Morocco

Ex-Post Evaluation of Japanese ODA Loan Project
Rural Water Supply Project (1) (2) (MR-P14/MR-P15)

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0. Summary

These projects ((1) (MR-P14) and (2) (MR-P15)) aimed at providing safe potable water to rural residents through construction of water supply facilities in rural areas in Morocco.

Relevance of these projects (MR-P14 and MR-P15) is high, as these projects are consistent with priority areas of Morocco's development plans and Japan's ODA policy, and moreover development needs for these projects are high. Effectiveness and impact of these projects (MR-P14 and MR-P15) are also high, as the actual numbers of localities (villages) covered by these projects are much more than the planned figures. In the beneficiary survey and interviews with rural residents, many of them expressed positive opinions that water fetching labour was largely reduced after the project, that water quality was improved, that the amount of available water increased, that attendance rates of children at school was improved due to decreased water fetching labour, and that sanitary conditions at home was improved etc. Efficiency of these projects (MR-P14 and MR-P15) is fair, as project period exceeded the plan, while project cost was within the plan. Sustainability of MR-P14 is high, as no major problems have been observed in the operation and maintenance (O&M) in the areas covered by the project, on the other hand, sustainability of MR-P15 is fair, as some problems have been observed in terms of structural and financial aspects of the O&M conducted by water users' associations (AUEPs) in the areas covered by the project.

In light of the above, MR-P14 is evaluated to be highly satisfactory and MR-P15 is evaluated to be satisfactory.

1. Project Description

Public Water Post in Moulay Yacoub (MR-P14)

Borehole in Khouribga (MR-P15)

1.1 Background

In Morocco economic bases were being built to encourage private investments in order to promote export industries in preparation for market integration with EU in 2008 based on the partnership agreement made between Morocco and EU. On the other hand, infrastructure development in rural areas, which was largely lagged behind compared with urban areas, as well as environmental issues were regarded as important issues in order to achieve sustainable development[1]. At the time of project appraisal (1997), the water access rate was 100% in large cities such as Rabat and Casablanca, while the rate was 32% on average in rural areas[2], and to improve the rate in rural areas was the urgent issue. In order to redress the disparity in water access rates between urban and rural areas, the Moroccan government initiated the Program of Potable Water Supply to Rural Population (PAGER) in 1996, which targeted at achieving 80% of the water access rate in rural areas by 2010, through construction and rehabilitation of water supply facilities in 31,000 localities nationwide (benefiting 11 million people)[3]. These projects (MR-P14 and MR-P15) were implemented as part of PAGER.

MR-P14 was to improve the water access rate in rural areas by constructing reservoirs, pumping stations, water distribution lines and public water posts etc. which were extended from existing water supply systems, and the executing agency (National Office for Portable Water: ONEP) requested Japanese ODA loan for subprojects for which budget was not yet secured among those ONEP selected as the prioritized subprojects to be covered in PAGER. Then the areas subject to the project (MR-P14) were selected based on criteria such as whether water resource was confirmed, whether detailed design was well developed and whether budget (cost to be covered by Moroccan side) was secured etc.[4].

MR-P15 was to improve the water access rate in rural areas by constructing an independent water supply facility which takes water from a well or a borehole in each one or plural localities, and the executing agency (the General Directorate of Hydraulic (DGH)) requested Japanese ODA loan for areas selected by DGH. Then the areas subject to the project (MR-P15) were selected according to priorities based on criteria such as whether water resource was confirmed, whether population of localities was relatively large, and whether will of beneficiaries to assume responsibility for project implementation and O&M was high etc.[5].

1.2 Project Outline

The objective of these projects is to provide safe potable water to rural residents through

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1 Source: JICA appraisal documents

2 Source: document provided by the General Directorate of Hydraulic (DGH), the Ministry of Energy, Mines, Water and Environment (MEMEE)

3 Source: JICA appraisal documents

4 Source: Special Assistance for Project Formulation (SAPROF) report

5 Source: same as above

construction of water supply facilities in rural areas in Morocco (Moulay Yacoub[6], Safi, Tiznit, Azilal, Beni Mellal, Khenifra, and Khouribga Provinces (7 provinces in total)), thereby contributing to betterment of people's livelihood.

Loan Approved Amount/ Disbursed Amount	MR-P14: 5,004million yen / 4,513million yen MR-P15: 2,462million yen / 2,236million yen
Exchange of Notes Date/ Loan Agreement Signing Date	MR-P14: October, 1999 / March, 2000 MR-P15: October, 1999 / June, 2000
Terms and Conditions	(for both MR-P14 and MR-P15) Interest Rate: 1.7% Repayment Period: 30years (Grace Period: 10years) Conditions for Procurement: General untied (for consulting service, interest rate: 0.75%, repayment period: 40years (grace period: 10years), conditions for procurement: bilateral tied)
Borrower / Executing Agencies	MR-P14: National Office for Portable Water (ONEP) / ONEP (Guarantor: Government of the Kingdom of Morocco) MR-P15: Government of the Kingdom of Morocco / Ministry of Energy, Mines, Water and Environment (MEMEE)
Final Disbursement Date	MR-P14: December, 2007 MR-P15: September, 2009
Main Contractor (Over 1 billion yen)	-
Main Consultant (Over 100 million yen)	MR-P14: Nippon Koei (Japan) / Dar Al Handasah Maroc (Morocco) (JV) MR-P15: Nippon Koei (Japan) / SCET-MAROC (Morocco) / CID(Conseil,Ingenierie et Developpement)(Morocco) (JV)
Feasibility Studies, etc.	Special Assistance for Project Formulation (SAPROF) March, 1997
Related Projects	(Technical Cooperation) April to September 1999: dispatch of a JICA expert to Oum Er-Rbia Office of the Ministry of Equipment, November 1999 to October 2001: dispatch of a JICA expert to the General Directorate of Hydraulic (DGH) of the Ministry of Equipment, October 2001 to October 2004 and October 2004 to October 2006: dispatch of a JICA expert to State Secretariat of Water and Environment (SEEE), October 2004 to October 2007: Support for the Rural Drinking Water Supply Plans (Grant Aid) 1994: Rural Drinking Water Supply Project, 1996:Rural Water Supply Project, 1998 to 1999: Pre-Rif Region Drinking Water Supply Project, 2000: Southern Provinces Drinking Water Supply Project, 2003: Benslimane Province Drinking Water Supply Project (International Organizations) World Bank, KfW, ABD, EU etc provide financial assistance for the implementation of PAGER

[6] At the time of project appraisal it was "Zouagha Moulay Yacoub of Fes Province", but the area currently belongs to Moulay Yacoub Province.

2. Outline of the Evaluation Study

2.1 External Evaluator

Masami Tomita, Sanshu Engineering Consultant

2.2 Duration of Evaluation Study

Duration of the Study: October, 2011 – September, 2012

Duration of the Field Study: January 15 – January 31, 2012 and May 7 – May 17, 2012

2.3 Constraints during the Evaluation Study

The numbers of localities (villages) covered by MR-P14 and MR-P15 are over 1,000 and to assess the overall situation of these projects would require visiting at least 10% of the whole localities through the beneficiary survey and site visits by the evaluator. However, this was not possible due to the limited amount of resources allocated for the ex-post evaluation, and thus overall operational status of the facilities provided by these projects were checked through questionnaires sent to executing agencies, and then 30 localities in total (6 localities each from Moulay Yacoub, Safi, Azilal, Khenifra, and Khouribga Provinces) were visited by the evaluator, and 6 localities in total (2 localities from Moulay Yacoub, 2 localities from Tiznit, one locality from Azilal and one locality from Beni Mellal) were covered by the beneficiary survey, to assess qualitatively effects realized by these projects and operational status of the facilities in detail. Localities to be visited were selected based on principles as follows; 1) all provinces where these projects were implemented need to be covered by the actual site visits by the evaluator and/or the beneficiary survey, 2) the site visits by the evaluator should cover both localities where the facilities provided by these projects are still operational and not operational, taking into account the accessibility from Rabat to such localities (including the accessibility from regional offices of executing agencies to such localities), 3) the beneficiary survey should cover provinces that cannot be visited by the evaluator due to accessibility, 4) provinces and localities subject to the beneficiary survey should be selected taking into account the actual number of localities benefited by these projects in each province (localities where the facilities provided by these projects are still operational[7]) and 5) the number of samples taken in the beneficiary survey should be 50 (25 from men and 25 from women) from each locality (300 in total).

[7] The objective of the beneficiary survey was to qualitatively assess the effects realized by these projects through questions to equal number of beneficiaries (25 each for men and women) regarding changes made after the implementation of these projects in detail, and thus only localities where project facilities are still operational became subject to the beneficiary survey.

