

Country Name	<b>The Provision of Equipment for Rural Water Supply Project In the Central Dry Zone</b>
Republic of the Union of Myanmar	

**I. Project Outline**

Background	In the central dry zone in Myanmar, residents mainly rely on shallow wells or small reservoirs fed from rainwater for their domestic water needs. Despite the efforts of the Department of Development Affairs (DDA), Ministry of Progress of Border Areas and National Races and Development Affairs, to develop groundwater, their drilling equipment that were aged and deteriorated could only drill around 180m deep wells against the evidence that in the central dry zone, many villages would require wells that exceed 181 m in depth. Also, DDA could test only some of the water quality standard parameters, and the accuracy and precision of the results were not high due to insufficient equipment for analysis and poor training.		
Objectives of the Project	To supply water through the entire year in 87 villages in the central dry zone, by procuring equipment and materials for groundwater development and implementation of technical assistance to develop the structure of DDA for water quality analysis, thereby contributing to elevation of the living environment in these villages.		
Contents of the Project	<ol style="list-style-type: none"> <li>1. Project Site: 87 villages in Mandalay Region, Magway Region and Sagaing Region</li> <li>2. Japanese side: <ol style="list-style-type: none"> <li>(1) Provision of grant necessary for procurement of (a) drilling equipment (drilling rigs mounted on trucks for 300m and 400m deep drilling, drilling agents, equipment for air lift pumping and pumping test, air compressor, cargo truck with crane), (b) well construction equipment and materials (casing pipes, screen pipes and bottom plugs, submersible motor pumps and diesel engine generators), and (c) water quality analysis equipment (spectrophotometer, water still)</li> <li>(2) Technical Assistance (soft component of Grant Aid) for strengthening the structure and improving accuracy of water quality analysis</li> </ol> </li> <li>3. Myanmar side: Inland transportation for equipment, etc.</li> </ol>		
Project Period	E/N Date	September 28, 2011	Completion Date January 10, 2014 (Completion of the soft component)
	G/A Date	February 13, 2012	
Project Cost	E/N Grant Limit / G/A Grant Limit: 629 million yen, Actual Grant Amount: 384 million yen		
Executing Agency	Department of Rural Development (DRD), Ministry of Agriculture, Livestock and Irrigation (Department of Development Affairs (DDA), Ministry of Progress of Border Areas and National Races and Development Affairs at the time of ex-ante evaluation)		
Contracted Agencies	Main Contractor(s): Mitsubishi Corporation; Ogawa Seiki Co., Ltd. Main Consultant(s): Kokusai Kogyo Co., Ltd.		

**II. Result of the Evaluation**

## &lt;Constraints on Evaluation&gt;

- Since the targeted villages are widely spread, the evaluator could visit the limited number of villages for detailed data collection and site observation.

## &lt; Special Perspectives Considered in the Ex-Post Evaluation &gt;

- [Construction of deep wells by Myanmar side] Following the ex-ante evaluation, this ex-post evaluation regards the deep well construction by the Myanmar side as “outcome” of this project, not “output”, and thus this was assessed in “effectiveness”.
- [Target Year for Evaluation] In ex-ante evaluation sheet, it is stated that the target year for evaluation is 2015 or three years after project completion. However, considering the planned implementation schedule, i.e., March 2012 to August 2013, the year 2015 should have been “two years after project completion.” Since the project was actually completed in 2014, the target year is adjusted to 2016.
- [Use of Supplementary Information] In addition to the two indicators set at ex-ante evaluation (Indicator 1: Number of newly constructed wells; Indicator 2: Water supply population), this evaluation used the following supplementary information to incorporate effects of the water quality analysis equipment and soft component in evaluation of effectiveness. For evaluation judgment, less weights are given to the supplementary information than the original two indicators. Supplementary Information: The number of water quality parameters analyzed at the DDA laboratory (from 10 parameters with low accuracy before the project to 18 parameters after the project, based on the baseline and planned values mentioned in Preparatory Survey Report).

**I Relevance**

## &lt;Consistency with the Development Policy of Myanmar at the Time of Ex-Ante and Ex-Post Evaluation&gt;

At the time of the ex-ante evaluation, this project was consistent with development plans such as “Ten-year Project for Rural Water Supply” (FY2000-FY2010) that aimed at developing at least one water resource in every village, and “A Five-year Project for Rural Water Supply” (FY2011-FY2016) in which DRD planned construction of 826 deep wells including the ones those planned for this project. At the time of the ex-post evaluation, “Twenty-year Development Plan” (FY2011-FY2031) continuously aims at improving rural water supply, and “Second Five-year Development Plan” (FY2016-FY2021) plans to construct 1,598 deep wells in the three regions targeted under this project. Also, “The Water, Sanitation and Hygiene Strategy (WASH Strategy)” (FY2016-FY2030) testifies Government of Myanmar’s strong commitment for improving water supply, sanitation and hygiene for rural community, school and rural health care center including the central dry zone.

