. Therefore, the project's relevance is high.

### 3.2 Efficiency (Rating: ③)

#### 3.2.1 Project Outputs

With regard to the construction of water supply facilities, several changes were made in the locations and types of facilities from the original plan. Regarding changes in the type of facility, as shown in Table 1, the plan was to construct 29 facilities with hand pumps, 28 with submersible motor pumps, and ones with a windmill. In the actual construction, the facilities in seven villages were changed from ones with submersible motor pumps to one with hand pump. Changes in location and facility type were carried out properly according to the set policies.<sup>9</sup>

With regard to the technical and institutional component, the duration and scale of some

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<sup>8</sup> Ministry of Water and Irrigation of Machakos County, and Department of Water, Irrigation, and Environment of Makueni County.

<sup>9</sup> 1. Availability of documents from vertical electric prospecting and social condition survey, accessibility, difficulties of land acquisition; 2. existence of a plan of construction of water supply facilities by other donors; 3. the existence of water supply facilities; 4. estimated pumping amount of water; 5. water quality standards; 6. community willingness to pay water user fees, and so on. All requirements must be met for the selection of the location and the types of facilities.

trainings were reduced owing to delays in fund provision or a lack of funds at the TAWSB. To mitigate the negative impact of such reductions, the Japanese side dispatched local experts again to the target communities to confirm the understanding levels of community people, provide follow-up for the establishment of the Water Users Association, and provide additional training for management and maintenance. Considering the limited budget, it is fair to say that Japanese side took appropriate measures.

Undertakings by the Kenyan side included securing sites for facilities, installing associated facilities (e.g., fences and supports) for Water Users Association (WUA) formulation, DWST formulation, support to communities for the installation of fences and drainage trenches, and follow-up training for WUAs. To secure sites for the facilities, the TAWSB concluded agreements with landowners. Regarding the formulation of the WUA, while some are registered as the WUA, most user groups for the facilities are registered as self-help groups,<sup>10</sup> whereas 21 facilities do not have a formal management group. As mentioned before, a few WUAs failed to bear the cost for DWST activities, and some activities related to the technical and institutional component were not conducted in nine villages. The installment of fences and drainage by communities is confirmed at only 26 facilities out of 58. As described above, some of the undertakings of the Kenyan side were not carried out, which were supposed to be followed up by the TAWSB after the completion of the project. However, as the responsibilities for the management and maintenance of the facilities were transferred to the county governments, the formal handover of the project from the TAWSB was not properly conducted. Accordingly, no follow-up activities were conducted, and DWSTs were discontinued.

As described above, outputs of the project were completed mostly as planned, except for the incompleteness of some activities in the technical and institutional component, which comprised a small part of the whole project with regard to financial and human input.

Table 1: Planned and Actual Outputs

	Planned	Actual
<b>Hand pump</b>		
Machakos County	12	16
Makueni County	17	20
Sub-total	29	36
<b>Submergible pump and generator</b>		
Machakos County	17	12
Makueni County	4	0
<b>Submergible pump and commercial power</b>		
Machakos County	1	1

<sup>10</sup> A group of community people can register itself as a self-help group I with the Ministry of Gender, Children, and Social Development, when the members share specific goals and objectives. Being officially registered, the self-help group will be recognized by law as a body and can transact business in its own name. It can also own property on behalf of the members.

Makueni County	1	1
Submergible pump and solar system		
Machakos County	2	3
Makueni County	3	4
Sub-total	28	21
Windmill pump		
Machakos County	0	0
Makueni County	1	1
Sub-total	1	1
Technical and Institutional Component		
Output 1: Sense of ownership and participation are improved.	<ul style="list-style-type: none"> <li>• Formulation of community action plans</li> <li>• Installation of fences surrounding the pump house, storage tank, and hand pump with participation of the community</li> <li>• Installation of drainage trench surrounding the pump house and storage tank</li> </ul>	Fences/drainage trench were installed at 26 facilities
Output 2: Capacity and skills of local administration to support communities in establishing community-based O&M and to facilitate enhancement of sanitation education are enhanced	<ul style="list-style-type: none"> <li>• Revision of a field implementation manual for trainers,</li> <li>• Formulation of DWST</li> <li>• Development of an action plan for DWST</li> <li>• Development of checklist for monitoring/follow-ups</li> </ul>	DWSTs were formulated, in which three districts were clustered instead of being formulated in every district
Output 3: Capacity of the target communities in the O&M of the improved water supply system is enhanced.	<ul style="list-style-type: none"> <li>• Preparation of constitution of water users</li> <li>• Support to formulation of WUA</li> </ul>	Review/revision of constitution and capacity building on O&M were not carried out at nine villages
Output 4: Increase in awareness on individual health and sanitation in relation with the use of safe water	<ul style="list-style-type: none"> <li>• Implementation of sanitation education</li> </ul>	Sanitation education was not carried out at nine villages
Assignment of Consultants	<ul style="list-style-type: none"> <li>• Japanese consultant (1 person), local consultants (2 people), 21.47 man/month</li> </ul>	As planned

Source: documents provided by JICA, interview survey by the evaluator



### 3.2.2 Project Inputs

#### 3.2.2.1 Project Cost

The planned project cost was 675 million Japanese yen (JPY) (608 million JPY on the Japanese side, 67 million JPY on the Kenyan side). The actual project cost was 530 million JPY, or 87% of the planned cost.<sup>11</sup> The reduction of cost on the Japanese side was due to the change of facility types. Compared to the plan, the number of facilities with hand pumps, which are the least expensive among the three types, increased from 29 to 36, while the number of facilities with submersible motor pumps, whose unit cost was high, was reduced from 26 to 19 (the number of facilities with generators and solar power systems was reduced from 21 and 5 to 12 and 7, respectively). The major reasons for the reduction in cost for the technical and institutional component, from 21 million JPY at the time of planning to 19 million JPY, were that training was jointly organized instead of separately organized for each target village, and the activity was not conducted in nine villages because of a lack of funds at the TAWSB.