3. Results of the Evaluation (Overall Rating: MR-P14: A, MR-P15:B[8])

3.1 Relevance (Rating: ③[9] for both MR-P14 and MR-P15)

3.1.1 Relevance with the Development Plan of Morocco

At the time of project appraisal, the Five-Year National Development Plan (2000-2004) prioritized the water sector development as one of the major policies in order to meet increasing demand for water, and the plan targeted at improving the water access rates in urban and rural areas[10]. Moreover, as explained above, PAGER, which has been implemented since 1996, targeted at achieving 80% of the water access rate in rural areas (individual connection 10%, public water post 40%, public well 30%) by 2010 through construction and rehabilitation of water supply facilities in 31,000 localities (benefiting 11 million people), in order to redress the disparity in water access rates between urban and rural areas[11]. Then the target of PAGER was revised in 2001 in order to accelerate improvement of the rural water access rate, and the new target was set to achieve over 90% of the water access rate in rural areas by 2007[12].

At the time of ex-post evaluation, improvement of people's access to basic services and correction of imbalance between urban and rural areas through regional development etc. are targeted in the Moroccan Financial Act 2010, and the water supply and sewerage sector is one of the prioritized areas for investments, together with energy, agriculture, fishery, mining and tourism sectors[13]. Moreover, the draft version of ONEP Investment Program (2011-2015) states that 22% of the planned investment amounts of 25.4 billion dirhams is going to be invested in rural drinking water supply, and the program aims at improving the water access rate in rural areas to nearly 95% during the program period[14]. The water access rate in rural areas in Morocco is 92% as of 2011[15]. However, there are still some localities without sufficient water access in isolated and dispersed rural areas, and thus to improve the water access rate further is ONEP's prime importance (PAGER was implemented by DGH and ONEP, but it was substituted by the Universal Water Access Program (GEP) and the responsibility to implement the program was entrusted to ONEP only since 2004)[16].

Therefore, water supply projects in rural areas were/are prioritized in Morocco's national development plans and sector plans both at the time of project appraisal and ex-post

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8 A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

9 ③: High, ② Fair, ① Low

10 Source: "Rural Water Supply Project" Mid-Term Review Report (2005)

11 Source: JICA appraisal documents

12 Source: document provided by ONEP

13 Source: "Agadir Water Supply Project" Evaluation Report (2010)

14 Source: document provided by ONEP

15 Source: document provided by DGH

16 Source: document provided by ONEP

evaluation, and thus relevance of these projects (MR-P14 and MR-P15) remains high.

3.1.2 Relevance with the Development Needs of Morocco

Rural population in Morocco was approximately 46% of the total population in 1996, however the rural water access rate was approximately 30% on average, and the country was often affected by severe droughts, and thus improving the rural water access rate was an important issue for the country's sustainable development[17].

On the other hand, as explained above, the rural water access rate reached 92% as of 2011, however, a rural water supply program is still being implemented in order to improve further the water access rate, and construction and rehabilitation of water supply facilities in rural areas are still important in Morocco which is often affected by severe droughts. In the interviews with beneficiaries in localities visited by the evaluator during the field studies, many of them replied that hours and distances for water fetching were largely reduced after the implementation of these projects, which improved attendance rates of children at school and increased hours spent by children for study at home etc. These projects are important from the perspective of improvement of people's living conditions and children's school attendance rates as well as provision of stable water supply to rural residents.

Therefore, these projects are important, which contributed to stable water supply in rural areas and improvement of people's livelihoods, and thus relevance of these projects (MR-P14 and MR-P15) remains high.

3.1.3 Relevance with Japan's ODA Policy

"The Official Development Assistance (ODA) Country Data Book" (2002) states that Japan's prioritized assistance areas for Morocco were water resource development for securing agricultural and drinking water aiming at efficient utilization of limited amount of water resources, and rural development for correction of disparities between urban and rural areas etc. Thus, these projects (MR-P14 and MR-P15) were consistent with Japan's assistance policy at the time of project appraisal.

These projects (MR-P14 and MR-P15) have been highly relevant with Morocco's development plan, development needs, as well as Japan's ODA policy, therefore their relevance is high.

[17] Source: JICA appraisal documents

3.2 Effectiveness[18] (Rating: ③ for both MR-P14 and MR-P15)

3.2.1 Quantitative Effects (Operation and Effect Indicators)[19]

3.2.1.1 The Numbers of Benefited Localities (Villages)

The numbers of localities benefited by these projects (MR-P14 and MR-P15) are shown below. The actual numbers largely exceed the planned numbers in both MR-P14 and MR-P15, following the increase of project outputs (as shown in "3.4 Efficiency").

Table 1 The Numbers of Benefited Localities (Villages)

(Unit: localities (villages))

L/A No.	Province (subject to JICA project)	Planned	Actual
MR-P14	Moulay Yacoub	290	275
	Safi	40	59
	Tiznit	67	292
	Total	397	626 (158% against the plan)
MR-P15	Azilal	-	115
	Beni Mellal	-	58
	Khenifra	-	44
	Khouribga	-	40
	Total	Approximately 200	257 (129% against the plan)

Source: planned: JICA appraisal document, actual: interviews with a technical assistance consultant and documents provided by executing agencies

Note: MR-P14: The actual numbers of localities covered by the project in Moulay Yacoub are 280 in total, however, public water posts provided by the project have not started operation yet in 5 localities as beneficiaries have not paid the participation fee (5% of the project cost), and thus the actual numbers of benefited localities are 275. The actual numbers of localities covered by the project in Safi are 63 in total, however, public water posts provided by the project have not started operation yet in 4 localities as watchman managers of public water posts have not been appointed by local authorities, and thus the actual numbers of benefited localities are 59. The actual numbers of localities covered by the project in Tiznit are 294 in total, however, public water posts provided by the project have not started operation yet in 2 localities for the same reason, and thus the actual numbers of benefited localities are 292.

MR-P15: The actual numbers show the numbers of localities where facilities provided by the project are still operational and functional among the total numbers of localities covered by the project, which were calculated based on documents provided by the executing agency.

3.2.1.2 The Numbers of Beneficiaries (approximate figures)

The numbers of population benefited by these projects (MR-P14 and MR-P15) are shown below. The actual numbers of beneficiaries are a little less than the planned numbers in both MR-P14 and MR-P15, despite that the actual numbers of localities largely exceed the planned numbers. One of the reasons for this would be that the numbers of localities

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

[19] At the time of project appraisal, indicators were set only for the numbers of benefited localities and the numbers of beneficiaries. While JICA appraisal documents indicate expected numbers of beneficiaries in each area and expected amount of water demand in 2010 for MR-P14, the project scope including the localities subject to the project was largely changed, and thus a comparison of the actual numbers of beneficiaries in each area and water demand at the time of post evaluation with these expected figures is not appropriate.

provided by ONEP which the numbers of beneficiaries shown below belong to in MR-P14 are less than the actual numbers of localities covered by the project etc.. However, the basis for the calculation of the planned numbers of beneficiaries at the time of project appraisal is unknown and thus an exact comparison of planned and actual numbers of beneficiaries is not possible. While attempts were made to calculate the numbers of beneficiaries in each locality based on the national population census of Morocco (2004), it is not possible to obtain perfect numbers, as the numbers of population in many localities are not shown in the national census, as names of these localities were changed due to integration and segmentation of localities etc., and thus the numbers of beneficiaries shown below are approximate numbers.

Table 2 The Numbers of Beneficiaries

(Unit: persons)

L/A No.	Province (subject to JICA project)	Planned	Actual
MR-P14	Moulay Yacoub	-	56,643
	Safi	-	25,585
	Tiznit	-	33,643
	Total	Approximately 140,000	115,871 (83% against the plan)
MR-P15	Azilal	-	72,596
	Beni Mellal	-	44,797
	Khenifra	-	19,898
	Khouribga	-	11,367
	Total	Approximately 150,000	148,658 (99% against the plan)

Source: planned: JICA appraisal document, actual: documents provided by executing agencies

Note: MR-P14: JICA appraisal document states that the project was expected to benefit approximately 140,000 people in 2010. On the other hand, according to ONEP the total numbers of population in the areas covered by the project in Moulay Yacoub were 58,535 in 2011, however, public water posts have not started operation yet in 5 localities as explained above, and thus the actual numbers of beneficiaries shown above were calculated by deducting the numbers of population in these 5 localities from 58,535. The actual numbers of beneficiaries in Safi and Tiznit shown above were the total numbers of population in the areas covered by the project in 2011 (provided by ONEP), and while public water posts have not started operation yet in 4 localities in Safi and 2 localities in Tiznit, the numbers of population in these localities are unknown. Moreover, while the actual numbers of localities covered by the project are 280 in Moulay Yacoub, 63 in Safi and 294 in Tiznit, documents provided by ONEP contains 265 localities only in Moulay Yacoub, 57 localities only in Safi and 275 localities only in Tiznit, and thus the actual numbers of beneficiaries shown above are approximate figures.

MR-P15: JICA appraisal documents states that the project was expected to benefit approximately 150,000 at the time of project implementation. On the other hand, the actual numbers of beneficiaries shown above indicate the numbers of population in localities where the facilities provided by the project are still operational and functional (in other words “benefited” by the project) among the total numbers of localities covered by the project. Also, the actual numbers of beneficiaries shown above are the numbers of population in subject localities at the time of implementation of the project’s each annual program from 2003 to 2007, however, the numbers are approximate due to reasons that the project was implemented over several years in the same locality in some cases and the numbers of population of such locality provided by DGH are sometimes different in each year. Moreover, for some localities in which the numbers of population in 2011 only were available, the numbers of population at the time of project implementation were calculated by using the rates of population growth in each province stated in the statistical data provided by the National Statistical Agency of Morocco.