## &lt;Consistency with the Development Needs of Myanmar at the Time of Ex-Ante and Ex-Post Evaluation &gt;

This project has been consistent with Myanmar’s development needs for groundwater development in the central dry zone as described in “Background” above and as planned in the above-mentioned development plans and strategies at the times of both ex-ante and ex-post evaluations.

<Consistency with Japan's ODA Policy at the Time of Ex-Ante Evaluation>

One of the priority areas of Japanese Assistance for Myanmar in 2011 was "emergent and humanitarian assistance"<sup>1</sup>.

<Evaluation Result>

In light of the above, the relevance of the project is high.

2 Effectiveness/Impact

<Effectiveness>

The project objective of supplying water through the entire year in 87 villages in the central dry zone has been mostly achieved. For quantitative effects, deep tube wells were successfully constructed in the targeted 87 villages with use of the procured equipment/materials as scheduled (Indicator 1). Also, the number of beneficiaries is almost equivalent to the target (Indicator 2). While the number of water quality parameters analyzed at the DRD laboratory is below the target figure, DRD follows the domestic guideline which was supported by UNICEF<sup>2</sup> (Supplementary Information) and has a capacity to conduct water quality analysis from the soft component during the project. Additionally, as a result of interviews to people in the target villages, it is confirmed that they are generally satisfied with the quality and taste of the water drawn from the wells constructed. Therefore, although testing results by laboratory on water quality of the constructed wells were not available, it is observed that DRD supplies portable quality of water.

As to qualitative effects, through interviews to DRD and 20 or more residents of the 7 targeted villages, it was confirmed that water is available throughout the year in the target villages after project completion, and the amount of water is sufficient. It was also confirmed that DRD had constructed necessary facilities such as water tanks and pump houses for each well by itself.

<Impact>

As shown by the table below, it is obvious that there was a positive impact for reducing people's workload for fetching water. During the field survey, it was confirmed that the saved time enabled people to devote themselves for social and economic activities. Furthermore, the village people pointed out that before the project, farmland (paddy and vegetable field) were located near natural ponds where people used to fetch water; after the project, village people can have small-scale farmlands near their house since people can supply water for such farmlands from tube wells; consequently, people can now have more time to stay and work with family members. Also, people said that they expanded livestock activities since people can feed water easily from the tube well after the project.

As for impacts on gender, according to interviews to village people, it was mainly the role of women to fetch water. Now that women can fetch water within their village, it is observed that the project contributes to reduction of women's workload. Also, people pointed out that children who have also assisted in water fetching have now more time to study since they do not have to go water fetching site located in long distance.

No negative impacts were found on environment. From interviews with DRD and village people, it was confirmed that DRD followed a proper procedure in digging deep tube well (i.e., testing) and that village people did not give any complaints in this regard. DRD did not make any land acquisition and no resettlement is reported in the project.

<Evaluation Result>

In light of the above, the effect of the project has been observed mostly as planned. Therefore, the effectiveness/impact of the project is high.

Quantitative Effects

Indicators	Baseline 2011 Baseline Year	Target 2016 2 Years after Completion	Actual 2013 1 Year before Completion	Actual 2014 Completion Year	Actual 2015 1 Year after Completion	Actual 2016 2 Years after Completion
Indicator 1: Number of newly constructed wells (using the equipment procured under this project)	0	87 (7 in Year 1 and 20 each in Years 2-5)	40 (40 in FY2013)	60 (20 in FY2014)	80 (20 in FY2015)	87 (7 in FY2016)
Indicator 2: Water supply population (corresponding to Indicator 1)	0	98,000 (cumulative)	46,169	69,414	92,952	97,893
Supplementary Information: Number of water quality parameters analyzed at the DRD laboratory	10 (not high accuracy)	18	15	15	15	15

Source: Preparatory Survey Report, Ex-Ante Evaluation Sheet, Interview to DRD.

Expected Impact

Region	Ratio of water-related household expenditure (%)		Average distance to water (km); Average time (minutes)			
	Before the project	Ex-post evaluation	Before the project		Ex-post evaluation	
			Rainy season	Dry season	Rainy season	Dry season
Mandalay	3.5% - 9.2%	1.7% - 6.6%	0.6km; 40 min	1.1km; 60 min	0.5km; 15 min	0.5km; 15 min
Magway	5.0% - 10.1%	2.0% - 6.0%	1.1km; 60 min	1.6km; 90 min	0.5km; 15 min	0.5km; 15 min
Sagaing	2.5% - 9.0%	3.0% - 6.0%	1.2km; 40 min	1.3km; 50 min	0.4km; 15 min	0.4km; 15 min

<sup>1</sup> Ministry of Foreign Affairs, ODA Country Data Book 2011.