#### 3.2.2.2 Project Period

The planned project period was a total of 22 months, from August 2011 (exchange of G/A) to May 2013 (completion of work), which was implemented as planned. As mentioned above, the duration of a few activities of the technical and institutional components was reduced, and some activities were not conducted in nine villages because of such reasons as a delay in budget provision at the TAWSB and repercussions of the election. It had been agreed before the completion of the project that the TAWSB would carry out follow-up on such delay of fund provision and the nine villages, but no such work was implemented. The handover of the project to the county governments after the reform was not done properly, and undertakings on the Kenyan side might not have been sufficiently carried out. However, the ex-post evaluation considers this a change of scope, rather than the incompleteness of the technical and institutional components, and regards the completion of the construction, which was later than the completion of the technical and institutional components, as the end of the project period.

The project cost was within the budget, and the project period was within the plan. Therefore, efficiency of the project is high.

### 3.3 Effectiveness<sup>12</sup> (Rating: ②)

An increase in the population who received safe water supplies (improved access to safe water) in the target areas was expected as an effect of the project. In addition to the number of

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<sup>11</sup> Information on costs covered by the Kenyan side was not provided to the evaluators. Thus, project cost was evaluated by reviewing only the cost covered by the Japanese side.

<sup>12</sup> Sub-rating for effectiveness is to be evaluated with consideration of impact.

people and the ratio<sup>13</sup> of the population who had access to water, which were set as effect indicators at the time of planning, the number of functioning facilities was added as an indicator to evaluate the effectiveness of the project. Additionally, to evaluate safe water supplies, the water quality of each facility was assessed. As the stability of the water supply is an important element for improving access to safe water, the water quantity of each facility was also assessed.

At the time of planning, effect indicators were set through the social condition survey as follows: the number of people with access to water was defined as the population living within a two km radius of the water supply facilities built by the project, but they should have been within the pumping capacity of the facilities (it was estimated that hand pump facilities can supply water to less than 500 people). Using these definitions, the number of people with access to water upon completion of the project was estimated. The ratio of the population with access to water at the time of planning was calculated by obtaining the average of the ratio of the population who had access to a water supply in the target districts. The expected ratio upon completion of the project was estimated by considering the expected increase in the number of people who would use the facilities built by the project.

The number of people who used facilities built by the project was estimated through interviews with residents near the facilities<sup>14</sup> because no accurate statistical data were available at the time of ex-post evaluation. With regard to the ratio of the population with access to water, only county-wise statistical data (but not district-wise data) are available, which is not comparable with the ratio calculated at the time of planning. Additionally, no accurate data for water quality and quantity at the facilities were available at the time of ex-post evaluation. Considering these situations, to evaluate the effectiveness of the project, both the estimated number of people who used water facilities and the number of functioning facilities were considered as the most important indicators. Water quality based on the beneficiary survey<sup>15</sup> and interviews<sup>16</sup> was also taken into consideration to evaluate effectiveness. The ratio of the population with access to water was not used as an indicator.

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<sup>13</sup> The number of people having access to safe water was set as an indicator for effectiveness in the ex-ante project evaluation, whereas both the number of people and the ratio of the population with access to safe water were set as indicators in the Phase 2 Implementation Review Study.

<sup>14</sup> Number of people who use the water supply facility, regardless of distance from the facility.

<sup>15</sup> The beneficiary survey was designed as follows: First, five villages where the facilities were constructed were selected randomly out of 45 facilities that were confirmed to be functioning through the preliminary survey conducted by the evaluation team. Questionnaire surveys were conducted for 30 households that were selected in those five villages (152 households in total, with 152 respondents, among which female respondents in 80 households). The sample error at the 95% confidence interval of the survey has approximately an average value of  $\pm 10\%$ . Because it was not possible to obtain a list of residents in the survey areas, nonprobability sampling was used in which the survey team started from the facility on foot or by vehicle and interviewed the households the team encountered. As most of the nonfunctioning facilities were excluded, the samples for the survey did not represent all beneficiaries of the project, and the results of the survey only reflect the opinions of actual users of the facilities in function. Thus, the results may overestimate the effects of the project.

<sup>16</sup> Interviews with residents living near the constructed facilities were conducted during the evaluation team's surveys at the all facilities. Group interview for the Water Users Associations (10 groups) and women (10 groups) were organized in five villages where the beneficiary surveys were carried out and in another five villages. Interviews with the personnel of health clinics near the facilities were also conducted in the five villages.

The expected effects of the technical and institutional components (i.e., improved capacity among district officers and communities (WUA)), and awareness among communities (outcomes (A)–(C) of the technical and institutional components, as described later), as well as improved awareness of sanitation in the communities (outcome (D)), are the qualitative effects of the project. As the former outcomes (A)–(C) are necessary elements for the sustainable operation and maintenance of the facilities, they are analyzed later to evaluate sustainability. Only the results of the activities are described in this section on effectiveness, which was used as information for evaluating sustainability.

