Mozambique

Ex-Post Evaluation of Japanese Grant Aid Project

"The Project for Groundwater Development for Rural Water Supply in Zambezia Province(1)(2)(3)"

1. Project Profile

Project Location

A woman using a deep well

1.1 Background

In the year 2000, when the project was just about to start, the Human Development Index (HDI)[1] of the United Nations Development Program (UNDP) put Mozambique in the 170th place out of 172 countries and indicated that it was one of the least developed of the developing countries in the world. In addition, it is indicated that the Gross Domestic Product (GDP) per capita of Zambezia Province where the project was implemented was the 9th place out of 10 provinces in the country, making Zambezia Province the second poorest province. The water supply ratio in Zambezia Province, which was 14%, was much lower than the national average of 30%, and the number of cases of waterborne diseases in Zambezia Province was significantly high in the country. Thus, the living and hygienic conditions in Zambezia Province were poor indeed.

1.2 Project Outline

The objective of the project is to provide safe water by constructing and rehabilitating deep wells and procuring machineries such as excavators in the northern eight districts of Zambezia Province.

1 HDI is a comprehensive socio-economic index comprising three dimensions (life expectancy, knowledge and education, and standard of living) that measure the level of human development.

Grant Limit/ Actual Grant Amount	(1) 990 million yen, (2) 507 million yen, (3) 428 million yen. Total: 1,925 million yen/(1)986 million yen, (2) 505 million yen, (3) 424 million yen. Total: 1,915 million yen
Exchange of Notes Date	(1) May 2001, (2) June 2001, (3) July 2002
Implementing Agency	Ministry of Public Works and Housing (MOPH)
Project Completion Date	(1) March 2002, (2) March 2003, (3) February 2004
Main Contractors	(1) Mitsubishi Corporation (Japan)/Sankyo Kogyo Co., Ltd. (Japan) (JV), (2) Sankyo Kogyo Co., Ltd. (Japan), (3) Sankyo Kogyo Co., Ltd. (Japan)
Main Consultant	Pacific Consultants International (Japan)
Basic Design	"The Basic Design Study on the Project for Groundwater Development for Rural Water Supply in Zambezia Province in the Republic of Mozambique" Pacific Consultants International (Japan) October 2000 to March 2001
Detailed Design	June 2001 to September 2001
Related Projects (if any)	JICA "Project for Sustainable Water Supply, Sanitation and Hygiene Improvement in Zambezia Province"

2. Outline of the Evaluation Study

2.1 External Evaluator

Mr. Koichiro Ishimori, Value Frontier Co., Ltd

2.2 Duration of the Evaluation Study

Duration of the Study: September, 2009－ July, 2010

Duration of the Field Study: November 28, 2009－December 18, 2009,
January 23, 2010－January 31, 2010

2.3 Constraints During the Evaluation Study

The project constructed and rehabilitated roughly 150 deep wells in the northern eight districts (approx. 54,600 km^2). Due to limitations on the budget available for the study on the part of the Japan International Cooperation Agency (JICA) and the data available for the study on the part of the Ministry of Public Works and Housing (MOPH), the study was unable to examine the operation and maintenance situations of all deep wells.

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

3.1 Relevance (Rating: a)

3.1.1 Relevance with the Development Policies/Plans of Mozambique

The Action Plan for the Reduction of Absolute Poverty (PARPA) I (2001-2005) at the time of the basic design prioritized basic infrastructures and aimed at improving the average water supply ratio up to 50% in urban areas and 40% in rural areas, both by 2005.

The National Water Policy (1995) aimed at improving the average water supply ratio up to 70% in urban areas by 2002 and 40% in rural areas by 2000 and put a high priority on the improvement of water supply in rural areas.

The Action Plan for the Reduction of Absolute Poverty (PARPA) II (2006-2009) at the time of the ex-post evaluation study prioritizes human capital and aims at improving the average water supply ratio up to 60% in urban areas and 55% in rural areas, both by 2009. The National Water Policy (2007) aims at improving the average water supply ratio both in urban and rural areas up to 70% by 2015 and still puts a high priority on the improvement of water supply in rural areas.

3.1.2 Relevance with the Development Needs of Mozambique

The water supply ratio in Zambezia Province at the time of the basic design was 14% (1999) and was much lower than the national average of 30% (1999). The living conditions of inhabitants in the province were thus poor in comparison with the rest of the country. In addition, the number of cases of waterborne diseases was also high due to inaccessibility to safe water. Consequently, the inhabitants' hygienic condition was also poor. Therefore, the project that intended to construct and rehabilitate deep wells and to procure machineries such as excavators for extending water supply did meet the development needs at that time. In light of the above, the needs of the project were judged to be high.

