JICA Project Brief Note: The Project for Capacity Enhancement on Water, Sanitation, and Hygiene Management for a Better Life (the Rural Water Better Life Project)

January 2025



Tackling the issues of water access and burden of water collection

1. Background and Challenges

(1) Two challenges in the rural water sector

An investment of approximately USD 30 billion per year is required in order to achieve the water sanitation target in Africa, in line with SDG Goal 6. However, the actual realization has been only around 10 to 19 billion USD, which is far below the necessary amount.¹⁾ Access to safe water in Kenya, particularly in rural areas, is as low as 52%.²⁾ The annual investment needed to ensure universal water access in rural parts of the country is estimated to be approximately 110 million USD, while the current amount is only approximately 18 million USD,³⁾ highlighting a considerable gap between the required cost and the actual funding.

Construction is essential to enhance access. However, the operation and maintenance (O&M) of existing water supply facilities also poses considerable challenges. For example, nearly half of the motorized schemes in one county in Kenya are nonfunctional.⁴) According to one estimate,⁵) approximately one in four hand pumps in sub-Saharan Africa are not operational. This means that the rural water sector grapples with two major challenges: expanding water access and ensuring the functionality of current services.

(2) Address the challenges by the motorized scheme

As one of measures to address the two above-mentioned challenges, upgrading hand pumps and rehabilitation of motorized schemes can be an option. Recently, the number of constructions of motorized schemes and upgrades from hand pumps to motorized schemes (**Fig. 1**) in rural areas has been increasing.⁶⁾ This is partly due to improved accessibility and technological advancements, such as the availability of affordable solar-powered systems.

However, as this related to the issue of access to water, many people in sub-Saharan Africa still fetch water to water sources far from their homes, and mostly women bear this burden. When it comes to water issues, the distance to a source of water is said to be the most frustrating.⁷⁾ In our activity areas, some women and children walk about 5 km a day to fetch water, but even then fetching water only from seasonal rivers. During the dry season, when surface water is dry, they have to walk as far as 10 km to obtain it. All people collecting water would prefer motorized schemes rather than hand pumps because of the reduction in labor. A report says that the installation of a motorized water supply facility reduced the time spent pumping water by about 80% and increased daily water consumption by about 30%.⁸⁾ So upgrading from hand pumps to motorized schemes and extension through rehabilitation of the existing motorized schemes can contribute to the reduction of associated labor. Additionally, the causes of nonfunctional facilities include the distance from the house to the hand pumps (access) and difficulty securing fuel costs in case the power source is a generator. Identifying the causes and eliminating them (e.g., installing pipes for better access and solar power for generators) would keep the facility in continuous operation.

Against the above-mentioned background, JICA and the Ministry of Water, Sanitation and Irrigation of Kenya have focused on upgrading and rehabilitation as one approach to address the two major challenges, and have launched a three-year technical cooperation project, "The Project for Capacity Enhancement on Water, Sanitation and Hygiene Management for a Better Life" (the Project), which started in April 2024 for a period of three years.



Fig. 1 Hand pump before the upgrade (left) and motorization by the Project.

2. Approach to address the Challenges (1) Implementation flow of the Project

The approach and implementation flow of this Project are shown in Figure 2. First, it will access the current status of existing water supply facilities through the database, and based on this, facilities to be upgraded or rehabilitated will be identified, which will then be done accordingly. The Project will also reconsider the management of the facilities through upgrades and rehabilitation. As per Kenya's Rural Water Supply Guidelines, the priority is to introduce professional management, such as by water utilities, but if a community organization takes the lead in the management, the Project will implement training on O&M of motorized schemes for these organizations. Based on these activities, and in collaboration with other development partners, new guidelines will be developed that provide practical processes of upgrading and rehabilitation, and practical management cases of the facilities by various actors in Kenya. Through these processes, the Project will approach the two challenges facing the rural water sector in Africa expect impacts (see next section). These activities are being implemented primarily in four counties in Kenya (Fig. 3).

