EX-POST PROJECT EVALUATION 2011: PACKAGE III-4
(TUNISIA, MOROCCO, SLOVAKIA)

SEPTEMBER 2012

JAPAN INTERNATIONAL COOPERATION AGENCY

SANSHU ENGINEERING CONSULTANT

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Preface

Ex-post evaluation of ODA projects has been in place since 1975 and since then the coverage of evaluation has expanded. Japan's ODA charter revised in 2003 shows Japan's commitment to ODA evaluation, clearly stating under the section "Enhancement of Evaluation" that in order to measure, analyze and objectively evaluate the outcome of ODA, third-party evaluations conducted by experts will be enhanced.

This volume shows the results of the ex-post evaluation of ODA Loan projects that were mainly completed in fiscal year 2009, and Technical Cooperation projects and Grant Aid projects, most of which project cost exceeds 1 billion JPY, that were mainly completed in fiscal year 2008. The ex-post evaluation was entrusted to external evaluators to ensure objective analysis of the projects' effects and to draw lessons and recommendations to be utilized in similar projects.

The lessons and recommendations drawn from these evaluations will be shared with JICA's stakeholders in order to improve the quality of ODA projects.

Lastly, deep appreciation is given to those who have cooperated and supported the creation of this volume of evaluations.

September 2012
Masato Watanabe
Vice President
Japan International Cooperation Agency (JICA)

Disclaimer

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Minor amendments may be made when the contents of this volume is posted on JICA's website.

JICA's comments may be added at the end of each report when the views held by the operations departments do not match those of the external evaluator.

Tunisia

Ex-Post Evaluation of Japanese ODA Loan Project

Rades - La Goulette Bridge Construction Project

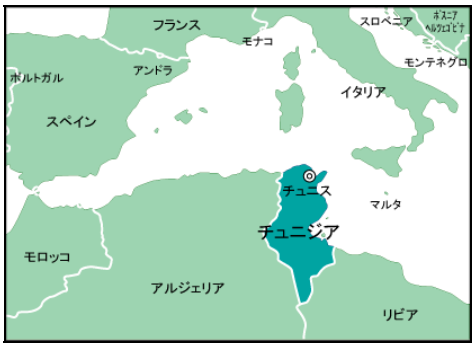
External Evaluator: Yasuhiro Kawabata, Sanshu Engineering Consultant

0. Summary

The objectives of the project were to: i) mitigate traffic congestion in the regions surrounding the Tunis Lake by diverting traffic concentration into the Tunis central district; and ii) improve accessibility between La Goulette and Rades ports by constructing a bridge connecting La Goulette, located in the north of the Tunis Lake canal, and Rades, located in the south, and thereby contributing to the regional economic development and industrial promotion in the Tunis Lake coastal region. The project has been highly relevant to the development plans and needs of Tunisia, as well as Japan's ODA policies. Regarding mitigation of traffic congestion in the regions surrounding the Tunis Lake by diverting traffic concentration into the Tunis central district and improvement of accessibility between La Goulette and Rades ports which are the project's objectives, since the project has somewhat achieved its objectives, its effectiveness is fair. Although the project cost was lower than planned, the project period was significantly longer than planned. Therefore, the efficiency of the project is fair. Some problems have been observed in terms of budget allocation for maintenance work, therefore sustainability of the project is fair.

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

1. Project Description



Projection Location

Rades - La Goulette Bridge

1.1 Background

Greater Tunis, the project's target area consists of four municipalities: i) Tunis, which covers the Tunis central district in the west of Tunis Lake, and Tunis in the east of the lake including Carthage, La Marsa, and La Gourette; ii) Ariana in the north of Tunis (residential area); iii) Ben Arous in the south (industrial zone): and iv) Manouba located in the west of Tunis and Ariana. Arterial highways in Greater Tunis are Mohamed V (MV), which passes around the Tunis

central district, and other highways such as Z4 (Republique), Regional Roads 33 and 34, National Roads 1, 3, and 9, and Sortie Sud, radiating from the city center. The average daily traffic on these highways at the time of appraisal (1999) was 10,000-20,000 vehicles/day. However, the highways with the heaviest traffic had already recorded the highest traffic volume of MV with 100,000 vehicles/day and National Road 9 with 50,000 vehicles/day. Since most of these highways are two-lane highways, the traffic volume had already exceeded its highway capacity. The transporting capacity of the ferries crossing the Tunis Lake at the location where the bridge was planned under the project was 4,000 vehicles/day (only vehicles with less than 3.5 tons loading capacity were permitted), and the waiting time for boarding was at least 30 minutes. Thus, roads around the terminal area had always been congested. Under these circumstances, further increase in traffic volume was expected in the project affected area, and, thus mitigation of traffic congestion was anticipated.

1.2 Project Outline

The objectives of the project were to i) mitigate traffic congestion in the regions surrounding Tunis Lake by diverting traffic concentration into the Tunis central district; and ii) improve accessibility between La Goulette and Rades ports by constructing a bridge connecting La Goulette, located in the north of the Tunis lake canal, and Rades, located in the south, and thereby contributing to the regional economic development and industrial promotion in the Tunis Lake coastal region. The location of the project site is shown in Figure 1.

Note: Red lines are the project highways

Figure 1 Location of Project Site

Loan Approved Amount/ Disbursed Amount	8,403 million yen/8,402 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	March 1999/March 1999
Terms and Conditions	For work: Interest Rate: 2.20%, Repayment Period: 25 years (Grace Period: 7 years) Conditions for Procurement: General untied For Consulting services: Interest Rate: 0.75% Repayment Period: 40 years (Grace Period: 10 years) Conditions for Procurement: Bilateral tied
Borrower / Executing Agency (ies)	Republic of Tunisia/Ministry of Equipment (Department of Bridges and Highways)
Final Disbursement Date	June 2009
Main Contractor (Over 1 billion yen)	Taisei Corp., Kajima/Sumitomo/ARABCO (Egypt), Taisei Corp., SOMATRA Get (Tunisia), SENELEC (Tunisia)
Main Consultant (Over 100 million yen)	Nippon Koei/Pacific Consultant International/SCET Tunisie/STUDI (Tunisia)
Feasibility Studies, etc.	Feasibility Study by JICA (1991), SAPROF (February 1997)
Related Projects (if any))	-

2. Outline of the Evaluation Study

2.1 External Evaluator

Yasuhiro Kawabata, Sanshu Engineering Consultant

2.2 Duration of Evaluation Study

Duration of the Study: July 2011 –September 2012

Duration of the Field Study: December 5 – 19, 2011, January 28 – February 7, 2012, and May 5 – 15, 2012

2.3 Constraints during the Evaluation Study

none

3. Results of the Evaluation (Overall Rating: B[1])

3.1 Relevance (Rating: ③[2])

3.1.1 Relevance with the Development Plan of Tunisia

The Tunisian 9th Five-Year Plan (1997-2001) stated that in order to integrate the Tunisian economy with the world economy, the "grading up" efforts was aimed at enhancing productivity to strengthen competiveness, and a new development strategy to diversify the

[1] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

[2] ③: High, ② Fair, ① Low

Tunisian economy was adopted. Enhancement of industry's productivity, increase of exports, and control of inflation were the major issues to be addressed. The importance of transport sector was emphasized particularly in order to achieve the smooth and speedy logistics and enhance the industrial competiveness. With respect to highway sector projects to be implemented during the 9th Five-Year Plan, mitigation of traffic congestion in the Greater Tunis was identified as a priority agenda. The project was considered to be an important link in the metropolitan ring road, which connects the southeast region and northwest region in the metropolitan area.

Under the 11th Five-Year Plan (2007-2011), the Tunisian government aimed to achieve the economic development at 6.1% per annum through open market, enhancement of productivity, and creation of new job opportunities. Under the government policy, the transport sector has been an important part to strengthen its industrial competitiveness. The development of arterial highway network is particularly considered a required investment in order to expedite the economic exchange and trade with neighboring countries, and promote the human exchange, such as tourism. Furthermore, promotion of development of arterial highways and rural roads (under the project, National Roads 9 and 10 will be connected with Route 1 in the eastern coastal region), development of the road network connecting the industrial zones and commercial cities, and promotion of the infrastructure development are also considered essential.

3.1.2 Relevance with the Development Needs of Tunisia

At the appraisal stage, Greater Tunis was divided into north and south regions by Tunis Lake Canal, and two alternative routes connecting the south and the north are as follows: i) the route passing through Tunis central district (road), and ii) the route connecting La Gourette and Rades ports by ferry boats. However, since the ferry service had some constraints on the operating hours and its transporting capacity (number of vehicles per vessel and maximum loading capacity of each vehicle), most traffic traveling the north - south direction selected the route passing through the Tunis central district. As a result, there was traffic congestion in the Tunis central district, and the environment, such as air pollution and water pollution[3], deteriorated (partly due to drained water from highways) in Tunis Lake. Due to the increase in traffic volume, as a result of the development of economic activities, increase in tourism, demand and integrated development around the lake coastal area in Greater Tunis, mitigation of traffic congestion was anticipated.

Upon completion of the project, since the alternative route, which crosses the bridge

[3] The project is located around the channel opening at the eastern edge of Tunis Lake and consideration to water conservation by construction was sought.

constructed under the project was created in addition to the route passing through the city central district, the traffic congestion seen in the central district before the project has somewhat improved. Thus, it is recognized that the project has contributed to the development needs, which is mitigation of traffic congestion.

3.1.3 Relevance with Japan's ODA Policy

At appraisal, the previous version of Japan's ODA Charter (1992) emphasized that infrastructure development was an essential foundation for the economic and social development. Moreover, in the Overseas Economic Cooperation Implementation Strategy (December 1999- March 2002) at appraisal (1999), the basic infrastructure to strengthen Tunisia's international competitiveness and promote private investment to the country was considered a priority sector in Tunisia. Since the objective of the project was to construct a bridge and highways, which is considered to be the basic infrastructure for the regional development and promotion of industry development, the project was in accordance with the Japanese aid policies.

Accordingly, the project has been highly relevant with the Tunisian development plan and needs, as well as Japan's ODA policies. Its relevance is therefore considered high.

3.2 Effectiveness (Rating: ③)

3.2.1 Quantitative Effects (Operation and Effect Indicators)

Since the project's outcome is to mitigate traffic congestion in the regions surrounding Tunis Lake by diverting traffic concentration into the Tunis central district and improve accessibility between La Goulette and Rades ports, the quantified effects were examined.

(1) Mitigation of Traffic Congestion in the Regions surrounding Tunis Lake

In order to examine the contribution of the project in mitigating traffic congestion, changes in traffic volume on the main arterial roads in the Tunis central district need to be examined in terms of traffic volume before and after the project taking into account the increase in vehicles (traffic volume) due to economic development. However, in Tunisia, the traffic volume on main roads is counted every five years. The previous counting was undertaken in 2007 and the next counting is scheduled for this year 2012. Since the data on traffic volume after completion of the project is not available, the traffic counting around the Rades – La Gourette Bridge section (North Extension Highway, Canal Highway, Rades-La Gourette Bridge, and Rades South Approach Road) were carried out under this evaluation work. By analyzing the data on counted traffic, the contribution to mitigation of traffic congestion was examined. Highways/roads included in the project are shown in Figure 2.