3.2.1.3 Water Supply and Demand

As the areas covered by these projects (MR-P14 and MR-P15) are widely dispersed in the country and the volumes of water demand largely vary in different localities (the volumes of water demand vary according to poverty levels of localities, with or without domestic animals, public water posts or individual house connections etc., and people tend to take water free from natural resources and existing local wells particularly in poor localities), and thus it is very difficult to quantitatively evaluate the situation of water supply and demand in the whole areas covered by these projects. Thus, water supply and demand in project areas are evaluated qualitatively based on information provided by executing agencies and interviews with residents in 30 localities visited by the evaluator etc.

For MR-P14, the amount of water supply (consumption) in the areas covered by the project in Moulay Yacoub was 294,920m^3 in 2011[20], which means water consumption per capita per day is approximately 14L, calculated by using the numbers of beneficiaries presented in the Table 2. The amount of water supply (consumption) in the areas covered by the project in Safi was 35,901m^3 in 2011[21], and water consumption per capita per day is approximately 12L. The amount of water supply (consumption) in the areas covered by the project in Tiznit was 170,924 m^3 in 2011[22], and water consumption per capita per day is approximately 14L. According to ONEP, the national average of water consumption per capita per day in rural areas in Morocco is approximately 10L, and water consumption per capita per day in all provinces presented above are above the national average. In 6 localities in Moulay Yacoub and 6 localities in Safi (12 localities in total) visited by the evaluator, the least volume of water consumption per capita per day was approximately 2 to 6L (the amount varies in different seasons) in localities where many residents are very poor, they take water from public water posts and they use the facilities provided by the project for taking water only for drinking and cooking, and the largest volume of water consumption per capita per day was approximately 40 to 60L in localities where residents have individual connections and they have domestic animals etc. Water supply capacity of the facilities provided by the project was approximately 5 to 15m^3/hour and no case was observed in which water demand exceeds water supply capacity. Water deficit was not reported in the beneficiary survey (2 localities in Moulay Yacoub and 2 localities in Tiznit, 4 localities in total), either.

[20] Source: document provided by ONEP

[21] Source: same as above. According to ONEP, facilities provided by the project started operation in September 2011 in Safi, as the payment of the participation fee (5% of the project cost) by beneficiaries was delayed, and the amount of water consumption presented above is the amount consumed during 4 months from September to December 2011.

[22] Source: same as above

For MR-P15, in 6 localities in Azilal, 6 localities in Khenifra and 6 localities in Khouribga (18 localities in total) visited by the evaluator, the least volume of water consumption per capita per day was approximately 6L in localities with public water posts only and the largest volume of water consumption per capita per day was approximately 60 to 80L in localities with individual connections. In 3 localities out of 18 localities in total (including localities where the facilities provided by the project are no longer used) beneficiaries claimed that there is no enough water particularly in summer. This tendency seems to be seen particularly in case of wells. According to DGH and the Water Services (under DGH), boreholes are less affected by climatic changes as the source of water of boreholes is a deep pocket of underground water which exists under an impermeable layer. However, wells are more likely to be affected by climatic changes and thus water deficit is seen particularly in summer in case of wells[23]. According to some beneficiaries in localities facing water deficit, there was not much rainfall in winter from 2011 to 2012, and thus the water deficit might be due to the climate. On the other hand, there was a locality among those visited by the evaluator, where the facilities provided by the project were not used, as the project deepened the existing well but a sufficient amount of water was not obtained. As explained in "3.4 Efficiency", in the areas covered by MR-P15, the scope of the project was changed in 2002 so that localities where a sufficient amount of water resources was secured through elaborated surveys in advance would be selected as targets for the project, and 4 annual programs would be implemented for such localities from 2003 to 2006. However, the surveys for the water resources might not have been sufficiently conducted. As only 18 localities were visited by the evaluator and thus the situation of water demand and supply in the whole areas covered by MR-P15 cannot be confirmed. In part of localities among those visited by the evaluator, however, beneficiaries claimed that they face water shortage particularly in summer.

3.2.1.4 Water Quality

According to the beneficiary survey and interviews with residents in site visits by the evaluator, beneficiaries of MR-P14 and MR-P15 used to obtain water from local wells, individual wells, natural resources such as rivers and lakes, rain storage tanks, and buying from water vendors etc. before implementation of these projects. On the other hand, after the project implementation, in the areas covered by MR-P14 water is supplied from the facilities owned and managed by ONEP and many beneficiaries replied that the water quality was largely improved. Regional laboratories of ONEP regularly conduct quality checks of portable water, and no problem was reported regarding water quality in interviews with residents in localities visited by the evaluator. In the areas covered by

[23] Source: interviews with DGH and the Water Services

MR-15 water is supplied mainly from wells and boreholes after the project, and these wells and boreholes are different from traditional local wells and individual wells which are not equipped, as wells and boreholes provided by the project are equipped with pumps and the top is sealed by a cover, and thus contaminating materials are less likely to be put into these wells and boreholes, and moreover water supplied from these facilities are chlorinated, and thus, many beneficiaries replied that the water quality was improved after the project. As shown in "3.2.2 Qualitative Effects" below, in the beneficiary survey more than 90% of respondents in all 6 localities subject to the survey replied that the currently supplied water has no colour, no taste and no odour.

3.2.2 Qualitative Effects

A beneficiary survey was conducted in the ex-post evaluation[24]. The overview of the survey results is presented below.

Table 3 Whether the length of hours to fetch water has changed after the projects (%)

Province/Locality	Became longer	Became shorter	Unchanged	Unanswered
Moulay Yacoub/ Znata (MR-P14)	0	100	0	0
Tiznit/ Laäouina (MR-P14)	2	90	6	2
Tiznit/ Ighlen Ait Taleb Brahim (MR-P14)	0	96	4	0

Number of samples:
50 in Znata in Moulay Yacoub, 50 in Laäouina in Tiznit, and 50 in Ighlen Ait Taleb Brahim in Tiznit total: 150
In Coopérative Ghania in Moulay Yacoub (MR-P14) and Aït Ammou Lablan in Azilal (MR-P15) beneficiaries had individual wells etc. at home before the projects, and thus these localities are not subject to this question. On the other hand, beneficiaries in Tihouna N'Aït Amer in Beni Mellal (MR-P15) used to take water mainly from a river before the project, and they are supplied water by individual connections after the project, and hours to fetch water previously required (0.5-3.0 hours) are no longer needed.

Table 4 Whether the distance to fetch water has changed after the projects (%)

Province/Locality	Became longer	Became shorter	Unchanged	Unanswered
Moulay Yacoub/ Znata (MR-P14)	0	100	0	0
Tiznit/ Laäouina (MR-P14)	2	92	4	2
Tiznit/ Ighlen Ait Taleb Brahim (MR-P14)	0	96	4	0

Number of samples:
50 in Znata in Moulay Yacoub, 50 in Laäouina in Tiznit, and 50 in Ighlen Ait Taleb Brahim in Tiznit total: 150
In Coopérative Ghania in Moulay Yacoub (MR-P14) and Aït Ammou Lablan in Azilal (MR-P15) beneficiaries had individual wells etc. at home before the projects, and thus these localities are not subject to this question. On the other hand, beneficiaries in Tihouna N'Aït Amer in Beni Mellal (MR-P15) used to take water mainly from a river before the project, and they are supplied water by individual connections after the project, and distances to fetch water previously required (0.5-5.0km) are no longer needed.

[24] The beneficiary survey was conducted in the following manner. Time: February to March 2012, the number of samples: 300 in total (100 samples from 2 localities in Moulay Yacoub, 100 samples from 2 localities in Tiznit, 50 samples from one locality in Azilal and 50 samples from one locality in Beni Mellal) (the equal numbers of samples taken from men and women), method: questionnaire survey

Table 5 Whether the quality of water has changed after the projects (%)

Province/Locality	Improved	Worsened	Unchanged
Moulay Yacoub/ Znata (MR-P14)	100	0	0
Moulay Yacoub/ Coopérative Ghania (MR-P14)	96	0	4
Tiznit/ Laäouina (MR-P14)	94	0	6
Tiznit/ Ighlen Ait Taleb Brahim (MR-P14)	100	0	0
Azilal/ Aït Ammou Lablan (MR-P15)	100	0	0
Beni Mellal/ Tihouna N'Aït Amer (MR-P15)	100	0	0

Number of samples:

50 in Znata in Moulay Yacoub, 50 in Coopérative Ghania in Moulay Yacoub, 50 in Laäouina in Tiznit, 50 in Ighlen Ait Taleb Brahim in Tiznit, 50 in Aït Ammou Lablan in Azilal and 50 in Tihouna N'Aït Amer in Beni Mellal total: 300

Regarding the current water quality, 98% in Znata in Moulay Yacoub, 96% in Coopérative Ghania in Moulay Yacoub, 96% in Laäouina in Tiznit, 100% in Ighlen Ait Taleb Brahim in Tiznit, 98% in Aït Ammou Lablan in Azilal and 96% in Tihouna N'Aït Amer in Beni Mellal replied that the currently supplied water has no colour, no taste and no odour.