(2) Impacts by upgrade and rehabilitation

The upgrading and rehabilitation of water supply facilities are expected to have three major impacts, i) reduction of the burden of water collection ii) improvement of access to water with high cost-effectiveness iii) ensuring sustainability through improving the management system.

i) Reduction of the burden of water collection

Upgrading hand pumps to the motorized schemes can make it possible to reduce the burden of water collection. In rural Kenya, many women, carrying jerrycans on their backs, spend long hours walking over great distances from their homes to water sources (**Fig. 4**), and there is a huge burden of water collection for people in rural areas. The need for motorized schemes is overwhelmingly more significant than that for hand pumps in order to reduce the burden of water collection. In particular, when piped water supply facilities are built, it is possible to reduce the burden substantially by installing pipelines to the center of the community area and to each house.

ii) Improve the access to water along with high cost-effectiveness

Upgrades and rehabilitations are cost-effective in terms of improving water supply access. As a case study for calculating cost-effectiveness, we considered rehabilitating an existing hand pump and drilling a new borehole with a hand pump (Option 1). As an



Fig. 2 Project approach and implementation flow.



Fig. 3 Project target counties.



Fig. 4 Women walk a long distance with heavy jerrycans.

alternative, Option 2 was considered for upgrading the existing hand pump to a motorized scheme, and the construction costs per unit of water supply (costeffectiveness) of these options were compared. **Figure 5** shows an image of these options, and the results of the cost-effectiveness calculation for each option are summarized in **Table 1**.

The maximum daily water supply volume for a hand pump alone was set at 5 m³ a day, constrained by manual pumping irrespective of the borehole yield. With Option 1, the water supply capacity would be 10 m³ a day since there would be two boreholes with hand pumps. The facility considered as Option 2 was an actual case in the Project where a hand pump was upgraded to a motorized scheme. This facility's maximum planned daily water supply volume is 45 m³ a day. The construction costs for these options are based on actual costs involved in the Project. Option 2, which involves upgrading an existing hand pump, yielded a lower cost per unit of water at 56,111 KES/m³, demonstrating higher cost- effectiveness compared to Option 1. In other words, the cost-effectiveness of the upgrade was higher than that of developing a new borehole.

iii) Improving O&M for the sustainability

The Project has three major management options, as shown in **Table 2**. Based on the existing guidelines in Kenya³, the management system of the upgraded or rehabilitated facilities in this Project will be handled with the highest priority given to the introduction of professional management, such as by the existing water utilities and other entities. In reality, however, due to the difficulty of commercial viability in rural areas and the wishes of the community members themselves, community organizations often prefer to continue to be responsible for the O&M. Therefore, for facilities where community organizations continue to perform management after upgrading and rehabilitation, training on O&M will be provided to them to strengthen the sustainability of the facilities.

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	Option 1	Option 2
	Rehabilitation of a HP and	Upgrade from a HP to the
	drilling a new BH	Motorized scheme
Construction cost (KES) A	2,375,750	2,525,000
Supply volume	10	AE
a day (m³/day) B	10	40
Cost per 1m ³	237 575	56 111
(KES/m ³) A/B	201,010	50,111

HP: Hand pump, BH: Borehole

 Table 2 Management options.

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Options	Note
1. Management by a water utility	Professional
2. Management by private opera-	management
tors or related organizations	
through a management contract	
3. Management by community or-	
ganization	



Fig. 5 Hand pump before the upgrade and motorization and solarization by the Project.

3. Results of the implementation of the Project to date

(1) Impacts of upgrading and rehabilitation

An assessment of the current situation in Kitui County was conducted. We confirmed from the database that 828 rural water facilities used boreholes as their sources, and their functionality was 59% (Fig. 6). We also identified facilities qualifying for i) upgrade from hand pumps to motorized schemes, ii) installation of solar-powered systems due to the power source being a generator, iii) rehabilitation due to aging (Table 3). While a large number of hand pumps have been upgraded in this county, there remains a significant demand for rehabilitation. The database can thus be used to understand the current situation quantitatively and make decisions such as identifying and selecting facilities for upgrading and rehabilitation.

(2) Implementation of upgrading and rehabilitation

i) Effect of increased water access by upgrading

In Kenya, many hand pumps have been upgraded to motorized schemes, and effective use of the yield capacity of the boreholes has been implemented. The Project has also upgraded several hand pumps so far. Figure 7 shows the impact of increasing the supply volume of three facilities by upgrading to motorized schemes. The Project has confirmed the high-cost-effectiveness of the upgrading of the hand pumps, with water supply increasing approximately 4 to 11 times depending on the yield of the existing boreholes. This has improved the access to safe water, both in terms of quantity and distance, and has contributed to reducing the burden of water collection by motorizing pump and shortening the walking distance to the area through the extension of pipelines.

ii) Solarization and rehabilitation of aging facilities

The introduction of solar power systems and rehabilitation will provide an opportunity to revive nonfunctional facilities and improve management. Additionally, the increase in water supply volume and continuous operation of facilities as a result of the strengthening of the O&M system have had positive impacts such as extending pipelines to schools and health facilities that previously did not have access to safe water. For example, we installed the solar -powered system and rehabilitated a submersible pump in a facility where the power source had previously been a generator (Fig. 8). Figure 9 shows the monthly income and expenditure before and after the solarization of this facility. Solarization has eliminated the need to spend money on fuel for the generator. The income from selling water exceeded the expenditures needed for O&M since the solarization. The stable operation of the facility also made it possible to supply water through pipe extension to a primary school that previously did not have access to safe water. Subsequently, local residents built hand-washing facilities for their children (Fig. 8).