The water supply ratio in the province at the time of the ex-post evaluation study is 35% (2009) and is still lower than the national average of 51% (2009). In addition, the number of cases of waterborne diseases is also still high due to inaccessibility to safe water. Consequently, the living and hygienic conditions of inhabitants of the province are still poor. Therefore, the project is still meeting development needs today. In light of the above, the needs of the project are still judged to be high.

3.1.3 Relevance with Japan's ODA Policies

The previous Charter on Official Development Assistance (1992) at the time of the basic design prioritized "development of infrastructures" as a basis of economic and social development and "basic human needs" of people in difficulties. The previous Mid-term Policy on Official Development Assistance (1999) prioritized "support for the use of water resources" as a means of poverty alleviation and social development and "support for impoverished areas, in particular rural areas" as a means of filling gaps in economic and social development among different regions.

It is also considered appropriate that the project took the form of a grant aid, since the project was intended to meet basic human needs through the provision of safe water for villages in the northern eight districts, which were the least developed districts in Zambezia Province.

In sum, this project has been highly relevant with the country's development plan, development needs, as well as Japan's ODA policy, therefore its relevance is high.

3.2 Efficiency (Rating: b)

3.2.1 Project Outputs

The planned and actual outputs of the project are described in Table 1, including notes and reasons regarding differences between the two.

Table 1: Outputs

Plan (Basic Design)	Actual (Ex-post Evaluation)	Notes
(1) Construction of new deep wells: 148 places	(1) Construction of new deep wells: 145 places	3 places have been cancelled because the construction cost of the 2nd phase of the project was foreseen to exceed its E/N limit.
(2) Rehabilitation of hand pumps of old deep wells: 13 places	(2) Rehabilitation of hand pumps of old deep wells: 7 places	6 places out of 13 had already been rehabilitated by communities before the project.
(3) Procurement of machineries (excavators, trucks, equipment, etc.): One set	(3) Procurement of machineries (excavators, trucks, equipment, etc.): As planned	All machineries except a truck mounted hydro-fracturing unit have been used. The latter has not been used partly because the operator who received training from the supplier has not fully mastered how to use it.
(4) Capacity building towards PEC animators of EPAR (Training on communication with communities, participatory sanitation, and maintenance of wells): 30 days	(4) Capacity building towards PEC animators of EPAR (Training on communication with communities, participatory sanitation, and maintenance of wells): As planned	The implementation of capacity building was an efficient and appropriate choice to improve the sustainability of the project.

Source: Ministry of Public Works and Housing (MOPH)

3.2.2 Project Period

The project period planned for the appraisal was 29 months from May 2001 (sign of E/N) to September 2003. However, the actual project period was 34 months from May 2001 (sign of E/N) to February 2004 and thus slightly longer than planned. The delay is explained by the fact that it has taken five months longer to reach an agreement with communities concerning the conditions of operation and maintenance of deep wells, which were the prerequisites of constructing new deep wells.

3.2.3 Project Cost

The project cost planned for the basic design was 1,925 million yen. However, the actual project cost was 1,915 million yen and thus lower than planned.[2]

In sum, although the project cost was lower than planned, the project period was slightly longer than planned, therefore the efficiency of the project is fair.

3.3 Effectiveness (Rating: a)

3.3.1 Quantitative Effects

3.3.1.1 Results from Operation Indicators

Table 2: Operation Indicators

Indicator (Unit)	1999	2004	2005	2006	2007	2008
Water-supplied population in the 8 districts (people)	345,000	412,300	437,000	-	489,700	647,800
Water supply ratio in the 8 districts (%)[3]	14	23	21	-	25	32
Number of excavated deep wells (place)	0	57	28	33	42	29

Source: Ministry of Public Works and Housing (MOPH) and National Statistical Institute (INE)

The project planned to increase the water-supplied population in the eight districts from 345,000 before the project in 1999 to 419,000 after the project in 2004. The actual water-supplied population in 2004 was 412,300, which was slightly lower than the target,[4] but which achieved 98% of the target. The actual figures after 2004 show a tendency toward steady improvement.