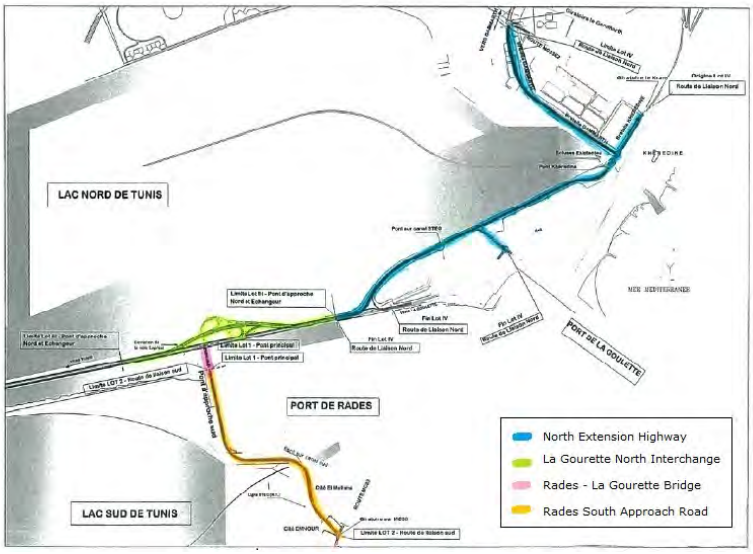


Figure 2 Highways/roads included in the Project

1) Traffic Volume of Crossing the Bridge (Average Daily Traffic)

The traffic volume of crossing the bridge upon completion of the project is shown in Table 1.

Table 1 Average Daily Traffic (Rades - La Goulette Bridge)

	2009	2010	2012
Absolute number (vehicles/day)	27,200 (21,300)	- (22,400)	29,500 (24,400)
Passenger car unit (PCU) (vehicles/day)	36,200 (28,300)	- (29,700)	33,600 (31,000)

Source: Appraisal documents (Summary of SAPROF report) Responses to Questionnaire, Actually surveyed data by the evaluation team
Note 1: Numbers in ( ) are planned volume at the appraisal stage.
Note 2: Actual figures in 2009 are surveyed by MOE right after opening of the bridge to traffic.
Note 3: Actual figures in 2012 are the traffic volume which was surveyed from 7:00 to 19:00 on March 24 and 26, 2012 and converted to the 24-hour volume[4]. March is the month which has average traffic volume through the year.
Note 4: PCU: passenger car unit

The traffic volume crossing the Rades-La Gourette Bridge as of 2012 is 29,500 vehicles/day, which is about 20% higher than the planned. In terms of PCU, the actual traffic volume is only about 8% higher than the planned. The reason for lower volume is considered to be that the ratio of large vehicles among all the vehicles was only 7%, which is lower than estimated.

[4] Based on the data on the hourly variation of in-out traffic at Sfax interchange, the ratio of day time and night time traffic was calculated, and the daily traffic was estimated by using this ratio (night time traffic is 20%).

According to the traffic count and movement survey conducted in March 2012, the breakdown of crossing traffic by direction is as follows: i) traffic of Rades-La Gourette direction is 24,600 vehicles/day, and ii) traffic of Tunis-Rades direction is about 4,900 vehicles/day. Before the project was completed, ferries connecting between Rades and La Gpourette transported about 4,000 vehicles/day[5] (only vehicles with less than 3.5 tons loading capacity were permitted). Thus, it is considered that about 25,000 vehicles/day (29,500 - 4,000), which should have passed through the Tunis central district have contributed to the mitigation of traffic congestion around the central district. However, since the traffic of 25,000 vehicles/day includes generated/induced[6] traffic, which has occurred after the project was completed, these traffic needs to be excluded. It is considered that the project has contributed to the reduction of at least 20,000 vehicles/day among the traffic passing through the Tunis central district.

2) Traffic Volume of North Extension Highway (Average Daily Traffic)

The traffic volume of the North Extension Highway is shown in Table 2.

Table 2 Average Daily Traffic (North Extension Highway)

(vehicles/day)

	2009	2010	2012
Motorway - MC33E2	- (14,300)	- (15,900)	44,900 (19,100)

Source: Appraisal documents (Summary of SAPROF report) Responses to Questionnaire, Actually survey data by the evaluation team

Note: Numbers in ( ) are planned numbers assuming that the project would be completed by 2002.

Because of the improvement to the expressway standard and extension of the route, the traffic volume of the North Extension Highway is substantially higher than planned (about 2.4 times) and the actual traffic volume was 44,900 vehicles/day. The reason for higher traffic volume would be that more traffic than expected at the planning stage heading Carthage and La Marsa in the northeastern region from the Tunis central district avoided National Roads 8 and 9 along the Tunis Lake north coast, which were heavily travelled and made detours to the Canal Crossing Highway and North Extension Highway. More traffic uses North Extension Highway, which was constructed under the project, and consequently contributed to the mitigation of traffic congestion on National

[5] Transporting capacity per day by two ferries. The operating hour is from 6:00 AM to 9:30 PM and the average crossing time by ferry is about 40 minutes. When the weather was adverse or commercial vessels cross the canal, the ferry operation was stopped.

[6] Generally, generated and induced traffic is assumed to be 5-10% each. It was conservatively assumed here that each traffic would be 10% and the total 20%.

Roads 8 and 9, which connect directly with the Tunis central district.

(2) Improvement of accessibility between La Goulette and Rades ports

1) Improvement of Accessibility between La Goulette and Rades ports

Before the project, it took 15 minutes (including time for embarkation, crossing and disembarkation) to travel between La Gourette and Rades ports by ferry. However, drivers needed to allow 30-40 minutes given the weather condition, and waiting time. Upon completion of the project, it is now possible to travel in five minutes regardless of the weather condition.

(3) Reduction of Travel Time

In order to examine how much benefits (reduction of travel time, namely enhancement of accessibility) were brought in to users who travel in the high demand section between the Tunis northeastern and southeastern regions, the time needed to travel between two specified points by two routes - the one passing through the Tunis central district (a shortest route passing through arterial highways) and another crossing the bridge - were compared under the post evaluation work. The selected points are the probable center of each northeastern and southeastern region. The selected point in the northeastern region is the merging point of National Road 9 and Gammarth Road in Marsa District, and in the southeastern region is the merging point of National Road 1 and Environment Road in Hammam Lif.

Table 3 Travel Time by the Route Passing through the Central District and the Route Crossing the Bridge

	Section (Route)	Distance (km)	Travel Time (minutes)
Route Passing through the Central District	Passing through Tunis Central District (National Road 9, 9, and 1)	32	55
Route Crossing the Bridge	Crossing Rades - La Gourette Bridge (Route Express, Route 33, Environment Road)	24	31

Source: The time was actually surveyed by the evaluation team during the period of 10:30 AM - 3:00 PM on December 10 (Saturday), 2011. Since Tunisia is an Islamic country, Saturday is a working day (half day) and traffic volume is high.

Figure 3 Route passing through the Central District (blue line) and Route crossing the Bridge (red line)

Since the travel distance of the bridge crossing route is shorter than the city passing route by 8 km, the travel time between 2 points is reduced by about 25 minutes. The reasons for reduced travel time are because of the shorter travel distance and lighter congestion on roads. From the results of beneficiary survey, it is apparent that the travel time between northeastern and southeastern Tunis of road users was reduced by 15-20 minutes (average of reduced time of travel by respondents of beneficiary survey) upon completion of the project.

3.2.2 Qualitative Effects

As qualitative effects, mitigation of traffic congestion in the regions surrounding the Tunis Lake and improvement of accessibility between La Goulette and Rades ports are considered.

(1) Mitigation of traffic congestion in the regions surrounding the Tunis Lake

According to the Bridges and Highways Department of MOE, since the alternative route was developed in addition to the route passing through the Tunis central district by completion of Rades - La Gourette Bridge, the traffic congestion, seen at the south entrance point to the central district (the merging point of Republique Road (Z4) and National Road Route 1) was substantially mitigated. It was verified that the traffic, which makes a detour from passing through the central district by crossing the bridge, has increased because the regulation that enforces the time zone for large vehicles to be able to pass through the central district (large vehicles were not allowed to pass until 9:00 AM) was lifted after the project was completed.

(2) Improvement of accessibility between La Goulette and Rades ports

By completion of the project, the missing link (Rades - La Gourete Bridge section) in the ring road surrounding the Tunis Lake has been satisfied, and the network has been completed. Thus, it has enabled the dispersing of traffic, which used to concentrate into the central district. At the same time, La Gourette and Rades ports were connected by land and the accessibility was substantially enhanced. The role allotment of both ports was clarified and the integrated operation of both ports is now possible. La Gourette Port is now a passenger-specific port with some cargo handling, while Rades Port is a cargo-specific port. During project implementation, the old Rades Port was demolished and its functions were integrated into the new Rades Port. During the meeting with the Deputy Director of OMMP Rades Port, he testified that by completion of the Rades-La Gourette Bridge, Rades and La Gourette were integrated, the pressure to Rades region was mitigated, and the trucking firms are pleased with the effective operations in both ports.

In this ex-post evaluation work, beneficiary surveys were conducted, through interviews, in three districts near the Rades - La Gourette Bridge, including Lac 1, Le Kram, and Rades. The number of respondents at each district was 40, with a total number of 120 (50 females and 70 males). Regarding the mitigation of traffic congestion in the Tunis central district, 54% of respondents recognize that the contribution of the project is substantial and 41% think that it is fair. The remaining 5% recognize that the project has made some contribution. Thus, it reveals that the project has contributed to mitigation of congestion, which was one of the obstacles in the promotion of economic activities.

3.3 Impact

3.3.1 Intended Impacts (Contribution to the Regional Development and Industrial Promotion in the Tunis Lake Coastal Region

(1) Regional Development and Industrial Promotion in the Tunis Lake Coastal Region

As the regional development proceeds, the number of enterprises starting up a new business generally increases, as well as the migration of people as a result of increase in land prices. The comparison of land prices in the project affected area before and after the project showed that there were no major changes in land prices in the northern and southern regions around Rades - La Gourette Bridge. It was determined that there were no major changes in the northern region because there was no vacant land and the subject area was already a well-developed commercial area. The southern region (Rades side) is an industrial and warehouse zone. However, the development projects are planned in the project affected areas, including the area between National Road 9 and the Tunis Lake northern area (Bergus du Lac, and Lac 2 districts with a total area of about 1,300 ha), Ain

Zaghouan district located in the north of Lac 2, and Bhar Lazrak located in further north. The residents who would live in these developed areas will have access to the route passing through North Extension Highway, which was constructed under the project and the existing Canal Crossing Expressway when National Road 9 is congested. Completion of an alternative highway route (this project) will provide more benefits to the residents. This could be a factor in generating more economic development.