(3) Strengthening management of facilities

Upgrading or rehabilitation also provides opportunities to improve or strengthen the management of the facilities. In this Project, based on discussions with residents and local governments (Fig. 10), we decided as to which management option would be introduced, and professional management was introduced for some facilities. It has also become clear that in most cases, where community organizations have maintained the water supply facilities prior to upgrade or rehabilitation without any problems, the same organizations wished to continue managing the facilities after the upgrade. In such cases, the Project has conducted training on O&M for motorized schemes to community organizations (Fig. 10) to strengthen their capacity for management.



Fig. 6 Functionality of rural water facilities in Kitui.

Cases	The numbe of facilities	
Upgrade from hand pumps to notorized schemes	24 facilities	
) Solarization (the current power		

 Table 3 Identified potential facilities

 i) Upgrade from hand pumps to motorized schemes 	24 facilities
ii) Solarization (the current power source for the motorized scheme is the generator)	23 facilities
iii) Need rehabilitation due to aging facilities	259 facilities



Fig. 7 Increase water volume through upgrade.



Construct the solar system for the motorized scheme.



Solarization and pump rehabilitation led to the extension of the pipeline to the primary school. Subsequently, the community constructed a hand-washing facility for their children.

Fig. 8. Solarization and extension of the pipeline to the primary school.



Power source of motorized scheme

Fig. 9. Reduction in expenditures owing to the installation of a solar powered system. After solarization (January 2023), expenditures decreased and income tended to exceed expenditures. However, there are some periods during the rainy season such as April and May when expenditures exceed revenues due to a drop in water demand and the fixed costs of O&M.



Explanation of the proposed facility upgrade by the JICA expert to residents and new management system in Kitui county.



Work with local government officials to conduct training on the O&M of a motorized scheme to a community organization in Baringo county.

Fig. 10. Activities related to O&M.

(4) Making new guidelines

Based on these activities, the Project is working with other development partners to develop guidelines that indicate the process of upgrading and rehabilitation and practical cases of management options by various actors in Kenya (**Fig. 11**).



Fig. 11 Meeting for the new guidelines.

4. Measuring impacts and moving forward

To measure the impact of this project, we have set three indicators, as shown in **Table 4**. We will measure these indicators and conduct interviews with communities who will gain benefit from the upgraded or rehabilitated facilities to confirm the validity of the Project's approach. The Project will indicate the result of our impacts by the end of the Project.

With respect to motorization, not all hand pumps are eligible for upgrade due to the limitations of the yield of the borehole itself. However, many hand pumps have been carefully utilized by communities, and they need to be rehabilitated due to the aging of the hand pumps. For this reason, the Project is also rehabilitating the hand pumps rather than motorizing them, because of the limitation of yields. In addition, although a certain amount of water access can be improved by upgrading existing boreholes (see **Fig. 7**), the inherent yield of existing boreholes limits their upgrades. Therefore, it should be noted that improving access to water may require the development of new water sources in some areas.

In the impact study, we interviewed women about the current water collection (**Fig. 12**). From these interviews, we confirmed that some households do not have the means of transport (such as donkeys or three-wheelers) to carry the water from the source to the household, making its collection even more difficult and severe. At present, it is challenging to provide yard taps to all the households which would completely eliminate the labor of water collection, due to the limitations of the amount of yields and the development budget which can be invested. Therefore, we will consider initiatives for the joint purchase and transportation of water, mainly by women, to reduce the burden of fetching it as much as possible and will work to implement projects that will contribute to a better life for the community.

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Table 4 Indicators to evaluate the Project achieve-

	ment.
	Indicators
1	How much total water volume (supply capacity) of upgraded or rehabilitated RWSFs is increased?
2	To what extent has WUA's financial status improved after upgrades and rehabilitations of RWSFs?
3	How did our intervention contribute to reducing the burden of water collection?



Fig. 12 Interviews with women about fetching water.

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