Table 6 Whether the quantity of water used in beneficiaries' families has changed after the projects (%)

Province/Locality	Increased	Decreased	Unchanged	Unanswered
Moulay Yacoub/ Znata (MR-P14)	80	2	16	2
Moulay Yacoub/ Coopérative Ghania (MR-P14)	90	2	6	2
Tiznit/ Laäouina (MR-P14)	86	6	8	0
Tiznit/ Ighlen Ait Taleb Brahim (MR-P14)	92	4	4	0
Azilal/ Aït Ammou Lablan (MR-P15)	68	16	16	0
Beni Mellal/ Tihouna N'Aït Amer (MR-P15)	82	0	18	0

Number of samples:

50 in Znata in Moulay Yacoub, 50 in Coopérative Ghania in Moulay Yacoub, 50 in Laäouina in Tiznit, 50 in Ighlen Ait Taleb Brahim in Tiznit, 50 in Aït Ammou Lablan in Azilal and 50 in Tihouna N'Aït Amer in Beni Mellal total: 300

Table 7 Whether beneficiaries are satisfied with the facilities provided by the projects (%)

Province/Locality	Yes	No	Unanswered
Moulay Yacoub/ Znata (MR-P14)	100	0	0
Moulay Yacoub/ Coopérative Ghania (MR-P14)	86	2	12
Tiznit/ Laäouina(MR-P14)	96	2	2
Tiznit/ Ighlen Ait Taleb Brahim (MR-P14)	98	0	2
Azilal/ Aït Ammou Lablan (MR-P15)	92	8	0
Beni Mellal/ Tihouna N'Aït Amer (MR-P15)	98	2	0

Number of samples:

50 in Znata in Moulay Yacoub, 50 in Coopérative Ghania in Moulay Yacoub, 50 in Laäouina in Tiznit, 50 in Ighlen Ait Taleb Brahim in Tiznit, 50 in Aït Ammou Lablan in Azilal and 50 in Tihouna N'Aït Amer in Beni Mellal total: 300

Reasons for satisfactory of beneficiaries with the facilities provided by the projects are that water fetching labour was reduced, that water quality was improved, that water is stably supplied and that sanitary conditions at home were improved etc. One of the reasons for beneficiaries are unsatisfied with the facilities provided by the project is that operating hours of public water posts need to be changed (extended) etc.

As mentioned above, while the numbers of localities covered by the beneficiary survey are limited due to the limited amount of resources allocated for the ex-post evaluation, more than 90% of respondents replied that the length of hours and distances to fetch water were reduced and water quality was improved after the project implementation, and more

than 80% replied that they are satisfied with the facilities provided by these projects. Moreover, more than approximately 70% replied that the amount of water consumed increased after the project implementation and one of the reasons why they are satisfied with the facilities provided by these projects is the stable supply of water, which suggest that the situation of water supply was improved by these projects. Furthermore, in the interviews with residents in localities visited by the evaluator, many of them replied that the length of hours, distances and cost of fetching water were largely reduced and water quality was improved after the project implementation, and that local wells and natural resources in their neighbourhood went dried up and contained no water often in summer before these projects, however, water is currently supplied stably.

3.3 Impact

3.3.1 Intended Impacts

3.3.1.1 Changes in Children's School Attendance Rates by Reduction of Water Fetching Labour

In 6 localities subject to the beneficiary survey, only in the locality Znata in Moulay Yacoub 36% of respondents replied that it was usually children who used to fetch water before the project, and in other localities usually men and/or women (adults) used to fetch water before the project implementation. In the locality Znata in Moulay Yacoub 12% replied that children's school attendance rates have been improved significantly after the project, 34% replied that the rates have been improved a little (52% replied that the rates have been unchanged and 2% did not answer). Moreover, in 8 localities out of 30 localities visited by the evaluator beneficiaries replied that children have more time to study at home and their attendance rates at school have been improved due to the reduction of water fetching labour after these projects.

3.3.1.2 Improvement of Sanitary Conditions at Home

In 6 localities subject to the beneficiary survey, 32% of respondents in the locality Laäouina in Tiznit, 38% in the locality Ighlen Ait Taleb Brahim in Tiznit, 40% in the locality Aït Ammou Lablan in Azilal and 42% in the locality Tihouna N'Aït Amer in Beni Mellal replied that sanitary conditions at home have been improved after the project implementation, and their major reason was that they can now use toilet and shower at home etc. Moreover, in 5 localities out of 30 localities visited by the evaluator, beneficiaries replied that sanitary conditions at home have been improved after these projects as they became able to use toilet and shower at home and the frequencies to take bath and to do laundry have increased etc.

3.3.1.3 Changes in Incidence Rates of Water-Related Diseases

In 6 localities subject to the beneficiary survey, in the locality Tihouna N'Aït Amer in Beni Mellal beneficiaries used to take water mainly from a river before the project implementation (in other localities beneficiaries used to take water mainly from local wells and individual wells etc.), and 96% of respondents replied that incidence rates of water-related diseases such as fever and typhoid have been decreased after the project.

3.3.1.4 Evolving Activities through Water Users' Associations (AUEPs)

In one of the localities visited by the evaluator, domestic animals and beehives were provided to beneficiaries through a water users' association as part of the National Initiative for Human Development (INDH) Five-Year Plan (2006-2010) so that beneficiaries would become able to pay water tariffs after the project implementation. As a result, a cooperative association is nearly established among beekeepers. Moreover, as literacy rates are usually very low in many localities covered by these projects, a water users' association provided a literacy training to beneficiaries so that they would become able to read invoices for water tariffs after the project implementation.

3.3.2 Other Impacts

3.3.2.1 Impacts on the Natural Environment

In MR-P14 environmental monitoring was conducted by ONEP during the project implementation and its results were regularly reported to JICA through progress reports[25]. On the other hand, in the beneficiary survey approximately 30% of respondents in the locality Znata in Moulay Yacoub replied that there were negative impacts on the natural environment during project implementation and they raised the noise problem for the major reason (in other localities the numbers of respondents who pointed out negative impacts on environment were around or less than 10%). According to ONEP, most works were carried out in places far from localities except for public water posts. Moreover, when laying water pipes some measures were taken to mitigate negative impacts on nearby residents such as watering the soil to minimize dust caused by earthworks and providing emergency access roads etc., however, causing some noises during construction of water pipes was inevitable.

In MR-P15 reporting of results of environmental monitoring was not required as the scale of each component of the project was small. However, according to DGH, necessity for environmental protection during the construction was stipulated in contract documents with contractors, and the contractors complied with the condition[26].

[25] Source: interviews with ONEP and a technical assistance consultant

[26] Source: interviews with DGH

3.3.2.2 Land Acquisition and Resettlement

In the areas covered by MR-P14 the compensation for land acquisition has not been completed and is currently conducted. This is because the compensation requires a submission of land ownership certificate, however, sometimes several people claim a land ownership on the certain areas of land particularly in rural areas, which takes time to clarify land ownership[27]. The total areas of land for which the acquisition process has been completed in Moulay Yacoub are approximately 77ha, and approximately 1.3 million dirhams (approximately 16 million yen) was paid as a compensation fee, and the total areas of land for which the acquisition process has been completed in Safi are approximately 3ha[28], and approximately 0.5 million dirhams (approximately 6 million yen) was paid as a compensation fee[29]. The total areas of land acquired for the project in Tiznit is approximately 0.5ha, however, the compensation is still under the process and compensation fee is not known, as concrete information is not available[30]. In some localities visited by the evaluator, there were several beneficiaries whose land was acquired for the project and who are still waiting for the compensation, however, many of them replied that the delay of compensation is not a serious problem as they are satisfied with the project. Regarding resettlement, there seems to have been only one case for the construction of a pumping station in Moulay Yacoub, and according to ONEP the compensation has been completed, while the amount paid is unknown.

In the areas covered by MR-P15 all lands acquired for the project were donated from land owners and compensation has not been required, according to the Water Services[31]. However, according to the interviews with beneficiaries in localities visited by the evaluator, beneficiaries were supposed to contribute 5% of the project cost as part of beneficiary participation in this project, and some beneficiaries donated their land instead of paying the participation fee. On the other hand, in the locality Znaznia in Khouribga 60m out of the total length of 2km of water distribution pipes needs to be laid through a land of a resident, however, the land owner (who takes water from other sources than the one provided by the project and is not a beneficiary of the project) does not agree with the construction of the pipes and the construction of the pipes has not been completed[32]. There was no resettlement in the areas covered by MR-P15, according to DGH and the Water Services[33].

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27 Source: interviews with ONEP and a technical assistance consultant

28 Sizes of some lands for which the acquisition process has been completed are not mentioned in the document provided by ONEP and unknown.

29 Source: documents provided by ONEP. According to ONEP, additional approximately 2 ha of land (compensation fee: approximately 0.5 million dirhams) is under the process in Safi.

30 Source: same as above

31 Source: interviews with the Water Services

32 Source: same as above

33 Source: interviews with DGH and the Water Services

These projects (MR-P14 and MR-P15) have largely achieved its objectives, therefore their effectiveness and impact are high.