(2) Mitigation of Air Pollution in Greater Tunis

Among the substances, which are the sources of air pollution, major substances originating from exhausted gas from motor vehicles, includes suspended particulate matter and nitrogen dioxide. Since sulfur compounds are included in the low quality petroleum, its combustion generates a trace of sulfur oxides, which is also one of pollutants. In order to assess the air quality (air pollution), the yearly changes of three substances monitored in Tunis, including suspended particulate matter, nitrogen dioxide and sulfur dioxides are discussed below.

1) TSP

Regarding TSP, changes in suspended particulate matter (in PM10) monitored at two locations in Tunis are shown in Table 4 and 5.

Table 4 Changes of Suspended Particulate Matter in Tunis Central District (in PM10)

microgramme/m^3

Monitoring location	2006	2007	2008	2009	Allowable limit	Recommended targets
Bab Saadoun	316	328	190	170	260	120

Source: Agence Nationale de Protection de l'Environment (ANPE) – Indicateurs régionaux d'amélioration des conditions de vie-OTEDD- Juin 2010

Note 1: Figures are the maximum value recorded within 24 hours.

Note 2: The allowable limit and recommended targets are Tunisian standards.

Note 3: Bab Saadoun is in the central district.

Since 2007, the maximum value within 24 hours of PM10 has been decreasing. Although the actual recorded value is within the allowable limit, it has not reached the recommended target level.

Table 5 Changes of Suspended Particulate Matter (in PM10)

(at the monitoring station close to the project site)

microgramme/m^3

Monitoring location	2007	2008	2009	2010	Allowable limit	Recommended targets
Monthly variation in Ben Arous	71 - 87	57 - 90	61 - 84	56 - 150	260	120
Annual monthly average	81	76	72	94		

Source: ANPE

Note 1: Figures are 24 hours average

Note 2: The monitoring station is located about 7 km (linear distance) away from the project site.

Since 2007, the urban air quality has been improving. However, due to increase in traffic volume, it deteriorated in 2010. Since the PM10 values deteriorated, particularly in the summer time (exceeded the recommended targets in August and September), the annual monthly average was also higher than the previous year.

2) Nitrogen Dioxide (NO_2)

Changes of Nitrogen Dioxide (NO_2) in Greater Tunis are shown in Table 6.

Table 6 Changes of Nitrogen Dioxide (NO_2)

microgramme/m^3

Monitoring location	2006	2007	2008	2009	2010	Allowable limit (1-hour average)	Recommended targets (1-hour average)	WHO standards (1-hour average)
Bab Saadoun	104	56	150	-	126 (Dec.)	660	400	200
El Ghazela	-	-	139	98	48 - 102 (Jan. - Nov.)			
Bab Alioua	-	-	365	395	133 - 363 (Jan.- Jun.)			
Mannouba	-	-	122	115	81 - 151 (Jun. - Sept.)			

Source: ANPE - Indicateurs régionaux d'amélioration des conditions de vie-OTEDD- Juin 2010 Rapport National sur l'Etat de l'environnement en 2006, 2008, Ministère de l'Environnement et du Développement durable and Bulletin de l'air-2010 ANPE

Note 1: The Bab Saadoun monitoring station is in the Tunis central district.

Note 2: The El Ghazela monitoring station is about 12 km north of Tunis central district and near Ennahli Park.

Note 3: The Bab Alioua monitoring station is in the Tunis central district, and about 1.2 km west of Tunis Marina.

Note 4: The Mannouba monitoring station is about 8 km west of the Tunis central district.

For the past five years (2006 - 2010), the concentration of NO_2 at three monitoring stations, except at Bab Alioua, was within the WHO standards. The higher NO_2 value at Bab Alioua was due to heavy traffic in the area since the monitoring station is close to Tunis railway station and Z4, which is located along the Tunis Lake west coast.

3) Sulfur Dioxide (SO_2)

Changes of Sulfur Dioxide (SO_2) in Greater Tunis are shown in Table 7.

Table 7 Changes of Sulfur Dioxide (SO_2)

microgramme/m^3

Monitoring location	2008	2009	2010	Allowable limit	Recommended targets	WHO standards
El Ghazela	13	30	3 - 8	365	125	20
Bab Alioua	32	40	11 - 27			

Source: ANPE - Indicateurs régionaux d'amélioration des conditions de vie-OTEDD- Juin 2010, Rapport National sur l'Etat de l'environnement en 2008, Ministère de l'Environnement et du Développement durable and Bulletin de l'air – 2010- ANPE

Note 1: Figures are 24 hours average

Note 2: The allowable limit and recommended targets are Tunisian standards.

Note3: The El Ghazela monitoring station is about 12 km north of Tunis central district and near Ennahli Park.

Note 4: The monitoring station at Bab Alioua is about 1.2 km west of Tunis Marina.

As shown in Table 7, for the past two years (2008 and 2009), the concentration of SO_2 was worst. However, the pollution level both in the central district and suburban area has improved in 2010.

It is difficult to examine the effects on mitigation of air pollution by the project by referring to changes in the amount of air pollutants because: i) the locations of monitoring stations in the regions are irrelevant to the project; and ii) the traffic volume has been increasing yearly. However, it is apparent that SO_2 and NO_2 values, which originate in the exhaust gas emitted from motor vehicles has been decreasing.

(3) Promotion of Economic Development in Greater Tunis

By completion of the project, the missing link (Rades - La Gourete Bridge section) in the ring road surrounding the Tunis Lake has been satisfied, and the network has been completed. Thus, the accessibility for road users has been substantially enhanced. Because of completion of an alternative route, which goes around the Tunis central district, plans for development of residential areas, and attraction and promotion of industry promotion in the lake coastal regions (particularly in the northern coastal regions) have been developed. Thus, it is expected that the project will greatly contribute to the promotion of the economic development in Greater Tunis.

The beneficiary surveys showed that the project has contributed to the regional economic development around Tunis Lake, with 14% of respondents recognized the contribution as substantial, 66% think that it is fair, and that 20% acknowledged that it has made some

contribution. With regards to contribution in the promotion of business opportunities around the Tunis Lake, 41%, and 50% recognized that it is substantial and fair, respectively. Nine percent (9%) acknowledged that it has made some contribution.

Regarding the overall assessment of the project, 83% of respondents answer that the quality of life has improved with the completion of a detour route, not passing through the central district. Thus, it was confirmed that citizens also acknowledged the effectiveness of the project.

3.3.2 Other Impacts

(1) Impacts on the natural environment

The main issues before commencement of the project were conservation of the water quality in Tunis Lake and protection of traffic noise to the houses along the North Extension Highway corridor during the project implementation and operation stage. Although MOE has entrusted the monitoring of the water quality in Tunis Lake to a private firm engaged in the development of the south lake, no problems have been reported. These were due to the: i) revision of the alignment of North Extension Highway so that the area, where seaweeds are expected to proliferate, was also minimized by installing the geotextile screens and floating barriers when implementing the embankment work along the coast; and ii) flow of water in the channel connecting between the lake and sea was eased by reducing the obstacles, such as bridge piers in the channel.

Regarding the noise protection, the realigned route is located along the coast, therefore no houses exist along the right-of-way. There were no issues reported. Planting work has been undertaken in order to improve the aesthetic environment.

(2) Land Acquisition and Resettlement

The total land area acquired was 64 ha, of which 54 ha of public land and 10 ha of private land. Among two ordinary houses to be relocated, one was demolished and the other was relocated under the national solidarity program. Since it was discovered that the elementary school that was originally to be relocated was outside the right-of-way, relocation did not take place. The total amount spent for land acquisition and compensation is 4.3 million dinars. Resettlement was implemented as per the implementation schedule and there have been no compensation complaints received.

(3) Other Positive and Negative Impacts

Upon completion of Rades - La Gourette Bridge, the ferry service was stopped, and crews and staff were reassigned to the positions in Tunis Regional Bureau.

This project has largely achieved its objectives, therefore its effectiveness and impact are considered high.

Detailed Analysis of Achievement of Expected Effects including Impacts

The objective of the project was to i) mitigate the traffic congestion in the regions surrounding Tunis Lake by diverting traffic concentration into the Tunis central district; and ii) improve accessibility between La Goulette and Rades ports by constructing Rades-La Goulette bridge, thereby contributing to the regional economic development and industrial promotion in the Tunis Lake coastal region. Thus, in order to examine the impact to the regional development and industrial promotion by the project in quantifiable terms, it was essential to select the appropriate monitoring indicators, establish the baselines before the project, and plan the targets after the project (in several years). Consideration is needed to be taken to select indicators that will make it possible to easily collect existing statistical information or data without conducting specific studies after the project.

The detailed impact analysis was not planned before the commencement of the project. Thus, indicators regarding the actual condition before and after the project could be examined in quantifiable terms were selected for each evaluation item (four items in this analysis), and availability of the existing data and effectiveness of the data (monitoring location, date of monitoring and others) were examined. The availability and effectiveness of data on monitoring indicators for each evaluation item are shown in the following table. Among the information collected for purposes of the analysis in the report, discussions were based only on the indicators which are considered to be directly relevant to the project. Regarding the indicators on which quantitative data were not available, the qualitative information collected through interviews is supplemented.