There was no planned target for water supply ratio in the eight districts; thus, it is impossible to make a comparison between planned and actual figures. However, a

[2] The construction cost of a new deep well in this project is slightly high in comparison to the project run by the United Nations Children's Fund (UNICEF), which has excavated new deep wells in 30 places in Milange—one of the northern eight districts. One reason is that while approximately 45 new deep wells in this project have been constructed by Japanese contractors and the rest by local contractors, all new deep wells in the UNICEF project have been constructed by local contractors. There are also other reasons pertinent to the characteristics of the project and the quality of the newly constructed deep wells. First, while the project was implemented in 152 places within the 8 districts (approx. 54,600 km^2), the UNICEF project was performed in only 30 places within one district (approx. 8,860 km^2). Consequently, the transportation cost of construction equipment and materials in this project was higher than that for the UNICEF project. Second, while this project used 12 mm iron bars to reinforce the concrete that forms the foundation of the deep wells to improve their sustainability, the UNICEF project used 6 mm iron bars that were cheaper and less reinforced iron bars. Finally, while this project conducted tests to determine the appropriate volume of pumped water and the potential volume of pumped water in the future at all deep wells to improve their sustainability, the UNICEF project did not. In conclusion, it is not appropriate to argue about cost efficiency with only a simple comparison of the construction costs of a new deep well by this project and those of the UNICEF project.

[3] Water supply ratio in Zambezia Province was set as the indicator at the time of the basic design. However, it is not appropriate to make analyses of effectiveness of the project which was done only in the 8 districts based on water supply ratio in the province consisting of 1 city and 16 districts. Therefore, the ex-post evaluation study has chosen to use water supply ratio in the 8 districts as the indicator.

[4] As mentioned earlier in the section on outputs, the figure is slightly lower due to the cancellation of the construction of three new deep wells and the rehabilitation of six hand pumps.

substantial improvement in the water supply ratio was observed after the project was implemented.[5]

The planned number of deep wells excavated by MOPH using the procured machineries in 2004 was 40 to 50. The actual number in 2004 was 57, achieving 114-143% of the target, and the average from 2004 to 2008 was 38, achieving 76-95% of the target.

3.3.2 Qualitative Effects

According to the beneficiary survey[6] that was conducted during the ex-post evaluation study, it was found that 94 households out of 100 were using deep wells constructed by the project and that six households were not using them because of the long distance from their houses to the deep wells. It was also found that of the 94 households that were using deep wells, 88 (94%) were satisfied with the water volume, in comparison to 74 satisfied households (79%) before the project. 92 households (98%) were satisfied with the water quality, in comparison to 29 households (31%) before the project. These indicate that the project has made some great contributions to the improvement of the water volume and the water quality, respectively.

Beneficiaries using deep wells constructed by the project

In sum, the project has largely achieved its objectives, therefore its effectiveness is high.

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5 According to MOPH, roughly 25% (on average between 2005 and 2008) of all deep wells in the eight districts were temporarily unusable due to abrasions such as gaskets. Therefore, it is assumed that roughly 25% of newly constructed deep wells and rehabilitated old deep wells are in the same condition. Given this assumption, it is rational to believe that the project has not made the fullest contributions that it could have made to the improvement of water supply ratio in the eight districts.

6 The number of beneficiary households in each district was decided so that it would total up to 100 while using the same ratio as the number of deep wells constructed by the project in each district. That is, 10 from Lugela, 14 from Gurue, 17 from Alto Molocue, 10 from Namarroi, 21 from Ile, 12 from Milange, 8 from Mocuba, and 8 from Gile. Then, 100 households in the eight districts were randomly chosen after omitting areas to which access is difficult. There is also a note on the beneficiary survey, which states that one cannot deny the possibility that any of its results may contain some memory bias on the part of respondents.

3.4 Impact

3.4.1 Intended Impacts

Table 3: Hygienic Indicator in the Eight Districts

Indicator (Unit)	2000	2004	2005	2006	2007	2008
Number of diarrhea cases per 1,000 people (cases)	29	19	17	23	24	26

Source: Ministry of Health (MOH) and National Statistical Institute (INE)

There was no planned target for the number of diarrhea cases per 1,000 people in the eight districts, thus, it is impossible to make a comparison between planned and actual figures. As Table 3 indicates, however, the figures in 2004, when the project was completed, and in 2005 dramatically decreased in comparison to the figure in 2000, before the project began. The figures after 2006 show an increasing trend, partly because the number of health centers reporting the number of diarrhea cases has been increasing.[7] Nevertheless, the figure in 2008 was still below the figure in 2000, before the start of the project.

This statistical result coincides with the results from the above-mentioned beneficiary survey. Out of the 94 households that were using deep wells, 69 (73%) answered that none of their family members experienced diarrhea during the year after the project, while 36 households (38%) answered thus before the project. This indicates that the project has made great contributions to the improvement of hygienic conditions.