3.4 Efficiency (Rating: ② for both MR-P14 and MR-P15)

3.4.1 Project Outputs

Outputs of MR-P14 (both planned and actual) are shown below. As the scope of the project was largely changed due to influences of droughts etc., actual outputs are largely different from planned outputs.

Table 8 Comparison of the Outputs of the Project (Planned and Actual) (MR-P14)

	Planned		Actual	
	Province/Area	Facility	Province/Area	Facility
Civil Works	Moulay Yacoub (290 localities)	Reservoir: 11 Pumping Station: 3 Public Water Post: 290 Water Pipes: 318km	Moulay Yacoub (280 localities)	Reservoir: 19 Elevated Water Tank: 1 Pumping Station: 5 Public Water Post: 292 House Connection: 399 Water Pipes: 569km Remote Control System
	Safi, Tnine Ghiat (40 localities)	Reservoir: 3 Pumping Station: 4 Public Water Post: 40 Water Pipes: 97km	Safi, Tnine Ghiat (47 localities)	Reservoir: 4 Elevated Water Tank: 1 Water Tank: 2 Pumping Station: 6 Public Water Post: 91 Water Pipes: 155km
	Tiznit, Tafraout (36 localities)	Reservoir: 5 Pumping Station: 10 Public Water Post: 36 Water Pipes: 68km	Tiznit, Tafraout (38 localities)	Reservoir: 8 Reservoir (rehabilitation):1 Pumping Station: 7 Water Pipes: 143km Ferromanganese Remover
	Tiznit, Larbaa Sahel (31 localities)	Reservoir: 2 Pumping Station: 1 Public Water Post: 31 Water Pipes: 49km	Tiznit, Larbaa Sahel (56 localities)	Reservoir: 2 Water Tank: 10 Pumping Station: 5 Public Water Post: 78 Water Pipes: 148km
	-	-	Safi, Sbia'at (16 localities)	Reservoir: 1 Public Water Post: 16 Water Pipes: 43km
	-	-	Tiznit, Tlat Lkhasass (200 localities)	Reservoir: 5 Water Tank: 7 Pumping Station: 9 Public Water Post: 215 Water Pipes: 211km
	Total: 397 localities		Total: 637 localities	

	Planned		Actual	
	Province/Area	Facility	Province/Area	Facility
Consulting Service	Contents: ・ Review of detailed design and tendering documents ・ Procurement assistance ・ Assistance for supervision of the civil works including environmental monitoring during construction ・ Technical assistance for beneficiaries participation		Contents: Same as left	
	Mans-Months: ・ International Consultant: 36MM ・ Local Consultant: 60MM		Mans-Months: ・ International Consultant: 70MM ・ Local Consultant: 139.5MM	

Source: planned: JICA appraisal document, actual: documents provided by ONEP, interviews with ONEP and a technical assistance consultant

Background/Reasons for the Scope Changes

1. After the project appraisal in 1997, there were prolonged discussions within the Moroccan government on whether the Moroccan government or ONEP should be the borrower of the Japanese ODA loan, and consequently signing of the loan agreement (L/A) was delayed considerably (L/A was signed in March 2000)[34]. In the meantime, Morocco was hit by severe droughts, and the Tnine Ghiat region in Safi and the Larbaa Sahel region in Tiznit were particularly severely hit by the droughts, which required urgent provision of water supply facilities in these regions and ONEP implemented subprojects in these regions (areas which were supposed to be covered by Japanese ODA loan) with assistance provided by the Reconstruction Credit Institute (KfW)[35]. Then in October 2001 ONEP requested JICA to approve changes of subprojects of MR-P14, and JICA approved it on the ground that areas of substitute subprojects were located adjacent to the original areas in the same region and the same province, water resources and contents of civil engineering works of substitute subprojects were very similar to those of the original subprojects, project cost of substitute subprojects was almost the same as that of the original subprojects, and priorities of substitute subprojects were high according to the selection criteria applied in SAPROF and project appraisal[36].
2. Some parts of localities in Moulay Yacoub also required urgent provision of water supply facilities due to the severe droughts, and ONEP implemented projects in these areas with Moroccan government budget, and consequently some parts of localities covered by MR-P14 were changed (excluded) from the original scope[37].

[34] Source: JICA internal documents
[35] Source: same as above
[36] Source: same as above
[37] Source: same as above

3. In the Tafraout region in Tiznit public water posts were not constructed in the project, as individual house connections already existed, and procurement of a ferromanganese remover was added to the project scope, as the concentration of ferromanganese in underground water increased due to the droughts[38].
4. In May 2005 ONEP requested JICA to approve construction of water supply facilities in 240 localities in total in Moulay Yacoub, the Sbia'at region in Safi and the Tlat Lkhasass region in Tiznit using the remaining project budget for civil engineering works, which was approved by JICA[39].

Outputs of MR-P15 (both planned and actual) are shown below.

Table 9 Comparison of the Outputs of the Project (Planned and Actual) (MR-P15)

	Planned[40]		Actual	
	Province	Facility	Province	Facility
Civil Works	Azilal	Well: 27, Borehole: 26, Test Borehole: 50, Equipment: 55, Civil Works: 66	Azilal (177 localities)	Well: 29, Borehole: 55, Test Borehole: 66, Equipment: 73, Civil Works: 88
	Beni Mellal	Well: 11, Borehole: 13, Test Borehole: 7, Equipment: 36, Civil Works: 41	Beni Mellal (69 localities)	Well: 13, Borehole: 24, Test Borehole: 11, Equipment: 46, Civil Works: 52
	Khenifra	Well: 18, Borehole: 9, Test Borehole: 42, Equipment: 26, Civil Works: 28	Khenifra (89 localities)	Well: 31, Borehole: 9, Test Borehole: 43, Equipment: 40, Civil Works: 40
	Khouribga	Well: 12, Borehole: 12, Test Borehole: 66, Equipment: 30, Civil Works: 34	Khouribga (90 localities)	Well: 16, Borehole: 18, Test Borehole: 82, Equipment: 43, Civil Works: 46
	Total: approximately 200 localities		Total: 425 localities	
Consulting Service	Contents: ・ Review of detailed design and tendering documents ・ Procurement assistance ・ Assistance for water quality survey ・ Assistance for supervision of the civil works including environmental monitoring during construction ・ Technical assistance for beneficiaries participation		Contents: Same as left	
	Mans-Months ・ International Consultant: 48MM ・ Local Consultant: 30MM		Mans-Months ・ International Consultant: 48MM ・ Local Consultant: 218MM	

Source: planned: JICA internal documents, actual: documents provided by DGH and the Water Services
Note: planned outputs are the amount of outputs planned in annual programs of 2003 to 2006, and actual outputs are the amount of outputs realized in annual programs of 2003 to 2007. Actual outputs include facilities that are no longer used.

[38] Source: interviews with a technical assistance consultant
[39] Source: JICA internal documents
[40] Annual programs approved by JICA, and the project implementation method was revised in 2002.

Background/Reasons for the Scope Changes

1. MR-P15 originally targeted at approximately 200 localities among the total of 1,389 localities which were categorized as priority "A" in SAPROF. However, Morocco was hit by severe droughts after the prior notification and before the start of the project, and thus water supply facilities were constructed in approximately 30% of the originally targeted localities with the Moroccan government budget as part of urgent countermeasures. On the other hand, it was found out that some of the rest of the localities no longer had a sufficient amount of water resources due to the severe droughts[41]. Consequently, the method of project implementation was changed in 2002, from the way in which tenders and constructions of project components were to be conducted over 2 phases in the total of approximately 200 localities in 4 provinces, to the way in which an annual program was to be implemented over 4 years in localities where sufficient amount of water resources were confirmed through water resource surveys[42]. Moreover, while water resource surveys (excavation of test boreholes) were initially not to be covered by Japanese ODA loan, they became included in the scope covered by the Japanese ODA loan; while the project was initially to construct one water supply system in each locality (one water source in one locality), this was modified so that one water supply system provide water to single or multiple localities; and while the project was initially to provide water by public water posts only, this was also modified so that water would be provided by public water posts or individual house connections[43].
2. When the project scope was revised in 2002, it was planned to implement an annual program over 4 years from 2003 to 2006, however, the 2007 program was also implemented using the remaining project budget for civil engineering works[44].
3. Some localities in the revised project plan were changed, added, and cancelled due to the lack of accessibility, opposition to land acquisition, and needs expressed by local residents etc.[45].

In some of the localities covered by MR-P15 and visited by the evaluator, several cases were observed in which 1) a borehole and a reservoir provided by the project are not used, as water distribution pipes were constructed for a different locality due to political reasons, and the locality where the borehole and the reservoir were constructed does not have water

41 Source: JICA internal documents
42 Source: JICA internal documents
43 Source: same as above
44 Source: interviews with DGH
45 Source: same as above

distribution facilities; 2) all of the water distribution pipes were replaced by beneficiaries, as there were a lot of leakages from polyethylene-pipes provided by the project; and 3) while a reservoir was constructed on a highly elevated location, pressure was not taken into account when laying water distribution pipes and these pipes were broken shortly after the start of operation and hence water supply facilities provided by the project are no longer used in the locality. Thus, there seems to have been a room for improvement regarding the supervision of civil works.