Hierarchy of Objectives	Indicators	Source of Data Collection	Availability of Data/Information
Upper Goal: Regional economic development and industrial promotion in the Tunis Lake coastal region.		(originally planned)	
Outcome: 1) Integrated Development of Ports in Tunis	· Traffic volume crossing Rades - La Gourette Bridge (vehicles/day) · Required time to cross the bridge (minutes) · Handling volume of cargo by type of goods at 4 ports (Tunis, New Rades, Rades, and La Gourette) (tons/year), volume of transit cargo, Number of passengers (ferry users), waiting time at each port	MOE Port Authority	Actual data counted under the impact study (March 2012) Actual survey under the impact study (December 2011) OMMP's Annual Statistics available No data available on volume of transit cargo and waiting time
2) Mitigation of Air Pollution in Greater Tunis	· Emitted volume of SO_2, Dust, and NOx in 10,000 tons/year in Greater Tunis, · Concentration of SO_2, TSP, and NO_2 (mg/m^3) in Greater	Ministry of Agriculture and Environment (MAE)	Data on all the substances were collected from ANEP. (However, data at the relevant locations were not available)

	Tunis, Emitted volume and concentration of PM		
	· Number of patients having respiratory diseases	Ministry of Health (MOH)	Data collected from MOH
	· Traffic volume on main highways (ADT) by type of vehicle, Congestion rate	Ministry of Equipment (MOE)	Since only the data as of 2007 was available, traffic volume on roads around the Rades - La Gourette Bridge was counted under the Impact Study (March 2012), Congestion rates were calculated by the evaluation team.
	· Noise and Vibration		Data not available
3) Economic Development in the Tunis Lake Region	· Growth rate of GRDP, Number of new enterprises moved in, number of stores newly opened	Statistics Bureau	No data available by small jurisdiction /district
	· Land price, Developed area for housing, Population	Development Authority	Collected from newspaper articles, Data on area partly available
	· Number of bus operations connecting between the developed areas and Tunis central area.	Transport Bureau	Collected from Transtu
	· Change of transport cost after discharge		
	· Invested amount, development of industry, attraction of industries to the west	Development Authority	Data partly available through interview with OMMP, Information on development plan partly available
4) Other Quantifiable Impacts	Number of tourists visiting tourist spots	Statistics Bureau	Partly collected form annual statistics (data not available by spot)

As shown in the above table, data on the main substances of air pollutants were available. However, data at the sites where it is considered to be directly relevant to the project were not available. Since traffic counting has been undertaken every five years and the previous counting was made in 2007, data on traffic volume, which is an important indicator, after the project completion were also not available. Thus, a brief traffic counting was undertaken for two days (only day time) at four locations during the impact analysis and the results were used as data for examination. Regarding indicators to examine the economic development impacts, because the data by each small jurisdiction (district) are not available, it is difficult to compare the condition before and after the project and to make a quantitative impact examination is not feasible. Consequently, since the data to examine the impact to the regional development and industrial promotion in quantifiable terms was not sufficient, it was difficult to undertake the impact analysis/study with enough accuracy. In order to examine the impact by the project in quantitative terms not only at the outcome level but also at the impact level, it is essential to establish the most probable monitoring indicators at the planning stage and continue monitoring during the operation stage.

3.4 Efficiency (Rating: ②)

3.4.1 Project Outputs

The original and actual output of the project is shown in Table 8.

(1) Civil Work

Table 8 Output (original and actual)

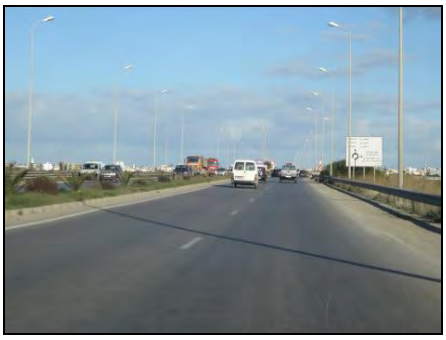
Item	Original	Actual
1) Canal Crossing Bridge	Length: 260 m, 2-lane x 2 (Extra-dosed Bridge)	as planned
2) Rades South Approach: viaduct, bridge	Approach viaduct:400 m Approach road: 2,190 m	Approach viaduct: as planned Approach: 2,000 m
3) La Goulette North Interchange and Expressway	Interchange viaduct:500 m Ramp way: 4 viaducts (about 1 km), 4 connecting highway (about 680 m), Relocation of existing expressway: 1.8 km	Interchange viaduct:720 m Ramp way: 4 viaducts (about 340 m), 4 connecting highway (about 850 m), Relocation of existing expressway: 2.4 km
4) North Extension Highway	Length: 2.3km	Lenght5.5km + 2 branch lines (1 km)
5) Lighting Facility	Not planned	Lighting and substation (15 km) Additional work

Source: Appraisal documents, PCR, Responses to Questionnaire

Note: The original planned outputs are at the time of appraisal. The final planned outputs were determined based on the detailed designs, which were undertaken under the project.

Regarding the output, the main components have been completed almost as planned. However, the scope of work and design specifications has been partly revised. Revisions were made and the reasons for revision are as follows:

1) Regarding La Gourette North Interchange and its connecting expressway, the length of bridges and viaducts and the dimension of the cross section of ramps (roadway width) were revised based on the analysis at the detailed design stage.
2) At the feasibility study stage, the route of North Extension Highway was planned so that it passes in the west of the power plant and continued directly to the north toward Carthage. However, at the detailed design stage, in order to avoid the community division around the power station, the route alignment was revised as the route traversed along the coast of the Tunis Lake. The route turns left to the west at the crossing point with MC33E2 in order to connect with National Road 9. The section from the east of the Rades-La Gourete Bridge to the crossing point with Mohamed V Road was defined as the project section. (revision of routing and length)
3) It was decided to install lightings along the whole stretch of the project roads together with substations considering the road user's safety and comfort.



North Extension Road

Rades-La Gourette Bridge and Ramps

(2) Consulting Services

The original consulting services included detailed designs/field surveys, assistance in bidding, construction supervision, detailed environmental impact assessment, training/technical assistance, and monitoring (5 months) the assignments of 96 M/M by foreign experts and 344 M/M by local experts. However, because of additional work (review of work implementation related documents, which was not included in the original scope of work) and delay of the implementation period, the actual assigned man/months were 147 M/M by foreign experts and 482 M/M by local experts. The original scope of work was implemented almost as planned.

3.4.2 Project Inputs

3.4.2.1 Project Cost

The estimated project cost at appraisal was 11.205 billion yen, of which the total Japanese ODA loan of 8.43 billion yen was to be used on foreign currency and part of local currency portions, and the rest was to be funded by the Tunisian government. The actual project cost was 11.477 billion yen, of which the Japanese ODA loan used was 8.42 billion yen and the rest was funded by the Tunisian government. Thus, the actual cost was slightly higher than planned, which is equivalent to 102% of the planned cost. In terms of the local currency, the actual cost exceeded the plan, which is equivalent to 141% of the plan. As mentioned above, the length of North Extension Highway was extended by 2.4 times and the lighting facilities were added, which resulted in higher scope of work against the original plan. If the total cost included the cost for the additional work (about 370 million yen) and officially amended in the contract, is compared with the plan, the actual cost was within the plan (99.7% of the plan).

Table 9 Comparison of Project Cost (Planned and Actual)

unit: million yen

Item	Planned					Actual				
	Foreign ODA loan	Local		Total		Foreign ODA loan	Local		Total	
		Own fund	ODA loan	Total	ODA loan		Own fund	ODA loan	Total	ODA loan
Civil work	3,135	156	3,823	7,114 (61.33)	6,959	2,926	1,024	4,424	8,374 (99.65)	7,350
Consulting Services	433	0	698	1,131 (9.75)	1,131	610	93	434	1,137 (13.53)	1,044
Contingency	314	397	0	711 (6.13)	314	-	-	-	-	-
Land Acquisition	0	804	0	804 (6.93)	0	0	439	0	439 (5.22)	0
Management Cost	0	116	0	116 (1.0)	0	0	79	0	79 (0.94)	0
Taxes	0	1,329	0	1,329 (11.46)	0	0	1,440	0	1,440 (17.14)	0
Administration Cost	-	-	-	-	-	8	0	0	8 (0.10)	0
Total	3,882	2,802	4,521	11,205 (96.60)	8,403	3,544	3,075	4,858	11,477 (136.58)	8,402

Source: Appraisal documents, Responses to Questionnaire
Exchange rate: 1TND=116 yen at appraisal, 1TND=84.03 yen (average during the period between January 2001 and September 2009) at post evaluation
Note: Numbers in ( ) are in million TND

The main reasons for the cost increase (in local currency) are as follows:

1) The length of bridges and viaducts and the dimension of the cross section of ramps (roadway width) in La Gourette North Interchange and its connecting expressway were revised based on the detailed designs.
2) At the detailed design stage, the alignment of the North Extension Highway was changed and extended (additional cost with 205 million yen).
3) Additional work for lighting facilities (168 million yen)
4) Increase by price escalation due to extension of the project period

However, since the Japanese yen appreciated by 38% from the appraisal stage, the total project cost was almost as planned in Japanese yen.

3.4.2.2 Project Period

The project period was much longer than planned. The project period planned at appraisal was from March 1999 (signing of the Loan Agreement) to October 2003 (open to public) with a total period of 56 months. The actual project period was from March 1999 (signing of the Loan Agreement) to March 2009 (open to public) with a total period

of 121 months, or equivalent to 216% of the plan.

The main reasons for the delay are as follows:

1) Commencement of the consultant selection process was delayed by 5 months, and it took 21 months, which is about double the plan to complete the selection process.
2) Due to delay in the consultant selection process, commencement of detailed designs was delayed by 14 months and the detailed design took 17 months, which is about double the plan.
3) Due to delay in the completion of detailed designs, the advertisement for bidding for civil work commenced with a 21-month delay from the original schedule. Moreover, it took longer to complete the bidding procedures (particularly to secure clearance on the bidding results), an actual total of 39 months, which is more than double the planned period.
4) Since the geotechnical and soil investigation at the design stage was not comprehensive enough, the following countermeasures were needed during project implementation: i) changes in construction methodologies because it was found that the planned boring machine was not suitable; and ii) soft ground treat work since the surcharge in the soft ground area was not planned in the original design.
5) Preparation of equipment (support members for viaduct sections, pre-stress concrete members and others) and its delivery was delayed.

Delay in the project period is partly due to the problems that occurred during project implementation. However, it is considered that the main reason is the implementation schedule prepared at the appraisal stage, which was not practical in Tunisia. For instance, 9 months for consultant selection, 7 months for detailed designs (including bidding documents), 15 months for procurement of civil work through the ICB procedures and 36 months for construction work are considered to be optimistic.

3.4.3 Results of Calculations of Internal Rates of Return (IRR)

(1) Economic Internal Rate of Return (EIRR)

EIRR at the appraisal stage was estimated at 14.4%. Since data on the construction cost spent by year, the spending plan for operation and maintenance work and details of benefits (vehicle operating costs, time saving costs and others) are not available, calculation of EIRR at the post evaluation stage is difficult to carry out.

Although the project cost was lower than planned, the project period was significantly longer than planned. Therefore, efficiency of the project is considered fair.

3.5 Sustainability (Rating: ②)

3.5.1 Structural Aspects of Operation and Maintenance

As originally planned, the executing agency, Department of Highways and Bridges of Ministry of Equipment (MOE) has been responsible for operation and maintenance of the project after completion of the project. However, with regards to the actual routine inspection and maintenance (signals, safety facilities, lighting facilities, changes of pars, repairs), Tunis Regional Bureau (staffed with about 50 employees for 268 km road sections) is responsible for the crossing bridge, La Gourette North Interchange and its connecting expressways, and North Extension Highway; while Ben Arous Regional Bureau (for 313 km road sections) is responsible for Rades South approach viaducts and bridges. The operation and maintenance of the monitoring system for the crossing bridge, detailed inspection of completed work, maintenance of plants and drainage facilities, and cleaning of expansion joints and rain water catchment facilities are entrusted to private companies.

Each team, responsible for the project components among the staff responsible for maintenance within the Tunis and Ben Arous Regional Bureaus, consists of a Chief Engineer responsible for maintenance work, an Engineer responsible for the region, three workers and a Lighting Engineer. Since the periodic maintenance work requires high technology (particularly on the extra-dosed bridge) and major repairs/improvement work are planned in the near future, the high-level planning strategy, including establishment of medium/long-term maintenance work implementation plans and decision making on priority of work to be done, needs to be developed. Thus, engineers and technicians, who are specialized in maintenance of bridges and structures are required, and increasing the number of staff in charge of maintenance and operation needs to be considered.