<sup>2</sup> The Government of Myanmar set National Drinking Water Guideline in 2014 with support from UNICEF and the number of water quality parameters is suggested as 15 in the guideline. Positive effects of the soft component were observed for Supplementary Information 1; however, not clearly observed for Supplementary Information 2 since the information on this regard was not available.

3 Efficiency

The outputs of the project were produced as planned. While the project cost was within the plan, the project period exceeded the plan (ratio against plan: 61%, 141%). The increase in the project period is due to longer time taken for mobilization of consultants, preparation of bidding documents, and arrival of equipment/materials at Myanmar.

Therefore, efficiency of the project is fair. Nevertheless, it should be noted that DRD completed the construction of the 87 tube wells in time, and these wells have supplied water to the local people since immediately after the completion as mentioned above.

4 Sustainability

<Institutional Aspect>

[Executing Agency Level] DRD is responsible for operation and maintenance (O&M) of the equipment, including drilling of tube wells, water quality analysis and maintenance of the procured equipment. There are 50 staff members assigned for construction of deep tube wells including drilling teams using the project equipment, 5 staff members assigned for maintenance of the procured equipment, and 5 staff members assigned for water quality analysis of the wells and O&M of laboratory equipment. DRD considers that the assigned number of staff is appropriate to carry out respective activities including O&M related to this project sufficiently. There is no negative impact of the restructuring of DDA to DRD in 2012 (DDA was split into (a) DRD in charge of rural development and (b) Township Development Committees in charge of urban development) on O&M of the procured equipment since responsible staff have been clearly nominated.

[Village Level] After DRD drills wells and the water supply facilities are handed over to the villagers, the villagers operate and maintain them by themselves as planned in the ex-ante evaluation. At the time of the ex-post evaluation, there is a Village Water Committee (VWC) in each village. Although the number of members of the VWC varies depending of the size of villages, normally there are 7-15 members in a VWC including a chairman, a secretary, an accountant, an auditor, 3-5 O&M personnel, and sales personnel. The seven VWCs interviewed for this evaluation and DRD observe that the number of VWC members for O&M is sufficient.

<Technical Aspect>

[Executing Agency Level] It was observed that DRD has sufficient level of technical standards. Based on various experience and achievement including this Grant Aid project and a JICA technical cooperation project, “The Project on Rural Water Supply Technology in the Central Dry Zone” (2006-2009), DDA/DRD has been developing ground water on their own with drilling teams consisting of members with more than 3-year experience of working under the aforementioned technical cooperation project as planned in the ex-ante evaluation of this project. The laboratory staff who received training under this project are still working. From interview to DRD and the visit to one of its maintenance workshop for the procured equipment, it was confirmed that DRD has been updating its technical instruction/manual and regularly providing trainings to O&M staff in drilling and rehabilitation/maintenance workshop as well as VWCs in water quality testing and daily O&M of the water supply facilities, both before and after DDA was restructured to DRD.

[Village Level] From interview to DRD and the site visit, it is generally observed that VWCs are capable of doing daily O&M based on the training from DRD. In case of major problem of tube well which cannot be solved by the VWC itself, DRD staff can provide support for the VWC. Also, under the WASH Strategy, DRD expects other donors would provide technical supports for VWC.

Maintenance budget allocated by DRD to Nyaung U maintenance workshop

Unit: million MMK

	FY2012	FY2013	FY2014	FY2015	FY2016
Provision of spare parts for drilling rigs (bits, etc.)	122.5	126.889	891	572	295
Maintenance of drilling rigs	215	160	80	80	80
The Grant Aid Project drilling rigs repair works	5.12	5.12	5.12	5.12	1.792
The Grant Aid Project bit repair works	5	5	5	5	1.75

Source: Interview to DRD

Note: 1MMK=0.09 yen (2017). Among DRD workshops, Nyaung U workshop is the only one for the equipment provided by this Grant Aid project.

<Financial Aspect>

[Executing Agency Level] While DRD is likely to have some financial resources for doing O&M based on the available information on maintenance of drilling rigs (see the table), we could not judge whether the amount for O&M is enough or not since they could not provide sufficient information on other budget for O&M such as survey, transportation, drilling work, maintenance of equipment other than rigs, etc.