Reservoir constructed in MR-P14

Well excavated in MR-P15

3.4.2 Project Inputs

3.4.2.1 Project Cost

The planned project cost of MR-P14 at the time of project appraisal was 7,204 million yen (foreign currency: 1,800 million yen, local currency: 5,404 million yen), of which Japanese ODA loan portion was 5,004 million yen[46]. However, the actual project cost in total is unknown, as the compensation for land acquisition has not been completed, as explained above, and the actual cost in total of land acquisition is currently not known[47]. Then, a comparison was made between planned and actual cost for civil works, consulting services and physical contingencies. However, the numbers of procurement packages are over 50 and ONEP does not have concrete information on the actual cost, and thus an attempt was made to calculate the actual project cost based on the project completion report and information provided by a technical assistance consultant. The planned cost at the time of project appraisal was 4,375 million yen for civil works, 191 million yen for consulting services, 438 million yen for physical contingencies, in total 5,004 million yen[48]. On the other hand, the actual cost was 4,411 million yen for civil works, 357 million yen for consulting services, in total 4,768 million yen[49]. At the time of project appraisal all cost for

[46] Source: JICA appraisal document

[47] The actual project cost of Japanese ODA loan portion is 4,513 million yen (source: JICA internal document).

[48] Source: JICA appraisal document

[49] Calculated by multiplying the actual cost by the average exchange rate of 1DH=12.0JPY (the average exchange

civil works, consulting services and physical contingencies were to be covered by Japanese ODA loan, however, some cost for civil works that were not completed at the timing of loan expiry (approximately 255 million yen) was paid by ONEP[50]. The amount of physical contingencies does not seem to have been fully consumed, and the actual cost for the total of civil works and consulting services seems to be a little less than the planned cost including the amount of physical contingencies.

The planned project cost of MR-P15 at the time of project appraisal was 3,283 million yen (foreign currency: 477 million yen, local currency: 2,806 million yen), of which Japanese ODA loan portion was 2,462 million yen[51]. On the other hand, the actual project cost was 2,826 million yen (foreign currency: 151 million yen, local currency: 2,675 million yen), of which Japanese ODA loan portion was 2,236 million yen, and it was lower than planned (86% against the plan)[52].

A major reason for why the actual cost was within the planned cost despite that the actual outputs were considerably more than planned outputs, was that procurement cost turned out to be lower as a result of competitive bidding etc. in both MR-P14 and MR-P15[53].

3.4.2.2 Project Period

The planned project period of MR-P14 at the time of project appraisal was 50 months in total from March 2000 to April 2004 (the completion of the project is the end of civil works)[54]. On the other hand, the actual project period was 118 months in total from March 2000 to December 2009 (the end of civil works)[55], and it was significantly longer than planned (236% against the plan). Reasons for why the actual period significantly exceeded the planned period are that revisions of localities covered by the project and project components were required, as Morocco was hit by severe droughts after the project appraisal, that detailed studies for subprojects were delayed, that there were many inconsistencies between detailed designs and construction specifications, which required re-creation of specification documents, that the project scope increased largely and that the numbers of contract packages also largely increased from initial 24 packages to 56

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rate of the Japanese ODA loan disbursement period of March 23, 2000 – December 6, 2007), based on document provided by ONEP and information provided by a technical assistance consultant.

50 Source: interviews with a technical assistance consultant

51 Source: JICA appraisal document

52 Calculated by multiplying the actual cost by the average exchange rate of 1DH=12.16JPY (the average exchange rate of the Japanese ODA loan disbursement period of June 9, 2000 – September 30, 2009), based on document provided by DGH.

53 Source: interviews with executing agencies

54 Source: JICA appraisal document

55 Source: document provided by ONEP

packages etc.[56]. As the actual project outputs were considerably more than planned outputs as explained above, this needs to be taken into account in evaluating the project period. The ratios of the major actual outputs to planned outputs are presented below.

Table 10 The Ratios of Actual Outputs to Planned Outputs (MR-P14)

Facility	Planned	Actual	Ratio
Reservoir and Water Tank	21	61	291%
Pumping Station	18	32	178%
Public Water Post	397	692	174%
Water Pipes	532km	1,269km	239%
Average			221%

Source: calculated based on the Table 8

The average ratio of the actual outputs to planned outputs is 221% and the actual project period of MR-P14 is evaluated to be fair, taking into account the ratio.

The planned project period of MR-P15 which was revised in 2002 was 85 months in total from June 2000 to June 2007 (the completion of the project is the end of civil works)[57]. On the other hand, civil works in 2 localities in Khouribga have not been completed at the time of ex-post evaluation. This is because in one of the localities the landowner has not agreed with laying water distribution pipes on his land as explained above, and in the other locality deepening of an existing well is currently conducted (this is outside of the project scope of MR-P15) and equipment such as pumps that were procured as part of the project will be put in place after the completion of the excavation[58]. Thus, the actual project period was 144 months in total from June 2000 to May 2012 (at the time of ex-post evaluation), and it was significantly longer than planned (169% against the plan). Reasons for why the actual period significantly exceeded the planned period are that, apart from the non-completion of civil works explained above, revisions of project components and implementation methods were required, as Morocco was hit by severe droughts after the project appraisal, that the start-up of the project was delayed due to prolonged discussions on whether the Ministry of Territory Development, Water and Environment or ONEP should be in charge of the implementation of MR-P15 after DGH was transferred from the Ministry of Equipment to the Ministry of Territory Development, Water and Environment (currently the Ministry of Energy, Mines, Water and Environment) due to the

[56] Source: JICA internal documents and interviews with a technical assistance consultant

[57] Source: JICA internal documents. As explained above, in MR-P15 a reappraisal was conducted in 2002 due to the severe droughts, and it was determined that the project was to be implemented as annual programs, and the Project Memorandum states that civil works of the project were to be completed by June 2007 (one year reception period was to end in June 2008).

[58] Source: interviews with the Water Services

organizational reform within the Moroccan government in 2003 and the responsibility for the implementation of a rural water supply program was taken over by ONEP, and that the project scope increased largely etc.[59]. As the actual project outputs were considerably more than planned outputs as explained above, this needs to be taken into account in evaluating the project period. The ratios of the major actual outputs to planned outputs are presented below.

Table 11 The Ratios of Actual Outputs to Planned Outputs (MR-P15)

Facility	Planned	Actual	Ratio
Well	68	89	131%
Borehole	60	106	177%
Test Borehole	165	202	122%
Equipment	147	202	137%
Civil Works	169	226	134%
Average			140%

Source: calculated based on the Table 9

The average ratio of the actual outputs to planned outputs is 140% and the actual project period of MR-P15 is evaluated to be fair, taking into account the ratio.

Although the project cost of MR-P14 and MR-P15 was within the plan, the project period of MR-P14 and MR-P15 was exceeded, therefore efficiency of these projects is fair.

3.5 Sustainability (Rating: ③ for MR-P14 and ② for MR-P15)

3.5.1 Structural Aspects of Operation and Maintenance (O&M)

The Commune Charter states that communes (equivalent to towns/villages) are responsible for provision of utility services such as electricity and water in rural areas in Morocco, and in many rural areas ONEP provides water supply services based on contracts with communes[60].

In the areas covered by MR-P14, water supply facilities upstream of water meters (water pipes, pumping stations and reservoirs etc.) are operated and maintained by ONEP sometimes outsourcing to private companies regardless of water being supplied through public water posts or individual house connections (house connections were realized only in Moulay Yacoub in this project)[61]. The total number of ONEP's staff is 7,229 as of the end of December 2010, and the numbers of staff in ONEP's provincial offices in charge of the areas covered by the project are 7 in the Fez-Moulay Yacoub provincial office, 17 in the

[59] Source: JICA internal document and interviews with DGH
[60] Source: interviews with ONEP
[61] Source: same as above

Safi provincial office and 8 in the Tiznit provincial office[62]. Public water posts are operated and maintained by watchman managers appointed by local authorities and watchman managers buy water from ONEP, sell water to rural residents, and clean and maintain public water posts[63]. In the case of individual house connections facilities downstream of water meters are operated and maintained by water users' associations (AUEPs), and AUEPs buy water from ONEP, sell water to rural residents, and maintain the facilities[64]. The numbers of persons belonging to AUEPs differ according to the number of population in each locality, and the number of persons belonging to AUEPs was 9 (consisted of a president, a deputy president, a general secretary, a deputy general secretary, a treasury, a deputy treasury, and advisors etc.) in 2 localities visited by the evaluator[65]. When major repairs of the facilities are required, ONEP is responsible for such repairs[66]. Considering the fact that O&M of the facilities are basically outsourced to private companies and the actual O&M situation in the field, sufficient numbers of staff are assigned and no major problem is seen in the O&M system.