3.5.2 Technical Aspects of Operation and Maintenance

The technical capacity of staff in charge of operation and maintenance (routine inspection and maintenance) at both Regional Bureaus is considered appropriate. Regarding the training of staff, the consultant in charge of construction supervision invited a few engineers responsible for maintenance to Japan and UAE for overseas study training. The periodic inspection/maintenance and major rehabilitation work (particularly bridge sections), which will occur in the near future, will be contracted out to private companies since the number of assigned technical staff is insufficient. However, it is essential to prepare the future maintenance work schedule, and determine the work priority to be implemented under the budget constraints on a timely basis, as well as further training of staff on the new maintenance technology and methodology, which was introduced under the project.

The monitoring and maintenance manuals for the structures completed under the project

were prepared by a local consultant on behalf of contractors, and they are now being reviewed by MOE for final approval.

3.5.3 Financial Aspects of Operation and Maintenance

Among the total budget allocated to the Department of Highways and Bridges of MOE, 88% are used for new construction of roads and improvement, and 12% are allocated for maintenance work. The ratio of budget allocation is more or less the same compared to other developing countries. The maintenance budget allocated to Tunis and Ben Arous Regional Bureaus for the past four years - covering 2009 through 2012 - after completion of the project is shown in Table 10.

Table 10 Maintenance Budget for the past Four Years

unit: million TND

Regional Bureau	2009	2010	2011	2012
Tunis	2,345	2,605	2,805	2,920
Ben Arous	875	1,265	1,255	1,350

Note 1: Maintenance budget for Tunis Regional Bureau includes 1,600 million TND for electricity for lighting.
Note 2: Fiscal year is from January 1 to December 31

From the maintenance budget allocated to the Regional Bureau, one million TND per year have been spent for the maintenance of the project sections (routine inspection and maintenance) for the past three years. It is reported that the budget allocated has been sufficient. While the completed infrastructure facilities are still new, this amount of budget might be sufficient for routine inspection and maintenance. However, when the periodic maintenance work and large-scale rehabilitation develops in the future, additional budget allocation is needed. MOE also acknowledged that they are concerned about the financial source for increase in budget for major rehabilitation and maintenance.

3.5.4 Current Status of Operation and Maintenance

The routine inspection and maintenance on roads and bridges constructed under the project has been implemented as per the annual implementation plan by MOE. However, the overlay of asphalt pavement and pavement of shoulders are contracted out to contractors by selecting contractors through competitive bidding. To-date after completion of the project, no major repairs have been undertaken, except for some minor work during the defect liability period, and thus, the surface condition has been well maintained. During the ocular inspection in the field, no cracks, pot holes and damaged joints were found on the surface of bridge and viaducts sections. As traffic volume (particularly large trucks) increases, the degree of damage to the bridge decks needs to be inspected from the bottom

of the decks (this applies to the existing bridges as well), and thus, procurement of special equipment for bridge inspection needs to be considered. The operation and maintenance of the project has been properly implemented, and the effectiveness by the project is expected to continue. However, it is essential to continuously monitor the degree of damage of the crossing bridge with increase in traffic volume, and properly maintain the completed work.

Some problems have been observed in terms of budget to be allocated for maintenance work, therefore sustainability of the project effect is considered fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The objectives of the project were to: i) mitigate traffic congestion in the regions surrounding the Tunis Lake by diverting traffic concentration into the Tunis central district; and ii) improve accessibility between La Goulette and Rades ports by constructing a bridge connecting La Goulette, located in the north of the Tunis Lake canal, and Rades, located in the south, and thereby contributing to the regional economic development and industrial promotion in the Tunis Lake coastal region. The project has been highly relevant to the development plans and needs of Tunisia, as well as Japan's ODA policies. Regarding mitigation of traffic congestion in the regions surrounding the Tunis Lake by diverting traffic concentration into the Tunis central district and improvement of accessibility between La Goulette and Rades ports which are the project's objectives, since the project has somewhat achieved its objectives, its effectiveness is fair. Although the project cost was lower than planned, the project period was significantly longer than planned. Therefore, the efficiency of the project is fair. Some problems have been observed in terms of budget allocation for maintenance work, therefore sustainability of the project is fair.

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

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

It is recommended to conduct regular traffic counting at the same location and same time of the year. The traffic volume is a fundamental data in planning and programming its yearly and future maintenance and management work, and for preparation of future road development plans. The Maintenance Bureau of MOE could be an appropriate unit responsible for collecting data on traffic count, and analyzing and storing the data.

4.2.2 Recommendations to JICA

It is recommended to continue monitoring the maintenance and management condition focusing on the bridge section (the bridge has unique structure, which is new to Tunisia). It is also essential to implement the training program on the maintenance methodology for the special bridge structure and assist financially in procuring special maintenance equipment (for bridge inspection).

4.3 Lessons Learned

After the project had commenced, design changes on the substance of the project scope (changes of cross section, extension of the North Extension Highway, addition of lighting facilities) were made. Consequently, along with the optimistic project implementation schedule prepared at the appraisal stage, the project period was substantially delayed. Thus, it is considered that the review on the technical appropriateness of the project at the appraisal stage was insufficient. It is essential in an infrastructure project that requires high-technology, such as the extra-dosed bridge introduced under this project (first bridge type in Tunisia), to invite outside expert/s or specialist/s in the relevant sector (bridge planning and designs in this case) to review the appropriateness of the plans and designs, and maintenance plans from the technical viewpoints at the appraisal stage.

Comparison of the Original and Actual Scope of the Project

Item	Original	Actual
1. Output		
1) Canal Crossing Bridge	Length: 260 m, 2-lane x 2	as planned
2) Rades South Approach:	Approach viaduct:400 m Approach road: 2,190 m	Approach viaduct: as planned Approach: 2,000 m
3) La Goulette North Interchange and Expressway	Interchange viaduct:500 m Ramp way: 4 viaducts (about 1 km), 4 connecting highway (about 680 m) , Relocation of existing expressway: 1.8 km	Interchange viaduct:720 m Ramp way: 4 viaducts (about 340 m), 4 connecting highway (about 850 m), Relocation of existing expressway: 2.4 km
4) North Extension Highway	Length: 2.3km	Lenght5.5km + 2 branch lines (1 km)
5) Lighting Facility	Not planned	Lighting and substation (15 km) Additional work)
6) Consulting Services	Foreign experts 96M/M, Local experts 344M/M	Foreign experts 147M/M., Local experts 482M/M
2. Project Period	March 1999 - October 2003 (56 months)	March 1999 - March 2009 (121 months)
3. Project Cost		
Amount paid in Foreign currency	3,882 million yen	3,544 million yen
Amount paid in Local currency	7,323 million yen	7,933 million yen
Total	11,205 million yen	11,477 million yen
Japanese ODA loan portion	8,403 million yen	8,402 million yen
Exchange rate	1TND = 116 yen (as of July 1998)	1TND = 84.3 yen (average between January 2001 and September 2009)

Attachment: Map of Greater Tunis

Tunisia

Ex-Post Evaluation of Japanese ODA Loan Project

El Jem - Sfax Motorway Construction Project

External Evaluator: Yasuhiro Kawabata, Sanshu Engineering Consultant

0. Summary

The objective of the project was to contribute to promotion of the economic development in both northern and southern regions in Tunisia through establishing efficient production and logistics system, and saving time costs by constructing a motorway between El Jem and Sfax in the southern Tunis. The project has been highly relevant to the development plans and needs of Tunisia as well as Japan's ODA policies, and therefore its relevance is high. Regarding saving of travel time, which is the project's objective, this project has somewhat achieved its objectives and has also contributed to promotion of the economic development in both northern and southern regions in Tunisia. Therefore, its effectiveness is fair. Although the project cost was lower than planned, the project period was longer than planned. Therefore, efficiency of the project is fair. Since no major problems have been observed in the operation and maintenance system (organizational setup, technical capacity and financial status), sustainability of the project is considered high.

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

1. Project Description

Project Location

El Jem – Sfax Section

1.1 Background

At the appraisal time (2002), according to the Free Trade Agreement with European Union (effective in 1995), the gradual elimination of tariffs (complete elimination by 2008) was planned, and activation of trade and logistics was expected. Thus, development of the transport infrastructure was considered to be a key issue to be addressed. Particularly, with respect to the

highway/road sector, development of the motorway network was considered essential in order to efficiently move/transport freight and passengers and strengthen the industry competiveness. Thus, according to the motorway development plan established in September 1998, construction had progressed on the following three arterial motorways radiating from the capital city, Tunis: i) 260 km section toward the south; ii) 140 km section to the west, and iii) 50 km section to the north.

Regarding the highway development and improvement in Tunisia, Arab Fund for Economic and Social Development (AFESD), European Investment Bank (EIB), African Development Bank (ADB), The World Bank, and other financial institutions have been financing. As far as the motorways are concerned, AFESD has financed Autoroute No. 1 (Tunis - Msaken route), No. 3 (Tunis - Mejez El Beb route) and No. 4 (Tunis - Bizerte route), and EIB was to finance the Msaken - Sfax section, which is located to the north of the subject project.

At the appraisal stage, the National Route No.1 connecting between Tunis and Sfax, the Tunisian second largest city in the south was heavily trafficked. Particularly, the share of commercial vehicles such as large trucks among all the types of vehicles was high. Since the existing national highway was a two-lane highway for both directions, issues such as traffic accidents due to increasing traffic volume and increase of travel time due to traffic congestion had been concerned.

1.2 Project Outline

The objective of the project was to contribute to promotion of the economic development in both northern and southern regions in Tunisia through establishing efficient production and logistics system, and saving time costs by constructing a motorway between El Jem and Sfax in the southern Tunis. The location of the project site is shown in Figure 1.