### 3.3.1 Quantitative Effects (Operation and Effect Indicators)

#### 3.3.1.1 Ratio of the Functioning Facilities

At the time of ex-post evaluation, 43 of the 58 facilities (approximately 74%) were functioning; 15 facilities in total, namely six in Machakos County and nine in Makueni County, were not functioning. The breakdown of the nonfunctioning facilities is 10 level-1 facilities (hand pumps) and five level-2 facilities (three generator-equipped facilities, one with a solar power system, and one windmill facility). The reasons for nonfunctioning sites include technical troubles such as water pump malfunction (nine facilities), generator and water pump theft (two facilities), water shortage (two facilities), worsening of water quality (one facility), and inconvenient location for users (one facility). With regard to technical troubles, many of them, such as problems with pump parts, could have been fixed but were not because of a budget shortage. Three facilities that were not functioning at the time of the June 2014 defect inspection were also left unrepaired.

#### 3.3.1.2 People Who Have Access to Safe Water

At the time of planning, it was estimated that 39,000 people would use the facilities in Machakos County and 21,000 in Makueni County in 2013 (increased access for 60,000 people to safe and stable water supplies). In the interviews with residents about the size of population that is actually using the facilities, the interviewees answered either by the number of households or the number of people. The results are that 7,159 households and 12,605 people<sup>17</sup> currently use the facilities built by the project. If the average number of people per household is seven (as estimated in the social survey conducted at the time of planning), it is estimated that 61,718 people are using the facilities,<sup>18</sup> which exceeds the goal of 60,000 people.

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<sup>17</sup> With regard to the number of users of the water supply facilities, residents near the facilities gave either the number of people or households to the evaluation team. Neither the number of people nor households were confirmed in two facilities in Machakos County.

<sup>18</sup> The average number of people per household was estimated to be around seven in the target counties; 7,159 households x 7 people + 12,605 people = 61,718 people.

### 3.3.1.3 Supply of Safe Water

With regard to safe water supply, criteria were set to determine a successful borehole at the time of planning. Regarding water quality, it was determined that arsenic should be less than 0.05 milligrams per liter, fluorine should be less than three milligrams per liter, and total dissolved solids (TDS)<sup>19</sup> should be less than 2,000 milligrams per liter. It was determined that the quantity of pumping water should be more than 330 liters per hour for hand pump facilities, more than 600 liters per hour for windmill facilities, and more than 1,000 liters per hour for submergible motor pump facilities. At the time of ex-post evaluation, there were no accurate data for water quality and quantity because the inspection was not carried out. In the beneficiary surveys, about 90% of the respondents responded positively regarding the transparency, color, and smell of the water; 70% responded positively regarding the taste; and nearly 70% responded positively regarding the stability of the water supply (Table 2).

Table 2: Responses on Water Quality and Stability

		Ratio (%)
Transparency	Good	88
	Acceptable	10
	Poor	2
Color	Good	89
	Acceptable	10
	Poor	2
Smell	Good	91
	Acceptable	7
	Poor	2
Taste	Good	70
	Acceptable	28
	Poor	2
Stability	Good	67
	Acceptable	21
	Poor	12

Source: Beneficiary Survey

At the time of ex-post evaluation, according to the interviews with the users of the facilities, many people at most of the facilities complained that the water from the facilities was too saline to be used for drinking, and there were three facilities where people only used water for their livestock. TDS seems to be the reason for this salinity. At the time of planning, the standard for TDS was carefully considered as underground water in the target areas of the project tended to contain higher TDS than the standard recommended in the water supply service manual of the Kenyan government, which could have lowered the success rate of the boreholes. Given the

<sup>19</sup> TDS are residues that are obtained from objects floating or dissolved in water when they are evaporated and dried. Among TDS' major components is salt.

serious water shortages at the target areas and the small health hazard posed by TDS, the Kenyan side requested at the time of planning that boreholes containing more TDS than the national standard should be considered successful. There were no data on TDS at the time of ex-post evaluation.

Table 3: Number of People with Access to Safe Water and the Number of Functioning Facilities

	Baseline	Target	Actual		
	2010	2013	2013	2014	2017
	Planned Year	Completion Year	Completion Year	1 Year After Completion	4 Years After Completion
<b>Number of people with access to safe water</b>	808,000	868,000 (+60,000)	N/A	N/A	+61,717
Machakos County	465,000	504,000 (+39,000)	N/A	N/A	+25,743
Makueni County	343,000	364,000 (+21,000)	N/A	N/A	+35,975
<b>Number of functioning facilities</b>			58	55	43
Machakos County			32	30	26
Makueni County			26	25	17

Source: Documents provided by JICA, interview surveys by the evaluators

Note: The actual number of people who used the facilities was based on interviews with Water Users Associations and residents living near the facilities, and the number of functioning facilities was based on the results of surveys by the evaluation team.

#### 3.3.1.4 Access to Water Supply (Effect Indicator)

At the time of planning, the ratio of the population with access to water was expected to increase upon completion of the project in 2013 from 41.5% to 45.0% in Machakos County and from 38.3% to 40.5% in Makueni County. The average ratio in the two counties was expected to increase from 39.9% to 42.8%. According to data from the National Statistics Bureau, the ratio was 37.0% and 36.0% in Machakos and Makueni, respectively, in 2013. However, these figures represent the county-wise ratio while the baseline figures calculated at the time of planning represented the average of the ratio of only the target districts of the project. Thus, it is not appropriate to compare these figures. Because no data were available on district-wise ratios at the time of ex-post evaluation, the ratio of the population with access to water is not used as an indicator to evaluate effectiveness of the project.

#### 3.3.2 Qualitative Effects

At the time of planning, the following were defined as the effects of the technical and

institutional component:

- A) Community's sense of ownership and participation are improved
- B) Capacity and skills of local administration to support communities in establishing community-based operation and maintenance (O&M), and to facilitate sanitation education, are enhanced and retained by the concerned organization
- C) Capacity of the target communities in the O&M of the improved water supply system is enhanced
- D) Increase in awareness of individual health and sanitation in relation to the use of safe water

The effects of the technical and institutional component were evaluated based on the results of interviews with stakeholders and assessments of the conditions of all facilities. Some training activities were downsized, while the TAWSB did not implement follow-up activities. Thus, the effectiveness of the technical and institutional component was limited.