[Village Level] According to DRD and village people, water fees have been collected in most of the targeted 87 villages, although there is a village which did not officially launch water fee collecting system. On average, 500-750 MMK is collected per 1 cubic meter of water. Also, most of VWCs have saving money (approx. in a range of 3–5 million MMK) for renewal of capital, for example, pump. From such information, it is generally observed that VWCs have sufficient water fee. In case of necessary for large expenditure, VWCs can also request support for DRD.

<Current Status of Operation and Maintenance>

[Executing Agency Level] From interview to DRD and site visit, it was confirmed that most of the equipment procured under this project is in good condition and necessary spare parts and consumables are properly managed at the time of the ex-post evaluation. DRD stores drilling bits, rods and pipes and accessories in a warehouse to supply to the detected tube wells in a short time. While there are some minor issues on O&M, e.g., it takes long time to procure some spare parts, DRD has a financial and technical capacity to solve the issues<sup>3</sup>.

[Village Level] It was observed from interview to DRD and the site visit that O&M of the wells/related facilities have been conducted by VWCs, and there is a written record. As mentioned above, this has been made possible by VWCs’ sufficient technical capacity through training etc. from DRD and collection of water fees.

<Evaluation Result>

In light of the above, sufficient information could not be obtained in terms of the financial aspect of the executing agency. Therefore, the

<sup>3</sup> One of the hydro pumps has been non-functional since 2015. Since then, DRD has used its own hydro pump for constructing tube wells under the project. DRD has proposed budget for repairing the hydro pump. In addition, it is observed that DRD does not have timely access to spare parts manufactured in foreign countries. Therefore, in case of problem to machineries and equipment, it sometimes takes time for DRD to procure parts/materials and to resolve the issue.

sustainability of the project effect is fair.

### 5 Summary of the Evaluation

The project mostly achieved its objective of supplying water all year round in 87 villages in the central dry zone with the number of wells constructed as planned and the beneficiary population that almost reached the expected level. Consequently, the expected impact of reducing cost and workload to fetch water and improving their livelihood has been obtained. Regarding the sustainability, with the available information, it is not certain whether the executing agency allocates adequate O&M budget for the equipment procured under this project was not collected. As for the efficiency, the project period exceeded the plan.

Considering all of the above points, this project is evaluated to be satisfactory.

### III. Recommendations & Lessons Learned

#### Recommendations to Executing Agency:

- [Timely availability of spare parts] In order to address the issue of spare parts availability and thus to enhance impact and sustainability, DRD should regularly explore a shop/dealer which can provide spare parts manufactured in both foreign and domestic country in a timely manner and grasp the cost estimate for such spare parts. If DRD observes that such spare parts are not easy to access in time, DRD may need to allocate adequate budget and to procure them in advance and store in their workshop so that DRD can promptly use the spare parts when needed.

#### Lessons Learned for JICA:

- [Good O&M capacity] In a project such as this project that targeted to support 87 deep tube wells in 87 villages, it is quite challenging for JICA to have information on each village after project completion, especially on O&M of tube wells, but it is realistic that executing agency (i.e. DRD) and beneficiaries (i.e. village water committee) owe large parts of responsibility for O&M. In this connection, it was effective that both of DRD and village water committee had a sufficient capacity to fulfill responsibility for O&M from the preceding technical assistance. The significant achievements of the project in this regard have been maintained by the factors that (a) members of village water committee are quite good at doing O&M and (b) DRD is ready to technically and financially support for O&M to be done by village water committees. That was made possible due to the fact that before the implementation of the project, JICA had supported both DRD and some village water committees through a technical cooperation project, "The Project on Rural Water Supply Technology in the Central Dry Zone" (2006-2009) in enhancing capacity for O&M. Therefore, it would be important for a project when procuring equipment for a number of sites scattered in wide areas (1) to identify demarcation of responsibilities for O&M before project implementation, and (2) to provide technical support and other capacity development, if the project does not accompany any, through soft component under grant aid project and/or technical cooperation for not only Executing Agency but also for village/community which will have to fulfill O&M on ground. It should also be noted that soft components (technical assistance) provided by Grant Aid' tends to be focused on technical assistance on equipment/materials (e.g. how to use the equipment, etc.). However, for similar projects like this project, 'soft components (technical assistance) provided by Grant Aid' should also focus on sustainable realization of the benefits (outcome of the project) by utilizing the equipment.



After completion of the project, a VWC by itself installed water distribution pipe from the tube well which was supported by JICA, so that every household in the village can draw water in their house (Magway Region).



It was observed that, in the evening time, many village people come to the tube well to fetch the water. According to the village people, time to fetch the water was reduced from 40-60 minutes to only 15 minutes on average (Mandalay Region).