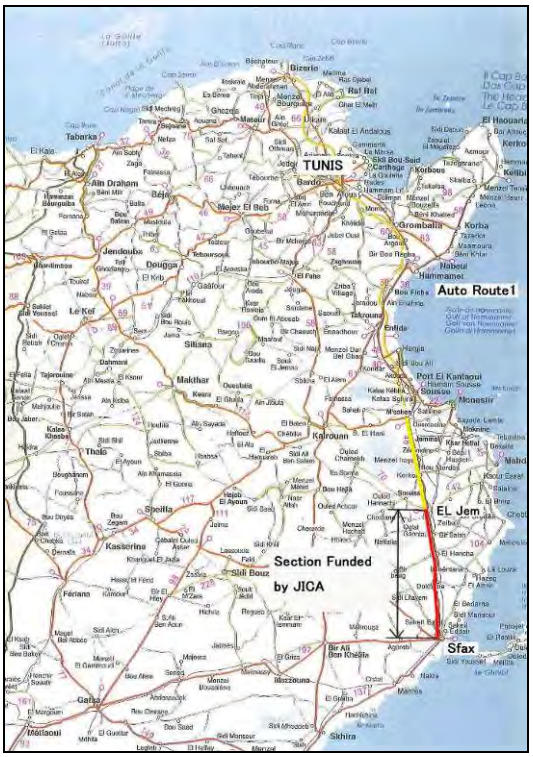


Figure 1 Location of the Project Site

Loan Approved Amount/ Disbursed Amount	12,501 million yen /10,113 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	March 2002 / March 2002
Terms and Conditions	For work: Interest Rate: 2.20% Repayment Period: 25 years (Grace Period: 7 years) Conditions for Procurement: General untied For Consulting services: Interest Rate: 0.75% Repayment Period: 40 years (Grace Period: 10 years) Conditions for Procurement: Bilateral tied
Borrower / Executing Agency (ies)	Societe Tunisie Autoroutes (STA)
Final Disbursement Date	December 2009
Main Contractor (Over 1 billion yen)	Afrique Travaux/Soroubat (El Jem - El Hancha section), SBF/ETEP (El Hancha - Sfax section) (Tunisia)
Main Consultant (Over 100 million yen)	Nippon Koei/SCET Tunisie (Tunisia)
Feasibility Studies, etc.	F/S by Tunisian Consultants (1998), SAPROF (February 2001)
Related Projects	Msaken – El Jem section (50km), which is located in the north of the project section, was funded by European Investment Bank (EIB)

2. Outline of the Evaluation Study

2.1 External Evaluator

Yasuhiro Kawabata, Sanshu Engineering Consultant

2.2 Duration of Evaluation Study

Duration of the Study: July 2011 - September 2012

Duration of the Field Study: December 5 - 19, 2011, January 28 - February 7, 2012, and May 5 - 15, 2012

2.3 Constraints during the Evaluation Study

none

3. Results of the Evaluation (Overall Rating: B[1])

3.1 Relevance (Rating: ③[2])

3.1.1 Relevance with the Development Plan of Tunisia

In the Tunisian 10th Five-Year Plan (2002-2006), following the previous Five-Year Plan, "Development of the infrastructure in order to strengthen the industrial competitiveness" was identified as one of policy guidelines, and importance of the transport sector was emphasized so that particularly the logistical system needed to be improved and industrial competitiveness needed to be enhanced. In the transport sector, particularly, highways had carried about 90% of passengers and about 80% of freight as the most important land transport mode in Tunisia, and thus, the highway development was a key issue in order to promote the economic activities. Moreover, in the motorway development plan issued in September 1998, the subject section was identified as one of 520 km priority sections surrounding Tunis, which was planned to be completed by 2012.

In the 11th Five-Year Plan (2007 - 2011), the economic development with the growth rate of 6.1% per annum was anticipated through the open market policy, enhancement of productivity and creation of new job opportunities. In order to achieve this target, the transport sector has been still considered important to strengthen the industrial competitiveness. Particularly, the development of motorway network has been considered to be an essential investment in order to activate the economic exchanges and trade with neighboring countries, and promote the human exchanges through tourism. Development of arterial highways and rural roads, and establishment of highway network connecting between industrial and commercial cities are also emphasized.

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

2 ③: High, ② Fair, ① Low

3.1.2 Relevance with the Development Needs of Tunisia

At the appraisal stage, it was anticipated that construction of a safe and efficient motorway would soon commence to address issues such as traffic accidents and increase of transporting time due to traffic congestion, which were basically caused by increase of traffic volume on National Route No. 1 connecting between Tunis and Sfax. Along the corridor, core cities such as Sousse and Monastir (tourist cities) and Sfax (commercial city) exist, and promotion of economic development has been anticipated by constructing a motorway.

The allocation of budgets to the highway/road sector among the transport sector under the 10th and 11th Five-Year Plans were 57% and 31%, respectively, and the highway/road sector was the largest budget taker. Thus, the highway/road sector has been still a priority sector. The motorway development plan with a total length of 1,200 km, which was established in 1998, is still valid. The section to be constructed under the project is the important 50 km section between El Jem and Sfax along Autoroute No.1 with a total length of 630 km, originating at Bizerte, passing along the Mediterranean coast toward south, and ending at the border with Libya. Autoroute No.1 including the subject project section is also the segment of Trans-Africa Highway Route 1 (Maghreb Highway concept) connecting between Cairo and Dakar. The Msaken - El Jem section (50 km), which is located to the north of the subject project, and was funded by European Investment Bank (EIB), was open to traffic at the same when the El Jem - Sfax section was open to traffic. The southern Sfax - Gabes section, also funded by EIB is now under construction and expected to be completed by end 2013. The Gabes - Medenine section will be implemented with the Japanese ODA loan (Loan Agreement was signed on February 17, 2012), and the Medenine - Ras Jedir section with the loan from African Development Bank (Loan Agreement was signed in September 2011).

3.1.3 Relevance with Japan's ODA Policy

In the Country Assistant Strategy for Tunisia (issued in October 2002), priority sectors and themes to be aimed in Tunisia included the following three pillars: 1) enhancement of industries: 2) development and management of water resources; and 3) improvement of environment. Particularly, regarding the enhancement of industries, the assistance to the economic infrastructure sector focusing on transport and IT/telecommunication sectors was also included together with other items to be assisted. In the Overseas Economic Cooperation Project Implementation Strategy of Japan International Cooperation Agency (JICA), "the development of transport infrastructure which would contribute to strengthening the industrial competitiveness" was listed as one of pillars for financial assistance.

Accordingly, the project has been highly relevant with the Tunisian development plan and needs, as well as Japan's ODA policies. Its relevance is therefore considered high.

3.2 Effectiveness[3] (Rating: ②)

3.2.1 Quantitative Effects (Operation and Effect Indicators)

(1) Average Daily Traffic (El Jen - Sfax section)

The average daily traffic after completion of the project is shown in Table 1.

Table 1 Average Daily Traffic (El Jem - Sfax section)

unit: vehicles/day

	2009	2010	2011 in 3 years after completion
Motorway	- (9,000)	9,000 (9,500)	7,800 (9,900)

Source: Appraisal documents, Responses to Questionnaire
Note 1: At appraisal, opening was scheduled for April 2006. Actual opening date was June 2008.
Note 2: Actual traffic volume in 2010 is the volume during the period when no toll was charged until December 22, 2010.
Note 3: Charging toll commenced on December 23, 2010.
Note 4: Numbers in ( ) are projected volume at the appraisal stage. The projected volume in 3 years after the completion was 9,000 vehicles /day.

The average daily traffic of the El Jem - Sfax section as of 2011 was 7,800vehicles/day, which is 79% of the projected volume. Although one of reasons is delay of opening to public, the demand projection in the feasibility study is seemed to be overestimated[4].

(2) Travel Time (El Jem - Sfax section)

The travel time between El Jem and Sfax after completion of the project became 30 minutes (timed by the evaluation team) , which resulted in saving of one hour travel time compared with that of before the project (96 minutes by using National Route 1 according to the appraisal documents).

(3) Traffic Accident Rates

Changes of accident rates on the motorway and the existing National Route 1 (NR1) after completion of the project are shown in Table 2.

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

[4] The projected traffic volume in the first operational year (2006) of the El Jem - Sfax section was estimated at 15,710 vehicles/day and the share between the existing national road and the new motorway was assumed to be 50/50. Thus, the estimated traffic volume of the motorway was 7,855 vehicles/day. The assumed diversion rate under the traffic condition when the existing national road has still enough capacity to accommodate traffic volume is considered to be too high.

Table 2 Changes of Accident Rates on Motorway and NR1

unit: accidents/100 million vehicles km

	2006	2009	2010
	Before project	Right after opening	In 2 years after opening
Existing NR1	94.3	46.3	41.6
Motorway	-	40.6	33.4

Source: Appraisal documents, Responses to Questionnaire

The traffic accident rate on the existing national road was lowered by half because of reduction of traffic volume after opening of the motorway to public. The accident rate on the motorway in two years after opening has been also lowered as drivers have become familiar with driving on motorways. The reason for lower accident rates on both highways (almost same level as those in European countries and US) is likely that the traffic volume is much less than the highway capacity of each highway.

3.2.2 Qualitative Effects

Promotion of Regional Development

Since by completion of the project, Tunisian largest city, Tunis (with a total population of about 2.4 million including those in neighboring regions) was connected with the second largest city, Sfax (with a population of 920,000) in three hours (about 270 km), the highway network was expanded and the accessibility to markets was enhanced. Moreover, completion of a safe and efficient motorway has contributed to enhancement of production and logistic system.

3.3 Impact

3.3.1 Intended Impacts

Contribution to Promotion of Integrated Economic Development in the North-South Regions

The invested amount and increased employment opportunities in the project affected area (Sousse, Monastir, Mahdia, Sfax) during the past three years (2008 - 2010) were about 20% of the national total. The number of foreign enterprises registered in the project affected area as of October 2010 was 973 (about 32% of foreign enterprises in Tunisia), and they created 94,000 employment opportunities. Enterprises moved in to Sfax after the project completion includes Total Safety Services, which provides training in the health/safety/environmental protection sectors, Risel Industries, which is a metal production company, SLPI, which is a boiler and machinery production company, and Kamel Petto-Ser, which is specialized in petrochemical industry.

It is expected that completion of the project would improve the access to Tunis and promote the integrated economic development along the Tunis - Sfax corridor. It is difficult to directly compare the economic situation between before and after the project in the qualitative terms. In order to examine the economic development made, changes in the land price were investigated. With the economic development, the average land price in Sfax has increased, and the current price is about 2.3 times of that at the commencement of the project. (Note: the average annual inflation rate during the project period was 3.7%)

Table 3 Changes of Average Land Prices in Sfax

unit: Tunisian dinars/m^2

2003	2004	2005	2006	2007	2008	2009	2010
200	250	250	300	300	300	350	450

Sources: Argus Real Estate

3.3.2 Other Impacts

(1) Impacts on the natural environment

Since there were few houses and noise-sensitive facilities along the motorway, no noise barrier has been constructed. As a matter of fact, no complaints from citizens have been received according to the executing agency. Although no environmental monitoring plan was prepared, during the project implementation, watering to prevent dust was undertaken as specified in the contract, and thus no complaint from neighboring citizens was heard.

(2) Land Acquisition and Resettlement

The total land area acquired was about 505 ha (with 715 land owners), and the land acquisition cost was 13.5 million Tunisian dinars (TND). The reason for the increased area (from 390 ha to 505 ha) is that based on the detailed designs, the alignment was partly changed and thus, additional land needed to be acquired depending on the topography where the alignment passes through. According to authorities of the executing agency, the land acquisition work was implemented based on the domestic regulations and procedures, and thus, it took a longer time than expected to negotiate with land owners. Eventually, the amount to be paid and contents to be covered under the compensation scheme were agreed, and no problem has arisen since then. No resettlement occurred as planned.