At the time of ex-post evaluation, the results of each outcome can be described as follows.

With regard to outcome (A), it was confirmed by the ex-post evaluation that there were 13 facilities where Water Users Associations had not been formulated (or not registered with the relevant government authority), and two facilities were controlled by the landowner. Interviews with members of the WUA found that the sense of ownership of water supply facilities among community people remained limited. Accordingly, the effect of outcome (A) was limited.

With regard to outcome (B), it seems that the members of the DWST acquired the necessary knowledge and skills through the training provided by the project. The project developed a manual that addresses skills in leadership, institutional management, financial management, and operation and maintenance of the facility, as well as sanitation education and participatory monitoring and evaluation. However, given that the DWST stopped functioning, the manual was not being utilized by the county governments at the time of ex-post evaluation. The DWSTs were not sustained after the government reform (for details, see the part about sustainability).

With regard to outcome (C), the effect seems limited given that 15 facilities were not functioning and Water Users Associations were not formulated at several facilities. The current conditions of the facilities as well as the interviews with users suggest limited effects as well. Regarding participatory operation and management by the community, it is necessary to provide continuous follow-ups to them in addition to the short-term training provided by the project. The limited effect of the technical assistance can be attributed to the discontinuation of the DWST, which was supposed to conduct continuous training activities.

With regard to outcome (D), at the time of ex-post evaluation, according to the interviews with the residents and the Water Users Associations, effect of the activities of community

resource persons<sup>20</sup>—who were trained to provide sanitation education and other capacity building in their communities—was not confirmed.

### 3.4 Impacts

#### 3.4.1 Impacts of the Project

The reduction of water-borne diseases in the target areas (behavioral changes among residents regarding sanitation and improvements to the sanitation environment), as well as reduced labor among women and children in fetching water, were the expected impacts of the project. Additionally, the social survey conducted at the time of planning found low awareness of water quality among residents in the target areas, and many residents said they would still use the same water sources during the rainy season, even after the water supply facilities were built. Therefore, a technical and institutional component activity for outcome (D) was added. Considering these situations, increased usage of safe water by residents as a result of improved awareness of sanitation was assessed as an impact of the project in the ex-post evaluation. A series of group interview with members of the Water Users Associations and women, as well as interviews with the personnel of health clinics near the facilities, were conducted to assess changes in the prevalence of water-borne diseases and water fetching work among women and children.

##### 3.4.1.1 The Project's Contribution to Reduction of Water-Borne Diseases

While there are no statistical data on water-borne diseases in the target areas, the personnel of health clinics and residents near the facilities noted health improvements in their families and a reduction in diarrhea among their children. Meanwhile, it was pointed out in interviews with women that the establishment of water supply facilities had contributed to improved awareness of health and sanitation. In the beneficiary survey, 82% of the respondents answered that the facilities contributed to improved health conditions in their households. However, as many factors other than this project are related to the occurrence of water-borne diseases, it is difficult to assess a direct causal relation between the project and a reduction in water-borne diseases. Therefore, the aforementioned impacts are not included in evaluating the impact of the project.

##### 3.4.1.2 The Project's Contribution to Reduction of Labor to Fetch Water among Women and Children

At the time of planning, the social condition survey found that many households took more than two hours to fetch water during the dry season. At the time of ex-post evaluation, while

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<sup>20</sup> In outcome (D), community resource persons were trained through the training using the Participatory Hygiene and Sanitation Transformation (PHAST). They were expected to carry out the activities related to sanitation education in the target villages.

there were no statistical data on the time for fetching water in Machakos and Makueni counties, the beneficiary survey found that time for fetching water was reduced during both the rainy and dry seasons compared to before the project. There is a major difference in time between the dry and rainy seasons because many people also use rainwater and water from nearby rivers for drinking water. As shown in Table 5, the average time for fetching water during the dry season exceeded three hours, which includes time spent waiting at the facilities.

Table 4: Change of Time for Fetching Water

		Average (min)
Access time to source of drinking water (rainy season)	5 years before the project	148
	At the time of ex-post evaluation	93
Access time to source of drinking water (dry season)	5 years before the project	256
	At the time of ex-post evaluation	190

Source: Beneficiary Survey

In the interviews with groups of women and residents near the facilities, it was pointed out that the construction of facilities improved access to safe water with regard to time and distance. In the beneficiary survey, 87.0% of the respondents (88.0% when all the respondents were women) confirmed the facility's contribution to improved access to drinking water. It was noted in the group interview with women that they could spare more time for childcare because of the reduced time to fetch water.

Meanwhile, users sometimes had to wait half a day or a whole day for their turn at some facilities with hand pumps, which could have increased the total time for fetching water compared with the time before the project. Additionally, pumping water using a hand pump is laborious work for women. It is especially difficult for older women; younger people help them for free or charge a small fee.<sup>21</sup> Fetching water is also especially laborious for women at facilities without good access roads because they cannot use a cart, bicycle, or donkey to carry the water.

#### 3.4.1.3 The Project's Contribution to Improvement of Awareness of Sanitation

In the interviews with members of the Water Users Associations, it was pointed out that fewer people used the facilities during the rainy season because many people used rainwater and water from nearby rivers owing to low awareness of hygiene. It was suggested that continuous efforts are needed to further improve awareness of sanitation among community people. In the meantime, it was also suggested that installing water supply pipes and water kiosks could

<sup>21</sup> The results of the beneficiary survey indicated that 14% of the users of hand pump facilities were "very satisfied" with the facility, whereas 43% of the users selected the same option at the facilities with a solar power system.



reduce distance and time for access to safe water and further promote usage of the facilities.