In sum, both the statistical data from the Ministry of Health (MOH) and the National Statistical Institute, as well as the results from the beneficiary survey, indicate a decrease in diarrhea cases because of the project; therefore, it is thought that the project has contributed to the improvement of hygienic conditions.

3.4.2 Other Impacts

The ex-post evaluation study examined other impacts, such as those on the natural environment, resettlement, and land acquisition, and other unintended impacts through the beneficiary survey and through hearings from MOPH, but there have not been such observations.

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7 According to the Ministry of Health, while the number of health centers in 2000 was 76 and the number in both 2004 and 2005 was 77, the numbers in 2006, 2007, and 2008 increased to 83, 84, and 87, respectively.

In sum, the positive impact on hygienic conditions is only observed.

3.5 Sustainability (Rating: b)

3.5.1 Structural Aspects of Operation and Maintenance

According to the basic design, the Community Education and Participation (PEC) of the Provincial Rural Water Enterprise (EPAR) was going to support water committees in each village that were to be responsible for the operation and maintenance of deep wells. Similarly, the Production Unit of EPAR was going to operate the procured machineries and the Maintenance and Vehicle Unit of EPAR was going to maintain them.

3.5.1.1 PEC of EPAR

EPAR deployed one animator for PEC in each of the northern districts.[8] However, in the case of Ile, which is one of the eight districts, the project alone constructed 36 deep wells that are spread out all over the district. Therefore, the animator cannot make educational visits to all water committees in the district with proper frequency and timing. Since the PEC of EPAR cannot fully support maintenance activities by water committees, the structural aspects of operation and maintenance at the PEC of EPAR are not well observed.

3.5.1.2 Water Committees in Each Village

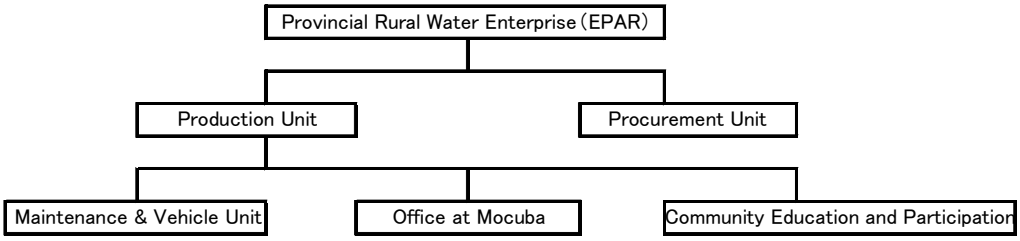
General and administrative matters regarding the operation and maintenance of constructed and rehabilitated deep wells are taken care of by water committees comprising water users, while technical matters are addressed by maintenance groups formed by the water committees. Though these are formed on a voluntary basis, the structural aspects of operation and maintenance at water committees are fine. A water committee normally consists of three men and three women, of whom one person serves as the head, one person as the tariff collector, one person as the accountant, and the remaining three members perform chores. A maintenance group normally consists of two men and two women, of whom one person serves as the head and the other three members perform chores.

3.5.1.3 Production Unit and Maintenance and Vehicle Unit of EPAR

EPAR deploys 11 full-time staff in its Production Unit (PU) for the operation of

[8] The basic design pointed out that it was necessary to deploy at least one animator in each district, but one animator in each district was not enough, as mentioned above. Therefore, it is difficult to acknowledge that the design considered enough aspects to assure the sustainability of the project.

machineries procured by the project and 12 full-time staff in its Maintenance and Vehicle Unit (MVU), which used to be at the same level as PU but is now under PU because of organizational restructuring. Therefore, the structural aspects of operation and maintenance at the PU and MVU of EPAR are fine. While the number of staff at the PU has remained steady since the planning of the project, the number of staff at the MVU has decreased to 12 due to the retirement of two members.



Source: Provincial Rural Water Enterprise (EPAR)

Chart 1: Organizational Diagram of EPAR

3.5.2 Technical Aspects of Operation and Maintenance

3.5.2.1 PEC of EPAR

Animators at the PEC of EPAR were going to provide technical training for maintenance groups formed by the water committees in each village. However, of the 18 animators who have received training on capacity building under the project, seven have left the office for other jobs and two have passed away. Consequently, the number of staff has decreased by half. Due to a lack of finances, EPAR has not been able to increase its staff; thus, the technical aspects of the PEC seem to have deteriorated.

3.5.2.2 Water Committees in Each Village

As mentioned earlier, the structural and technical aspects of the PEC of EPAR are not well observed. Consequently, the technical aspects of the maintenance groups formed by water committees in each village are not well observed either. In fact, as mentioned in footnote 5, roughly 25% of deep wells located in the eight districts are temporarily unusable due to abrasions such as gaskets.