(3) Other Positive and Negative Impacts

Regarding division of the regional community[5], which would have been caused by construction of a motorway, STA changed the location of overbridges taking into account

[5] Adverse effects such as the case in which the travel distance to the nearest crossing point becomes longer because of introduction of a fully access controlled highway, in which crossing the highway is prohibited.

convenience of residents along the corridor based on the results of hearing with residents.

STA has contributed to increase of job opportunities by employing residents along the corridor as a toll attendant (currently about 90 regular staff) upon completion of the project.

Although the actual traffic volume on the motorway is lower than planned, the travel time was substantially shortened, and the accident rate was also lowered. Thus, development of the safe and efficient infrastructure has been accomplished. The project has somewhat achieved its objectives, and therefore its effectiveness and impact is fair.

3.4 Efficiency (Rating: ②)

3.4.1 Project Outputs

The original and actual output of the project is shown in Table 4.

(1) Civil Work (Motorway and Linking Road)

Table 4 Output (original and actual)

Item	Original	Actual
Motorway (El Jem - Sfax)	Length: 50.3km Interchanges: 3 units Bridges: 4 units Overbridges: 27 units Service Area: 1 unit Others (drainage, traffic safety facilities)	as planned as planned as planned as planned as planned Drainage, sign boards, marking, toll plaza (civil work only), pipes for emergency telephones, planting: as planned
Linking Road	6.0km	as planned

Sources: Appraisal documents, PCR, Responses to Questionnaire

Civil works (a motorway and a linking road) were completed as planned.

(2) Consulting services

The originally planned consulting services included construction supervision (field supervision, progress control, and reporting), and safeguard management (management and monitoring) with the input by 5 foreign experts (95 M/M) and by 2 local experts (62 M/M). However, at the stage of transmitting a request for proposals to consultants, the services to be provided by foreign experts were changed only to progress control and the planned input was revised so that the input by foreign experts was reduced and that by local experts was increased. The actual input was 32 M/M by foreign experts and 105 M/M by local experts, and the originally planned work assignments were implemented almost as planned.

Overbridge

Linking Road
(Sfax Interchange)

3.4.2 Project Inputs

3.4.2.1 Project Cost

The estimated project cost at appraisal was 16.669 billion yen, of which the Japanese ODA loan with a total amount of 12.501 billion yen was to be used to the foreign currency and part of local currency portions, and the rest was to be funded by the motorway company (STA). The actual project cost was 15.355 billion yen, of which the Japanese ODA loan used was 10.113 billion yen and the rest was funded by STA. Thus, the actual cost was lower than planned, which is equivalent to 92% of the planned cost.

The main reason for the lowered project cost is that since the bidding brought severe competition, contracts were awarded with lower contract prices by 25% than the estimated costs. In the original estimated cost, costs for land acquisition and preparation work, toll collection equipment, relocation of power lines (included in the cost for Msaken - El Jem section) and interest during the construction period were not included. The actual cost excluding these costs is 72% of the planned cost.

Table 5 Comparison of Project Cost (Planned and Actual)

Item	Planned					Actual				
	ODA loan (foreign)	Local		Total		ODA Loan (foreign)	Local		Total	
		Own fund	ODA loan	Total	ODA loan		Own fund	ODA loan	Total	ODA loan
	million yen	million yen	million yen	million yen	million yen	million yen	million yen	million yen	million yen	million yen
Civil Work	10,038	1,133	1,399	12,570 (145.02)	11,437	9,877	0	0	9,877	9,877
Consulting services	299	0	79	378 (4.36)	378	236	0	0	236	236
Contingency	602	68	84	754 (8.70)	686	-	-	-	-	-
Taxes	0	2,967	0	2,967 (34.23)	0	0	1,810	0	1,810	0
Land Acquisition, preparation cost	-	-	-	-	-	0	1,190	0	1,190	0
Toll collection equipment	-	-	-	-	-	0	1,000	0	1,000	0
Interest during project period	-	-	-	-	-	-0	800	0	800	0
Relocation of power lines	-	-	-	-	-	-0	442	0	442	0
Total	10,939	4,168	1,562	16,669 (192.31)	12,501	10,113	5,242	0	15,355	10,113

Source: Appraisal documents, Responses to Questionnaire
Exchange rates: 1TD=86.68 yen at appraisal, 1TD=88.20 yen (average during the period between April 2005 and June 2008) at ex-post evaluation
Note: Numbers in ( ) are in million TND.

3.4.2.2 Project Period

The project period was longer than planned. The project period planed at appraisal was from March 2002 (signing of the Loan Agreement) to May 2006 (open to public) with a total period of 51 months. The actual project period was from March 2002 (signing of the Loan Agreement) to June 2008 (open to public) with a total period of 76 months, or equivalent to 149% of the planned period.

Main reasons for delay are as follows:

1) The bidding process for civil work commenced in ten months delay against the original plan.
2) The bidding process was delayed by 11 months because of: i) the lengthy administrative process for securing clearance from relevant agencies and ii) discussions and negotiations on the request for amendment of the contract price due

to increase of oil price by contractors.

3) The topographic condition in some sections was adverse and it required longer construction period.

4) It took longer time to negotiate on the land acquisition of some land owners.

3.4.3 Results of Calculations of Internal Rates of Return (IRR)

(1) Financial Internal Rate of Return (FIRR)

By using the same conditions and assumptions applied to calculate FIRR at appraisal, the FIRR at ex-post evaluation was calculated by the executing agency as shown in Table 6. However, for calculation of the FIRR at ex-post evaluation, the project life was extended to 30 years since the investment costs have incurred over the period of 9 years.

Table 6 FIRR (at appraisal/at ex-post evaluation)

	At appraisal	At ex-post evaluation
FIRR (%)	4.5	3.4

Costs: construction cost, operation and maintenance costs
Benefits: toll revenue, residual value

(2) Economic Internal Rate of Return (EIRR)

By using the same conditions and assumptions applied to calculate EIRR at appraisal, the EIRR at ex-post evaluation was calculated by the executing agency as shown in Table 7. However, for calculation of the EIRR at ex-post evaluation, the project life was extended to 30 years as done for calculating FIRR.

Table 7 EIRR (at appraisal and at ex-post evaluation)

	At Appraisal	At ex-post evaluation
EIRR (%)	18.9	11.0

Costs: construction cost, operation and maintenance costs
Benefits: savings of travel time, VOC savings, reduction of traffic accidents

The FIRR and EIRR are lower than those estimated at the appraisal stage. Main reasons considered are: i) the actual traffic volume is lower than the projected volume by about 20%; and ii) the period when investment costs have incurred is longer than planned since the commencement of the project was delayed by about 2 years and thus it resulted in delay of occurrence of benefits as well.

Although the project cost was lower than planned, the project period was longer than planned. Therefore, efficiency of the project is fair.

3.5 Sustainability (Rating: ③)

3.5.1 Structural Aspects of Operation and Maintenance

Societe Tunisie Autoroutes (STA) is responsible for operation and maintenance of the 360 km expressway network including the project section (about 50 km). As of 2011, 96% of shares are owned by the central government and the rest by financial institutions and private enterprises. Five Regional Management Offices are in charge of the daily operation and maintenance work, and El Jem Management Office is responsible for the section between Msaken and Sfax including the project section. The routine and periodic maintenance work is undertaken by 120 staff of the El Jem Management Office. Since the motorway is still new, no major rehabilitation has been undertaken. All the maintenance works including repair of pavement surface and structures, which need specific construction equipment and vehicles are entrusted to private firms. In addition, the office is staffed with about 90 toll attendants assigned to six interchanges under the control of the office.

El Jem Maintenance Office

Service Area (an operator being recruited)

3.5.2 Technical Aspects of Operation and Maintenance

The technical capacity of staff in charge of operation and maintenance (routine maintenance) at El Jem Management Office is considered appropriate. Manuals on the maintenance and management, toll collection business and other operations have been prepared and newly recruited staff takes training at entry. Regarding the work in the field, on-the-job training has been provided to new staff.

However, the periodic maintenance and major repairs/improvement work soon need to be undertaken. Thus, since the high-level planning strategy including establishment of medium/long-term maintenance work implementation plans and decision on priority of work to be done needs to be developed, further training on the maintenance management plans needs to be undertaken.

3.5.3 Financial Aspects of Operation and Maintenance

When EIB provided the loan for Sfax - Gabes Motorway Project in March 2010, three conditionality were made: i) increase of capital amounting to 279 million TND, which was to be used for the project to be implemented by STA; ii) increase of toll charge (by 15%) every three years after 2010; and iii) increase of capital amounting to 146 million TND to be used for making financial condition healthy and financing for the accumulated deficit. Capital increase was made in 2010 (279 million TND) and in 2011 (450 million TND), the current capital of STA is 999 million TND (about 54 billion yen). The Revenue and Expenditure Status of STA for the last 3 years is shown in Table 8.

Table 8 Revenue and Expenditure Status of STA

unit: million TND

Item	2009	2010	2011
Business revenue (toll)	33.4	39.3	41.8
Operating expenses (operation and maintenance) ( ) concession fees	39.7 (10.1)	45.4 (10.7)	46.7 (0)
Balance (main business)	△6.3	△6.1	△4.9
Investment income (interest and others)	0.2	11.5	25.0
Financial costs	8.1	15.5	18.1
Other general income	0	0.6	-
Other general expenditure	0.2	0.2	-
Balance (all business activities)	△14.3	△9.7	2.0
Cash flow	14.0	19.6	44.9
Repayment of loan/year (capital and interest)	-	36.3	42.3
Cash flow/repayment of loan/year	-	0.54	1.06

Source: Responses to Questionnaire

The toll rate of the motorway in Tunisia including that for the subject motorway section has been 0.023 TND/km (about 1.2 Japanese yen/km) since opening to public, and it is considered extremely low compared with the international standard rates in terms of rate per kilometer.

As shown in Table 8, the financial status of STA was in the red in 2009 and 2010. However, since payment of the concession charge was exempted (the concession charge for 2010 was about 11.5 million TND) and the investment income amounting to 25 million TND accrued, STA ended in the black in 2011. However, there are concerns about the financial viability as a toll highway relying on only the toll revenue, taking into consideration the current low traffic volume on the project section and the projected traffic volume[6] on the further southern sections up to the border with Libya, which are now under

[6] The projected traffic volume in 2018 (2 years after the project completion) of the Gabes-Medenine section is 10,695 - 13,056 vehicles/day. This project section is to be financed by JICA.

construction or planned. As a national policy, the government intends to link major cities by the motorway network[7], in which the 750 km section would be completed by 2016, and to promote the comprehensive economic development. Thus, the government has established the back-up system, in which the financial assistance would be provided by increasing capital instead of increasing the toll rates in case of being in the red, or the government would provide guarantee when the company gets a loan from financial institutions. Thus, since the financial assistance from the government will be provided in the future, no major financial issue is observed at this moment.