### 3.4.2 Other Positive and Negative Impacts

#### 3.4.2.1 Impacts on the Natural Environment

At the time of planning, given that the facilities are small in scale, it was considered that special environmental or social considerations were not required for the project. Because an Environmental Impact Assessment is required by the National Environmental Management Authority for drilling boreholes, the TAWSB carried out the necessary tasks. The TAWSB mentioned that there were no major problems during or after the implementation of the project. Meanwhile, residents near the facilities and members of the Water Users Associations also confirmed that there were no major positive or negative impacts.

#### 3.4.2.2 Land Acquisition and Resettlement

The water supply facilities were built either on public land, such as school property, or on privately owned lands. As the land required for the facilities was small, there was no resettlement for the project.

#### 3.4.2.3 Unintended Positive/Negative Impact

In the case of building the facilities on privately owned land, minor friction between landowners and facility users/Water Users Associations was observed at some facilities. For example, as many people used water from the facilities for their livestock, especially during the dry season, and would bring donkeys to carry water, some landowners complained that livestock and their feces might damage their land. The TAWSB and the landowners concluded a land agreement, but it was not legally binding. Without clear agreement on land usage for the facilities, it was also found that some landowners limited access to the facilities and unofficially partnered with a private company to collect water user fees and manage and maintain the facilities.

At the time of ex-post evaluation, 15 facilities out of the 58 were not functioning. Although the number was estimated based on numbers collected through interviews with actual users of the facilities, the functioning facilities have provided safe water to more than 60,000 people, which exceeds the planned number. While there are no objective data on water quality, no serious health damage to users has been reported. Thus, it is fair to say that this project has achieved its objectives to some extent in terms of effectiveness of the project as a whole.

With regard to the reduction of labor in fetching water, it is fair to say that the time to fetch “safe” water has been reduced as there were no water supply facilities at the time of planning. While women in the households are usually tasked with fetching water, it was suggested that they could now spend more time on childcare because the time for fetching water was reduced

by the construction of the facilities. Meanwhile, because of lack of awareness in hygiene, use of the facilities decreased during the rainy season as many residents would use water from nearby rivers during that time. It is suggested that a further reduction of time and distance by installing water pipes and water kiosks, as well as continuous efforts to raise awareness of sanitation among residents, would further promote use of the facilities. It can be evaluated that the 43 currently functioning facilities have had positive impacts while the degree of impact has varied among the facilities.

This project has achieved its objectives to some extent. Therefore, effectiveness and impact of the project are fair.

### 3.5 Sustainability (Rating: ①)

#### 3.5.1 Institutional Aspects of Operation and Maintenance

At the time of planning, the institutional framework for operating and maintaining the water supply facilities was to be 1) through promotion of active participation of communities as well as 2) participatory operation and maintenance including support services from government agencies. With regard to operation and maintenance at the community level, it was planned that community organizations would be formulated by each community through instruction and support from the district water offices before the starting the construction. They would be responsible for daily operation and maintenance of the facilities, collecting and managing water user fees, and minor repairs. The TAWSB was responsible for formulating the DWST and providing support services through its district offices to establish participatory operation and maintenance mechanisms, which would include training to enhance the capacity of communities, monitoring, and technical support to work beyond the capacity of the Water Users Associations. However, following the government reform in March 2013, the responsibilities for rural water supplies have drastically changed. The relevant water service board<sup>22</sup> is responsible for new construction of large-scale water projects, as well as projects involving more than one county, whereas the county governments are responsible for the operation and maintenance of water supply facilities located within the county. Following the reform, while the TAWSB was responsible for implementing this project, the county government of Machakos and Makueni were responsible for the operation and maintenance of the facilities. Each county government is responsible for the construction, operation, and maintenance of water supply facilities based on the county development plan. In Machakos County, the Department of Water and Irrigation is responsible for budgeting and planning, and it expects the Water Users Associations to carry out daily operations, except for financial management, whereas subcounty water offices established in each subcounty are responsible for operation and maintenance, as well as support to people's

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<sup>22</sup> The Water Service Board is established in eight regions. The TAWSB is responsible for Machakos, Makueni, Kitui, and Kajado counties.

organizations (Water Users Associations and self-help groups).<sup>23</sup> Two technical staff members are assigned at each subcounty office, who are responsible for technical support for the operation and maintenance of the facilities.

In Makueni, the Department of Water, Irrigation, and Environment is the agency responsible for the water sector, under which six subcounty water offices are established. Additionally, ward offices are established, or a ward coordinator is appointed, in each ward (however, because of staff shortages, for example, only five ward coordinators are appointed in Makueni subcounty, which has seven wards). The ward coordinators are responsible for monitoring the facilities built in the project, and subcounty water offices are responsible for operation and maintenance, including repairs to the facilities. The county government in Makueni expects the Water Users Association and self-help groups to carry out daily management, including the collection of use fees and financial management.

The *Water Act of 2002* stipulated the organizational framework to carry out water sector reform, in which the Water Service Board promoted outsourcing of the water supply service to private water service providers who oversee the operation and maintenance of water supply facilities under an agreement with the Water Service Board. However, given the high public interest and low profitability of rural water supply, it is difficult for private companies to manage the facilities. At the time of planning, the Water Users Associations continued to oversee operation and maintenance with support from the district water offices of the TAWSB at the target areas of the project. At the time of ex-post evaluation, while this situation was ongoing, the county government of Makueni would like to provide subsidies to water service providers to oversee the operation and maintenance of the facilities in the county in the future.