In the areas covered by MR-P15, AUEPs that are established in each locality are responsible for O&M of water supply facilities provided by the project, and they collect water charges from rural residents and maintain the facilities[67]. The numbers of persons belonging to AUEPs differ according to the number of population in each locality, and the numbers of persons belonging to AUEPs were 7 to 13 (consisted of a president, a deputy president, a general secretary, a deputy general secretary, a treasury, a deputy treasury, and advisors etc.) in 18 localities visited by the evaluator. According to DGH and the Water Services, contracts were made among a commune, the Water Services and AUEP before the project implementation in the areas covered by MR-P15, and the contracts state that the Water Services are responsible for providing technical support for AUEPs, when they are in need of such support, and the Water Services actually provide such support when they are requested from AUEPs[68]. However, the responsibility for the implementation of a rural water supply program has been taken over by ONEP since 2004, and DGH has withdrawn from rural water supply projects after the completion of the project (MR-P15) and a budget for rural water supply projects has no longer been allocated for DGH, and thus, DGH cannot provide financial support for AUEPs when major repairs of water supply facilities

62 Source: document provided by ONEP
63 Source: interviews with ONEP
64 Source: same as above
65 While the number of localities visited by the evaluator in the areas covered by MR-P14 is 12 in total, the number of localities with house connections among them was 2.
66 Source: interviews with ONEP and rural residents
67 Source: interviews with the Water Services and AUEPs
68 Source: interviews with DGH and the Water Services

are required etc.[69]. In the interviews with AUEPs in the localities visited by the evaluator, many members of AUEPs explained that there have been no major problems as the facilities provided by the project were planned to be relatively simply structured so that AUEPs could maintain the facilities independently and they collect fund from rural residents when repairs of the facilities are required. However, there were several localities among those visited by the evaluator where the facilities such as water pipes, generators and pumping equipment etc. were left broken, and hence the current O&M system is slightly inadequate.

3.5.2 Technical Aspects of Operation and Maintenance

In the areas covered by MR-P14, there are no major problems regarding experiences and education levels of staff in ONEP's provincial offices (the proportion of staff who have over 11 years of experiences and completed more than 2 years education after secondary schools is over 70% in all of the mentioned provincial offices)[70]. Moreover, ONEP has a department responsible for providing trainings on water supply projects in general and training facilities (ONEP has trucks with water supply equipment on board), and provides trainings regularly in rural areas[71]. Furthermore, taking into account the actual O&M situation in the field as well as the fact that O&M of the facilities provided by the project are basically outsourced to private companies and that maintenance works conducted by watchman managers are very limited such as cleaning of public water posts and changing water taps etc., no major problem is seen regarding the technical capacity for O&M.

In the areas covered by MR-P15, according to DGH and the Water Services, trainings on usage and O&M of the facilities were provided to AUEPs by technical assistance consultants during the project implementation, and manuals and trainings were also provided by contractors when handing over the facilities[72]. However, not all AUEPs attended these trainings and there are some cases in which attendees of these trainings no longer belong to AUEPs etc.[73]. Moreover, usually technicians are not present in AUEPs, and while the facilities provided by the project are relatively simply structured and relatively easy to maintain, there remains a concern regarding how to deal with technical problems.

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69 Source: same as above
70 Source: document provided by ONEP
71 Source: interviews with ONEP
72 Source: interviews with DGH and the Water Services
73 Source: same as above

3.5.3 Financial Aspects of Operation and Maintenance

In the areas covered by MR-P14, balance of current transactions of ONEP as a whole records a surplus and there seems to be no major problem in the financial situation. ONEP's profit and loss statement is shown below.

Table 12 ONEP's Profit and Loss Statement

(Unit: million dirhams)

Accounting Item	2007	2008	2009
Sales Revenue	3,118	3,325	3,488
Sales Cost	▲2,579	▲2,823	▲3,045
Materials etc.	▲610	▲677	▲755
Payrolls etc.	▲869	▲940	▲995
Project Investments etc.	▲1,100	▲1,206	▲1,295
Gross Profit	539	502	443
Operating Profit	473	614	580
Non-Operating Profit and Loss	▲244	▲378	▲188
Current Profit	229	237	392
Extraordinary Income and Loss	▲4	▲67	▲167
Profit of the Term Before Tax	225	170	225
Profit of the Term After Tax	137	92	124

Source: The "Agadir Water Supply Project" Evaluation Report (2010)

However, according to "Financial Analysis of Office National de l'Eau Potable" (Baker Tilly), ONEP invoices its sales of water, products and services etc. with VAT 7%, while it buys materials and services etc. at VAT 14 or 20% (14% until 2007 and 20% after 2008, according to ONEP), and the difference is accounted as "receivable" towards the Tax Authority (619 million dirhams in 2007 and 875 million dirhams in 2008). According to ONEP, ONEP is currently in negotiation with the government on how to collect (recover) such receivables, and an early settlement is desirable in order to ensure stable operations in the future.

On the other hand, balance of transactions in the provinces covered by MR-P14 is in red. The balance of transactions (the state of revenues and expenditures) in each province in 2010 is shown below.

Table 13 ONEP's Balance of Transactions in the Provinces Covered by MR-P14 (2010)

(Unit: dirhams)

Item	Moulay Yacoub	Safi/ Tnine Ghiat	Tiznit/ Tafraout, Larbaa Sahel, Tlat Lkhasass
Revenues	**2,992,045**	**349,747**	**1,565,239**
Sales of Water	2,384,126	349,747	1,559,857
Other Revenues	607,919	-	5,382
Expenses	**11,008,841**	**1,116,581**	**3,981,966**
Payrolls	1,118,430	149,062	1,072,806
Utility Costs	930,091	219,795	513,289
Water Treatment Costs	434	1,496	14,053
Material Costs	90,848	5,924	63,373
Maintenance Costs	552,878	207,569	840,126
Procurement Cost for Sales of Water for inter-ONEP	2,197,238	-	532,160
Other Expenses	6,118,922	532,735	946,159

Source: document provided by ONEP

Note: The above table shows the balance of transactions in Moulay Yacoub, the Tnine Ghiat region in Safi, the Tafraout, Larbaa Sahel, and Tlat Lkhasass regions in Tiznit as a whole and includes localities (areas) not covered by MR-P14.

According to ONEP, deficits derived from water supply operations in rural areas are covered by surplus derived from water supply operations in urban areas[74], and a financial situation of ONEP as a whole does not seem to be affected by these deficits derived from water supply operations in rural areas currently[75]. Moreover, the government subsidy of 150 million dirhams annually has been allocated to ONEP for rural water supply projects in the recent 3 years[76]. The subsidy is to cover investment costs, and a subsidy for O&M is not allocated to ONEP, as ONEP currently does not have a major problem in securing O&M budgets. Being a national public corporation, government subsidy is allocated to ONEP according to necessity, and it seems unlikely that ONEP would face extreme financial difficulties, and thus there seems to be no major problem in securing budgets for O&M of the facilities provided by the project.

Regarding the facilities downstream of water meters, in the case of public water posts, the water charge paid from watchman managers to ONEP is 2.54 dirhams/m^3, and watchman managers set prices necessary to conduct O&M of public water posts and collect water charges (approximately 10 dirhams/m^3) from rural residents regularly[77]. In the case of individual house connections, the water charge paid from AUEPs to ONEP is 3.87 dirhams/m^3, and AUEPs set prices necessary to conduct O&M of the facilities downstream

[74] According to the "Agadir Water Supply Project" evaluation report, ONEP's revenue is three to four times more than expenses in the areas covered by the project.

[75] Source: interviews with ONEP

[76] Source: interviews with ONEP

[77] Source: document provided by ONEP and interviews with rural residents

of water meters and collect water charges (approximately 5 to 10 dirhams/m^3) from rural residents regularly[78]. In the interviews in the localities visited by the evaluator, a few watchman managers claimed that the amount of water charges collected is not sufficient for conducting O&M in the localities where many beneficiaries are very poor and they use the facilities provided by the project only to take water for drinking and cooking. However, if major problems occur regarding the facilities downstream of water meters in the areas covered by MR-P14, ONEP will handle such problems, and thus there seems to be no major problem in securing budgets for O&M of the facilities downstream of water meters.

In the areas covered by MR-P15, water charges are decided by each AUEP and thus different in each locality, and in the localities visited by the evaluator water charges were approximately 2 to 15 dirhams/m^3. In some localities visited, 3 to 4 steps of water charges are applied according to the amount of water consumed, and in one of the localities visited a water charge is free but AUEPs collect 200 dirhams per month from each household as O&M cost. According to interviews with AUEPs, O&M budget required varies from approximately 1,000 to 5,000 dirhams per month in the localities visited, which is used for purchasing gasoline and filters for generators, spare parts, and chlorine chemicals, paying electricity bills and payrolls for operators, and repairing equipment etc. In 4 out of 14 localities visited by the evaluator (localities where the facilities provided by the project are still operational[79]), members of AUEPs claimed that water charges collected are not sufficient for conducting O&M, and even in other localities where members of AUEPs replied that water charges collected are enough for conducting O&M, some cases were observed in which pumping equipment were left broken and there were some leakages from elevated water tanks and water pipes etc., which suggests that water charges collected are not necessarily sufficient for conducting O&M.