Considering these circumstances, since February 2007 JICA has been implementing a four-year technical cooperation project called Project for Sustainable Water Supply, Sanitation, and Hygiene Improvement in Zambezia Province in 20 villages within four of the eight districts in which the project was implemented (Alto Molocue, Ile, Mocuba, and Gile). This technical cooperation project, with the

involvement of animators of the PEC of EPAR, encourages maintenance groups to strengthen their technical capability in the maintenance of deep wells, including training on repairing hand pumps.

3.5.2.3 The PU and MVH of EPAR

The educational level of the staff at the PU and MVU of EPAR is generally a high school diploma, but they have operated and maintained all procured machineries with no problem except for one truck mounted hydro-fracturing unit. Therefore, there seems to be no technical problem. (The situation of the truck mounted hydro-fracturing unit is explained in Section 3.5.4.)

3.5.3 Financial Aspects of Operation and Maintenance

3.5.3.1 The PEC of EPAR

The PEC is requested to be financially independent even though it is under the direction of EPAR. Since it is difficult to be so by providing education for inhabitants, the PEC is dependent on EPAR. While the financial situation of EPAR is sound, as mentioned later in the report, it cannot afford to progressively promote PEC activities. Therefore, the financial aspects of the PEC are not well observed.

3.5.3.2 Water Committees in Each Village

MOPH recommends that water committees in each village should collect 5 MZN (approx. 15 Yen) per household per month in order to properly maintain deep wells. Water committees in eight villages within the eight districts where the beneficiary survey was performed were largely collecting 5 MZN per household per month. (However, they were also making an exception that allows poor families to pay either 1 MZN (approx. 3 Yen) or 2 MZN (approx. 6 Yen).) In addition, they were collecting additional fees when deep wells had become unusable due to abrasions such as gaskets. Therefore, there seems to be no financial problem with the water committees.

3.5.3.3 The PU and MVH of EPAR

The PU and the MVU are under the direction of EPAR and secure their budgets from EPAR. Regarding the profit and loss sheets during the past three years, EPAR has been maintaining a net profit, so there seems to be no financial problem.

3.5.4 Current Status of Operation and Maintenance

It is assumed that roughly 25% of newly constructed deep wells are temporarily

unusable due to abrasions such as gaskets.

Two deep wells out of seven that have been rehabilitated are not in service due to the robberies of such equipment as hand pumps, pipes, and relevant parts. One deep well out of the two that are not in service is not repairable because it is completely filled with a large amount of sand, but the other one is still repairable.

All procured machineries are operated, with a few exceptions. The supplier of a truck mounted hydro-fracturing unit provided one staff member of EPAR with nine days of training on how to operate it during the project. Yet, since the staff member did not fully understand the usage of the machine and EPAR lost its manual, the unit is not in use. In addition, one excavator out of two is not in use due to a breakdown of its hammer in 2007.

In sum, some problems have been observed in terms of the structural and financial aspects of PEC of EPAR, therefore sustainability of the project is fair.

4. Conclusion, Recommendations, and Lessons Learned

4.1 Conclusion

The relevance, effectiveness, and impact of the project are generally high. Although there is a slight problem with the sustainability (particularly in the organization and the technical and financial capability of the PEC of EPAR), JICA has been trying to improve it by implementing a technical cooperation project that encourages the PEC and maintenance groups to strengthen their technical capability.

In light of the above, the project is evaluated to be satisfactory (B).

4.2 Recommendations

4.2.1 To MOPH

On the one hand, the water supply ratio in the eight districts has been improving; yet, on the other hand, it has not yet reached the target of 55% in rural areas set by PARPA II. In order to achieve this target, it is recommended that MOPH make an effort to intensively replace such consumables as gaskets at newly constructed deep wells and to repair the rehabilitated but now broken deep well that is still repairable. It is also recommended that MOPH should support the daily maintenance performed by water committees in each village by reexamining the organization and financial capability of the PEC of EPAR.

4.2.2 To JICA

Since the technical cooperation project has played a big role in improving the

sustainability of the project, it is recommended that JICA implement another project in the remaining four districts (Lugela, Gurue, Namorroi, and Milange) that are not covered by the current technical cooperation project.

4.3 Lessons Learned

(1) When introducing advanced equipment that does not exist in the recipient country, such as the truck mounted hydro-fracturing unit, it is important to make sure, after training is provided by suppliers, that trainees who have received such training have fully mastered how to operate the machines.

(2) When constructing deep wells with a hand pump, it is important either to secure sufficient gaskets or make them easily accessible in the local environment.