Following the government reform, operation and maintenance of the water supply facilities was transferred from the Water Service Board<sup>24</sup> to the ministry or department in charge of the water sector in the county government. Thus, the institutional structure for the operation and maintenance of facilities built in the project is different from what was expected at the time of planning. The transfer to the new institutional structure was not carried out smoothly, and no detailed handover to the county governments was carried out with regard to maintenance of the facilities. The DWSTs that were formulated by the project to provide capacity development for operation and maintenance, and to improve awareness of sanitation among community residents, stopped functioning in both counties. Mechanisms for monitoring and reporting on the conditions of the facilities have not been established, and the officers of the subcounty and ward water offices hardly visit facilities. The subcounty water offices in Machakos County and

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<sup>23</sup> No written rules or guidelines exist with regard to the roles and responsibilities of people's organizations such as the Water Users Associations and self-help groups in maintaining and managing water facilities. As a result, some groups were registered as the Water Users Associations while others as self-help groups.

<sup>24</sup> The Water Service Board is established in eight regions. The TAWSB is responsible for Machakos, Makueni, Kitui, and Kajado counties.

subcounty water offices and ward water offices do not own a vehicle for monitoring, and they share motorcycles with the staff of offices of the other sectors. The Machakos County government does not grasp firmly the importance of capacity development on operation and maintenance at the community level. Meanwhile, there is no mechanism to provide capacity development and trainings in Makueni County, although the importance of the community's participatory operation and maintenance is well recognized.

Thus, there are problems within the institutional structure for operation and maintenance.

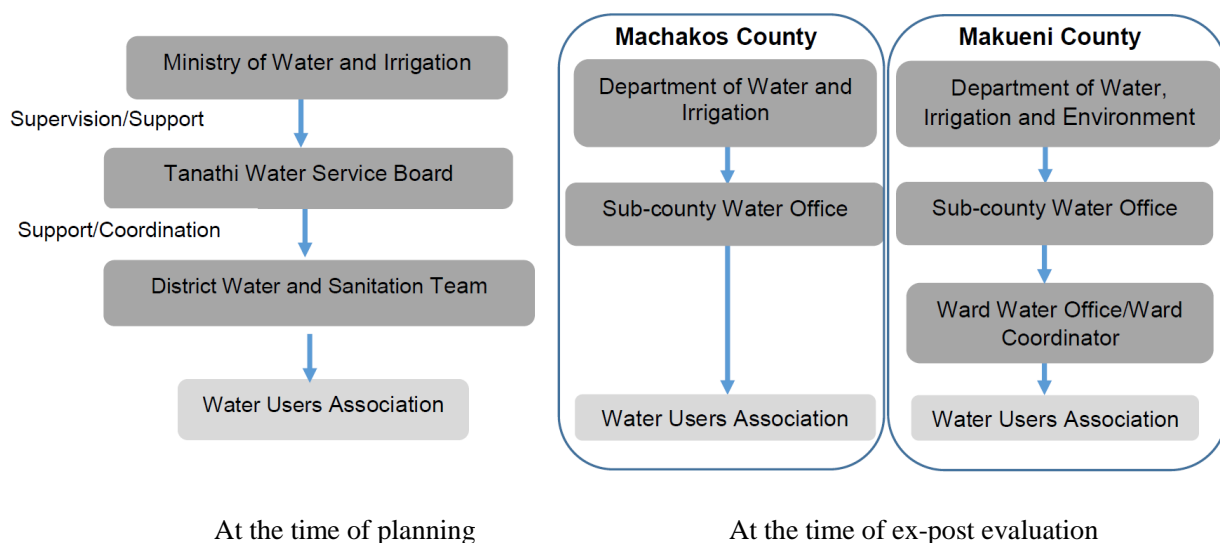


Figure 1: Organization Chart at the Time of Planning and Ex-Post Evaluation

### 3.5.2 Technical Aspects of Operation and Maintenance

At the time of planning, it was considered that the personnel of the central Ministry of Water and Irrigation, the TAWSB, and its district water offices had enough knowledge and skills with regard to the construction of rural water supply facilities, given that they had experience supervising local contractors in construction work funded by the government and donors and international organizations. In particular, personnel were assigned at the district water offices specifically for operation and maintenance, who regularly provided technical support to the Water Users Associations. Meanwhile, a limited capacity for operation and maintenance among the Water Users Associations was considered one of the challenges.

At the time of ex-post evaluation, following the government reform, the county governments became responsible for the operation and maintenance of the water supply facilities. In both Makueni and Machakos counties, technical personnel are appointed at the subcounty water offices, which are responsible for maintenance of the facilities, and it is considered that they have the necessary technical capacity to repair the facilities. Some staff members of the district water offices who were trained in the technical and institutional component of the project were

transferred to the subcounty water offices in both counties. However, the manual and monitoring tool (checklist) that were developed in the project are not used in the county governments.

Knowledge and skills for operation and maintenance among the members of the Water Users Associations for the facilities built in the project remain weak. Capacity is very weak, especially for the Associations, whose managerial members were changed after the project because the new members did not have opportunities to gain capacity through training. It was found that some facilities stopped functioning because the Water Users Associations did not take necessary measures, such as contacting a technician for repair immediately when technical problems arose at the facility. While the capacity development of the community with regard to operation and maintenance is highlighted as a priority by the Machakos County government, there are no specific plans or a structure to provide training thus far. Makueni County has no established mechanism for training. The discontinuation of the mechanism to provide capacity development to managerial members of the Water Users Associations has negatively affected sustainability with regard to operation and maintenance by the community. Without rebuilding the mechanism and skills to tackle technical and managerial problems, more facilities are likely to become nonfunctioning in the near future.