3.5.4 Current Status of Operation and Maintenance

In the areas covered by MR-P14, 6 localities each in Moulay Yacoub and Safi were visited by the evaluator as explained above, and the evaluator conducted interviews with rural residents and checked actual situations (current status) of the facilities provided by the project. While several cases were observed in which water occasionally stops due to broken water pipes, one of water taps of public water posts was broken and water pressure is somewhat low etc., no major problem was observed as ONEP (and outsourced companies) conducts O&M in the areas.

In the areas covered by MR-P15, 6 localities each in Azilal, Khenifra and Khouribga

[78] Source: same as above

[79] The number of localities visited by the evaluator in the areas covered by MR-P15 is 18 in total, of which in 4 localities the facilities provided by the project are no longer used.

were visited by the evaluator as explained above, and the evaluator conducted interviews with rural residents and checked actual situations (current status) of the facilities provided by the project. In the areas covered by MR-P15, there are some cases in which the facilities provided by the project are no longer used and/or were destructed due to troubles among residents and AUEPs, and the facilities are no longer used due to malfunctioning and/or non-existence of AUEPs, water deficit and deterioration of water quality etc. According to documents provided by DGH, the ratio of the localities where the facilities provided by the project are still operational to the total numbers of localities covered by the project, except for the localities where the amount of water was judged to be inadequate after excavating test boreholes and where the facilities have not started operation yet due to non-completion of civil works etc., is 75% in Azilal, 89% in Beni Mellal, 71% in Khenifra and 78% in Khouribga[80]. Regarding the localities where the facilities provided by the project are no longer used, water deficit and deterioration of water quality may be due to environmental influences such as climate changes etc., particularly in the case of wells, however, there is also a possibility that water resource surveys conducted before the project implementation were not sufficient. As for the cases in which AUEPs are non-functional and non-existent, assistance for formation of AUEPs, which was part of technical assistance for beneficiary participation provided as part of consulting services in the project, may not have been sufficient. Support services for AUEPs that provide patrolling localities and trainings on O&M of the facilities etc. would be needed, however, DGH has already withdrawn from rural water supply projects and no budget for supporting AUEPs is allocated to DGH, as explained above, and thus to provide technical support by the Water Services when they are requested by AUEPs would be the maximum support they could provide[81]. On the other hand, regarding the possibility that ONEP could support these AUEPs, according to ONEP, localities where water supply projects were implemented under the jurisdiction of DGH are currently covered by ONEP's investment programs step by step, and the Rural Water Supply Project (3) (MR-P28) (executing agency: ONEP) is actually being implemented in approximately 20 localities covered by MR-P15 in Khenifra which had problems of water quantity and quality[82]. However, it would be difficult for ONEP to support all AUEPs in enormous numbers of localities in Morocco instantly, and thus a provision of support services for AUEPs in localities that are not yet covered by ONEP's investment programs is desired. JICA's technical cooperation project "Support for the Rural Drinking Water Supply

[80] Source: calculated based on answers to the questionnaire from DGH. Among the localities where the facilities provided by the project are no longer used some cases are included in which wells excavated in the project do not produce sufficient amount of water. According to the Water Services, in approximately 80% of such cases the amount of water was found to be insufficient immediately after excavation.

[81] Source: interviews with DGH and the Water Services

[82] Source: interviews with ONEP and a technical assistance consultant

Plans" was implemented from 2004 to 2007, which aimed at providing a support for AUEPs to conduct O&M of water supply facilities, and the project provided technical assistance for the water support centre established in Agadir by SEEE, however, the centre was closed after SEEE withdrew from water supply projects in 2009[83]. To provide support services for AUEPs in the areas covered by MR-P15 through this type of a technical cooperation project could be one of the options to sustain effects realized by the project.

No major problems have been observed in the operation and maintenance system in the areas coved by MR-P14, therefore sustainability of the project effect realized by MR-P14 is high. On the other hand, some problems have been observed in terms of institutional and financial aspects of operation and maintenance in the areas covered by MR-P15, therefore sustainability of the project effect realized by MR-P15 is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

These projects ((1) (MR-P14) and (2) (MR-P15)) aimed at providing safe potable water to rural residents through construction of water supply facilities in rural areas in Morocco.

Relevance of these projects (MR-P14 and MR-P15) is high, as these projects are consistent with priority areas of Morocco's development plans and Japan's ODA policy, and moreover development needs for these projects are high. Effectiveness and impact of these projects (MR-P14 and MR-P15) are also high, as the actual numbers of localities (villages) covered by these projects are much more than the planned figures. In the beneficiary survey and interviews with rural residents many of them expressed positive opinions that water fetching labour was largely reduced after the project, that water quality was improved, that the amount of available water increased, that attendance rates of children at school was improved due to decreased water fetching labour, and that sanitary conditions at home was improved etc. Efficiency of these projects (MR-P14 and MR-P15) is fair, as project period exceeded the plan, while project cost was within the plan. Sustainability of MR-P14 is high, as no major problems have been observed in the operation and maintenance (O&M) in the areas covered by the project, on the other hand, sustainability of MR-P15 is fair, as some problems have been observed in terms of structural and financial aspects of the O&M conducted by water users' associations (AUEPs) in the areas covered by the project.

In light of the above, MR-P14 is evaluated to be highly satisfactory and MR-P15 is evaluated to be satisfactory.

[83] Source: "Dispatch of an expert to increase effects of cooperation in the rural water supply area in Morocco" Completion Report (2010)

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

(1) Recommendation to ONEP

In the areas covered by MR-P14, the facilities provided by the project have not yet started operation in 5 localities in Moulay Yacoub, 4 localities in Safi and 2 localities in Tiznit, as explained above. According to ONEP, ONEP is currently handling this issue, and early solution and start of operation are desired in order to enhance effects realized by the project.

(2) Recommendation to DGH

In the areas covered by MR-P15, the facilities provided by the project have not yet started operation in 2 localities in Khouribga, as explained above. Early solution and start of operation are desired in order to enhance effects realized by the project.

(3) Recommendation to MEMEE (DGH)

In the areas covered by MR-P15, AUEPs are responsible for O&M of the facilities provided by the project, however, there are not a few cases in which AUEPs are non-functional and non-existent, and the facilities are no longer used and/or destructed due to troubles among rural residents and AUEPs, and thus support services for AUEPs should be provided such as patrols of localities, inspections of the facilities and O&M guidance etc. Currently a budget for supporting AUEPs is not allocated to DGH, as explained above, however, ONEP established a support cell for AUEPs as a pilot project with assistance from international donors, and ONEP has also recently requested JICA an implementation of a technical cooperation project for supporting AUEPs[84], and it is desired that MEMEE, as an executing agency of MR-P15, should take an initiative to discuss with ONEP on possibilities to support AUEPs in the localities covered by MR-P15 and improve the situation.

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

In the Mid-Term Reviews of MR-P14 and MR-P15 conducted in 2005 and 2006, it was recommended to set indicators necessary for ex-post evaluation and prepare data by the time of

[84] Source: "Dispatch of an expert to increase effects of cooperation in the rural water supply area in Morocco" Completion Report (2010)

ex-post evaluation, as well as to monitor activities for strengthening capabilities of AUEPs, since the contents of these projects were changed several times. However, this has not been done till the time of ex-post evaluation. Since it is difficult to collect all the necessary information only in the ex-post evaluation, a monitoring should be regularly conducted by JICA operation departments through executing agencies during a project implementation. This ensures an appropriate implementation of PDCA (Plan, Do, Check, Action) cycles by executing agencies and an effective monitoring of implementation status and effects of projects by donors.

Comparison of the Original and Actual Scope of the Project

Item	Original	Actual
1. Project Outputs	MR-P14: Resrvoir/Water Tank: 21 Pumping Station: 18 Public Water Post: 397 Water Pipes: 532km MR-P15: Well: 68 Borehole: 60 Test Borehole: 165 Equipment: 147 Civil Works: 169	MR-P14: Resrvoir/Water Tank: 61 Pumping Station: 32 Public Water Post: 692 Water Pipes: 1,269km House Connection: 399 Remote Control System Ferromanganese Remover MR-P15: Well: 89 Borehole: 106 Test Borehole: 202 Equipment: 202 Civil Works: 226
2. Project Period	MR-P14: March 2000 – April 2004 (50 months) MR-P15: June 2000 – June 2007 (85 months)	MR-P14: March 2000 – December 2009 (118 months) MR-P15: June 2000 – May 2012 (144 months)
3. Project Cost Amount paid in Foreign currency Amount paid in Local currency Total Japanese ODA loan portion Exchange rate	MR-P14: 1,800million yen 5,404million yen (428million dirhams) 7,204million yen 5,004million yen 1 dirham = 12.6 yen (As of June 1997)	MR-P14: Unknown Unknown Unknown 4,513million yen
Amount paid in Foreign currency	MR-P15: 477million yen	MR-P15: 151million yen
Amount paid in Local currency	2,806million yen	2,675million yen
	(224 million dirhams)	(220 million dirhams)
Total	3,283million yen	2,826million yen
Japanese ODA loan portion	2,462million yen	2,236million yen
Exchange rate	1 dirham = 12.5 yen (As of October 1998)	1 dirham = 12.16 yen (Average between June 2000 and September 2009)