As described above, the county governments are not providing technical support to the Water Users Associations established in the project. There are problems with sustainability in view of the technical aspects.

### 3.5.3 Financial Aspects of Operation and Maintenance

At the time of planning, the budget of the central Ministry of Water and Irrigation was increasing because the government and the donors invested in sectoral reform. In fiscal year 2008/2009, the subsector of water supply and sanitation consisted of more than 80% of the total budget of the ministry. Meanwhile, many Water Users Associations charged water user fees (2–3 Kenyan shillings (KES) per 20 liters in many cases) to cover expenses for operation and maintenance. Based on the results of the social surveys and the estimation of the production costs of water for each type of facility, it was estimated that 2 and 1.4 KES per 20 liters were appropriate in Machakos and Makueni counties, respectively, to cover operation and maintenance costs.

After the government reform, the budget for the water sector had two tracks—that is, from the National Treasury to the central Ministry of Water and Irrigation, and then to the Water Service



Photo 1: Facility in Nguuswini Village

Boards, and from the Treasury to the county government. Each county government formulates the county's integrated development plan, based on which necessary budget is allocated to respective sectors. In Machakos County, the incumbent governor promotes the provision of free water and promotes the facility with a solar power system.<sup>25</sup> However, about 800 water supply facilities have been set up within the county with a plan to establish another 300 facilities in 2017, and it may be difficult to financially sustain such a high number of facilities with the county budget. Given the plan to increase the number of rural water supply facilities, the county government requires continuous efforts to increase the budget for maintenance. However, the ex-post evaluation did not find that the county government secured enough funds for that purpose, nor any cases in which the county government provided support for repairs to the facilities built by the project. It may be difficult to charge the fee again once water is provided free of charge. Therefore, there is a problem with regard to the financial aspect of the sustainability of the water supply facility in Machakos County. In Makueni County, the cost for operation and maintenance of the water supply facilities is supposed to be covered by the public participation program in which 20.5 million KES are allocated to each ward, and usage of the fund is determined based on a consensus among community people. However, according to the Department of Water, Irrigation, and Environment, the procurement process for equipment is complex and lengthy, which hampers the timely repair of the facilities. It also mentioned that the water sector does not have enough funds for operation and maintenance because local government revenues are limited and the county's industries are underdeveloped.

Meanwhile, 30 facilities among 43 functioning facilities charge water user fees (around 3–5 Kenyan shillings per 20 liters), which covers the expenses for operation and maintenance, including salaries for water attendants. During the dry season, when the demand for water increases, some facilities, such as the one in Nguusuwini (Photo 1), could accumulate 20,000 Kenyan shillings (about 20,000 JPY) per month from water user fees, which can cover expenses for the installment of fences, the employment of water attendants, and minor repairs. However, the surplus from the water user fee is greatly reduced during the rainy season as the number of users decreases. While the details of financial management at each facility are not clear because financial records are not kept by the Water Users Associations, a member of the Water Users Associations pointed out that it is difficult to cover the necessary costs for operation and maintenance, especially major repairs, without financial support from the county government. It was also found that the necessary repairs could not be carried out because use fees were not properly collected. There are no official regulations for the Water Users Associations to cover any part of expenses for operation and maintenance of rural water facilities, and the governments of both counties strongly request free water. Given the limited

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<sup>25</sup> According to the Ministry of Water and Irrigation of Machakos County, the cost for establishing solar panel systems depends on the pumping amount of water as follows: (1) pumping amount of water 0.5–2.5 m<sup>3</sup> per hour: 780,000 KES; (2) 2.6–5.0 m<sup>3</sup>: 1.2 million KES; (3) 5.1–7.5 m<sup>3</sup>: 2.1 million KES; (4) 7.6 m<sup>3</sup> or more: 3.1 million KES.

budget for operation and maintenance in the county government, it seems more realistic for the Water Users Associations to cover expenses for minor repairs and daily operation of the facilities. At the time of ex-post evaluation, thirteen facilities built by the project do not charge water user fees,<sup>26</sup> At the time of ex-post evaluation, only two facilities have been repaired through financial support from the county government, and it is important to establish mechanisms for operation and maintenance through financial support from the county government as well as the collection of water user fees by the Water Users Associations.

As described above, both the county government and the Water Users Associations have problems with financial sustainability.

#### 3.5.4 Current Status of Operation and Maintenance

Fifteen facilities out of the 58 were not functioning at the time of ex-post evaluation because of the malfunctioning of equipment and parts, the theft of generators and pumps, worsening water quality, inconvenient locations for users, and water shortages. Meanwhile, as seen in Photo 2, very few people use the facility at Kikulumi village because of the inconvenient location and the salinity of the water. Some facility compounds (especially where a water attendant is not hired because a use fee is not collected) are not cleaned regularly, and dung from livestock are not removed. The fences built by residents at many facilities also require repair work.



Photo 2: Facility at Kikulumi Village

Meanwhile, it was found that the initiatives of some members of the WUA led to support from the county government in which solar power systems (Photo 3) or water tanks, water pipes, and water kiosks were installed at two facilities in Machakos County. In Makueni County, two facilities started repairing equipment



Photo 3: Facility at Liyuni Village

<sup>26</sup> Ten facilities in Machakos county and three in Makueni County do not charge water users.



with financial support from the county government. Considering these initiatives, it is expected that maintenance of the facilities can be improved in the future. However, because mechanisms to train the Water Users Associations in the management and maintenance of the facilities, and systems to monitor and support the facilities are not well established in the county governments, it can be assumed that some of the currently functioning facilities could stop functioning in the future if proper systems are not established.

Major problems have been observed with regard to technical capacity of the Water User Associations, and institutional and financial aspects at the county governments. Therefore, the sustainability of the project effects is low.

#### **4. Conclusion, Lessons Learned and Recommendations**

##### **4.1 Conclusion**

The objective of this project was to improve access to safe water in Machakos and Makueni counties by constructing water supply facilities, thereby contributing to the improvement of hygiene conditions among local residents. This matches the development plan and development needs of the government of Kenya and the target counties, as well as Japan's ODA policy at the time of planning of the project. Therefore, the relevance of the project is high.

While some of the target villages and types of facilities have been changed from the original plan, the number of water supply facilities constructed by the project is the same as planned. Although some activities of the technical and institutional component were reduced, they comprise a small part of the project as a whole, and because both the project cost and project period were within the plan, the efficiency of the project is high.

This project improved access to safe water for approximately 60,000 people in the project sites. It was also found that the currently functioning facilities may help reduce water-borne diseases as well as the labor for fetching water among women and children. However, 15 facilities out of the total 58 were not functioning at the time of ex-post evaluation. While the project's efforts to establish a foundation for community participatory management and maintenance of the facilities did not succeed owing to the reform in 2013, maintenance skills as well as the awareness of hygiene and safe water among people in rural areas remain weak. Therefore, the effectiveness and impact of the project are fair.

At the time of ex-post evaluation, the institution responsible for maintenance had drastically changed from that at the time of planning. The transition from the Tanathi Water Service Board to the county governments in Machakos and Makueni Counties, which are now responsible for the maintenance of water supply facilities, was not carried out precisely, and the county governments face institutional and financial challenges, whereas the Water Users Associations, which are expected to carry out daily management and maintenance of the facilities, remain



weak institutionally, financially, and technically. Although it was found that some facilities receive support from the county governments for maintenance, the sustainability of the project's effects was low at the time of ex-post evaluation.

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

## 4.2 Recommendations

### 4.2.1 Recommendations to the Executing Agency

#### 4.2.1.1 Recommendations to the Tanathi Water Service Board

Regarding the rural water supply projects that are implemented by the Water Service Boards, it is important to strengthen the partnership between the relevant county governments that are responsible for maintenance of the facilities and the Water Service Boards in the whole process from planning (including the selection of the types and locations of the facilities) to implementation, thereby facilitating smooth transfer of the facilities to the county upon completion. Regarding the facilities constructed by the project, the TWSB should initiate a more effective institutional and technical handover to carry out operation and maintenance, as well as the necessary follow-up activities of the facilities, and establish partnerships with the county governments to further ensure the sustainability of the facilities.

#### 4.2.1.2 Recommendations to the County Government

Most of the nonfunctioning facilities at the time of ex-post evaluation failed because of the malfunctioning of a part, except in two cases of the theft of a generator and hand pump. However, the technical malfunction was not serious in many cases and could have been repaired if appropriate measures had been taken swiftly. Therefore, to maintain the facilities properly, it is important that the county government, in particular at the sub-county level (also at the ward level in Makueni County), institutionalize a mechanism for information management, regular monitoring, and communication and reporting with the Water Users Associations. As some users of the facilities expressed concerns about the safety of the water, it is also necessary to establish a mechanism to check water quality on a regular basis. While some facilities provide water free of charge, it is vital to collect water user fees to further ensure the sustainability of the facilities.

Meanwhile, it may not be realistic for the sub-county water offices of the county government to look after the daily management and maintenance of all facilities within their responsible areas, and it is necessary to strengthen the capacity of Water Users Associations for management and maintenance. In particular, the capacity for financial management needs to be strengthened, which would enable the communities to take care of daily maintenance and enhance the sustainability of the facilities. Additionally, for the facilities to be fully used by the community, it is critical to raise awareness of the importance of hygiene and safe water among community people. Therefore, it is important to keep providing sanitation education to the community in

partnership with the health and sanitation sectors as envisioned in the technical and institutional component of the project. A few people whose capacities were strengthened through the project were transferred to the sub-county water offices. Moreover, there is the manual for management and maintenance and sanitation education developed in the project. Such human resources and manual may be useful for the purposes mentioned above.

#### 4.2.2 Recommendations to JICA

The technical and institutional component of the project aimed to establish capacities and mechanisms to enhance awareness of hygiene and safe water within the executing agency by formulating District Water and Sanitation Teams that can provide training in management and maintenance to the Water Users Associations. Although the technical assistance was not particularly effective because the institution responsible for maintenance was drastically changed for reform, the approach and content of the technical and institutional component were considered relevant. As the expansion of rural water supply is one of the priorities in both target counties, and the need to strengthen skills and mechanisms for the maintenance of the facilities remains high, it may be important to provide similar technical assistance to the relevant departments of the county governments.

#### 4.3 Lessons Learned

##### 1) Importance of formulating a plan to reflect the needs of beneficiaries

With regard to the hand pump facilities, while being properly selected based on technical requirements such as the pumping amount of water and the water source, it was pointed out that pumping water by a hand pump is burdensome, especially for older women. Additionally, users must wait a half or whole day to fetch water from the facilities, which were used by an unexpectedly large number of community people. By contrast, it was found that one facility stopped functioning because it was not used at all and was not maintained properly because the location of a river-they used as a water source is close and much more convenient. It was also pointed out that it may be necessary to enhance convenience for users by distributing water to water kiosks. Additionally, because many people use the facilities to have their livestock drink water during the dry season, it was suggested that a separate watering place should be installed for the livestock. For effective use, a strong sense of ownership and management and maintenance of the facilities, as well as appropriate consultation processes, are necessary in the selection of locations and types of facilities to address community needs as much as possible.