3.5.4 Current Status of Operation and Maintenance

Currently, 120 staff of the El Jem Management Office implement the routine and periodic maintenance work by using their own maintenance equipment and the road surface has been maintained well. No cracks, potholes and defects of joints have been observed in the bridges and on the surface of viaducts, and thus it is likely that the maintenance has been properly undertaken. However, the current equipment fleet is minimal including 5 patrol cars, 4 mini-buses, 6 ordinary cars and a truck, and procurement of equipment including water tanks, wrecker trucks, mowing tractors and trucks needs to be accelerated. In some sections, road markings have disappeared. Should the marking work be undertaken by the management office, a line marking equipment also needs to be procured.

The operation and maintenance of the project have been properly implemented, and the effectiveness by the project is expected to continue. However, as a time has passed, items and volume of maintenance work will increase. Thus, the procurement of required equipment needs to be programmed according to the maintenance work plans.

No major problems have been observed in the operation and maintenance system, and therefore, sustainability of the project effect is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The objective of the project was to contribute to promotion of the economic development in both northern and southern regions in Tunisia through establishing efficient production and logistics system, and saving time costs by constructing a motorway between El Jem and Sfax in

[7] The project section is a segment within Tunisia under the Maghreb Trans-Africa Highway Concept. The total length in Tunisia is about 800 km, among which 300 km has been completed and 150 km is under construction. The 1,200 km section in the western neighboring country, Algeria has been almost completed. The 1,200 km section in its western neighboring country, Morocco has been completed. Construction of the section in the eastern neighboring country, Libya has not commenced yet.

the southern Tunis. The project has been highly relevant to the development plans and needs of Tunisia as well as Japan's ODA policies, and therefore, its relevance is high. Regarding saving of travel time, which is the project's objective, this project has somewhat achieved its objectives and has also contributed to promotion of the economic development in both northern and southern regions in Tunisia. Therefore, its effectiveness is fair. Although the project cost was lower than planned, the project period was longer than planned. Therefore, efficiency of the project is fair. Since no major problems have been observed in the operation and maintenance system (organizational setup, technical capacity and financial status), sustainability of the project is considered high.

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

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

As a time has passed, items and volume of maintenance work will increase. Thus, procurement of the required equipment needs to be programmed according to the maintenance work plans.

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

The originally planned project period was 51 months and the actual period was 76 months, which is 149% of the planned. The main reason for delay is that the procurement implementation plan for civil work and consulting services was optimistic. Presently, in establishing the project implementation plan for the ODA loan project at the appraisal stage, the standardized implementation schedule and period for each activity are applied to all the JICA funded projects. It is recommended to discuss and agree with the executing agency on the expected period needed for the procurement process and securing internal clearance based on the previous experience on the similar projects, and on the practical risk management methodology to avoid the delay.

Comparison of the Original and Actual Scope of the Project

Item	Original	Actual
1. Output		
Motorway (El Jem - Sfax section)	Length: 50.3km	as planned
	Interchanges: 3 units	as planned
	Bridges: 4 units	as planned
	Overbridges: 27 units	as planned
	Service Area: 1 unit	as planned
	Others (drainage, traffic safety facilities)	Drainage, sign boards, marking, toll plaza (civil work only), pipes for emergency telephones, planting: as planned
Linking Road	6.0km	as planned
Consulting services	Foreign experts: 95M/M, Local experts: 62M/M	Foreign expert: 32M/M, Local experts: 105M/M
2. Project Period	March 2002 -May 2006 (51 months)	March 2002 -June 2008 (76 months)
3. Project Cost		
Amount paid in Foreign currency	10,939 million yen	10,113 million yen
Amount paid in Local currency	5,730 million yen	5,242 million yen
Total	16,669 million yen	15,355 million yen
Japanese ODA loan portion	12,501 million yen	10,113 million yen
Exchange rate	1TND = 86.68 yen (as of July 2001)	1TND = 88.20 yen (average between April 2005 and June 2008)

Morocco

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

External Evaluator: Masami Tomita, Sanshu Engineering Consultant

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

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	MR-P14: 1,800million yen	MR-P14: Unknown
Amount paid in Local currency	5,404million yen (428million dirhams)	Unknown
Total	7,204million yen	Unknown
Japanese ODA loan portion	5,004million yen	4,513million yen
Exchange rate	1 dirham = 12.6 yen (As of June 1997)	
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)

Slovakia

Ex-Post Evaluation of Japanese ODA Loan Project

Motorway Construction Project (SLO-P1)

External Evaluator: Masami Tomita, Sanshu Engineering Consultant

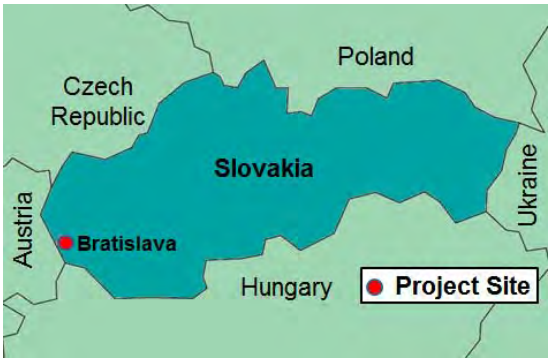
0. Summary

This project aimed at the completion of the motorway network in the capital city and the reduction of traffic congestions in adjacent roads of the section targeted by the project, by constructing approximately 3km of a motorway in the capital city of Bratislava.

Relevance of this project is high, as the project is consistent with priority areas of Slovakia's development plans and Japan's ODA policy, and moreover development needs for the project are high. The current traffic volume of the project section largely exceeds the volume expected at the time of project appraisal, due to traffics induced by the project and shifted from adjacent city roads. Moreover, traffic congestion in adjacent city roads was largely reduced and beneficiaries also showed high level of satisfaction with this project, and thus, effectiveness and impact of the project are high. Sustainability of the project is also high, as no major problem has been observed in institutional, technical and financial aspects of the operation and maintenance (O&M) and current O&M status. On the other hand, efficiency of the project is low, as both actual project cost and period largely exceeded planned cost and period.

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

1. Project Description



Project Location

The Tunnel Constructed by the Project

1.1 Background

Located in the centre of Europe, Slovak economy had been highly dependent on trade with neighbouring countries and the country was expected to develop by contributing to an increase of overland transportations between and among East and West Europe through constructing

overland transportation infrastructures. However, the total length of motorway networks within the country was merely 198km out of 17,868km in total of national roads before the project implementation, and the motorway networks within the country had not been connected directly with neighbouring countries except for Czech Republic, and thus in 1993 the Government of Slovakia determined a policy that a development of the motorway networks within the country was urgently needed[1]. Then in 1995 the government approved the motorway network development plan, which aimed at construction of 660 km of motorways in total consisting of 4 routes connecting with 5 neighbouring countries by 2005[2]. The plan was the country's largest project requiring the total planned amount of 152 billion koruna (approximately 570 billion yen), and this project was implemented as part of the plan[3].

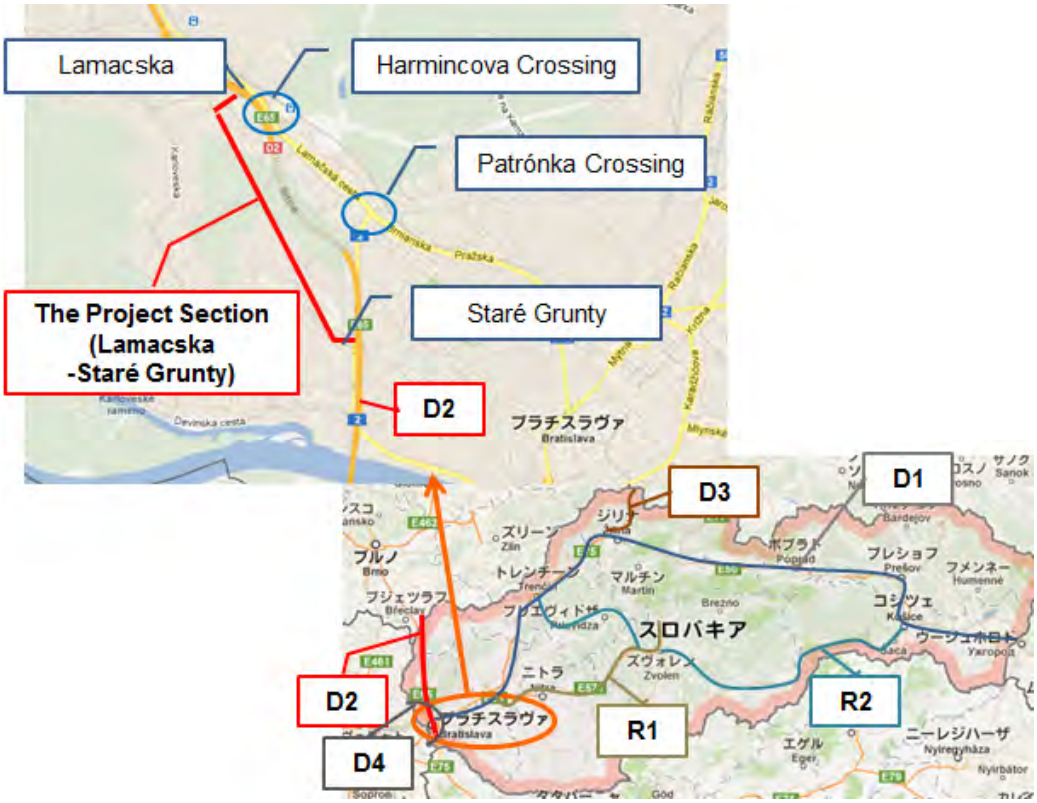
The motorway section targeted by the project is part of the north-south cross-nation route (D2) which passes from Czech Republic to Austria and Hungary through Bratislava. The section passing from Bratislava to Austria and Hungary and another section connecting to the motorway D1 which leads to eastern Slovakia were constructed with assistance from the European Investment Bank (EIB)[4]. The motorway network in the project area had not been completed, because of the lack of skills and experiences of tunnel construction required in the area. On the other hand, this project was regarded as a highly important project in order to reduce traffic congestions in adjacent areas and achieve smooth transportations and efficient economic activities by completing the motorway network around the capital city[5].

1.2 Project Outline

The objective of this project is to complete the motorway network around the capital city and reduce traffic congestions in adjacent roads by constructing the approximately 3 km section of a motorway in the western part of the capital city of Bratislava, thereby contributing to smooth commodity distribution and efficient economic activities in the region.

The project site is shown below.

1 Source: JICA appraisal document
2 Source: same as above
3 Source: same as above
4 Source: same as above
5 Source: same as above



Source: edited based on Google map

Figure 1: Project Site

Loan Approved Amount/ Disbursed Amount	11,094million yen / 11,093million yen
Exchange of Notes Date/ Loan Agreement Signing Date	December, 1998 / February, 1999
Terms and Conditions	Interest Rate: 2.2% Repayment Period: 25years (Grace Period: 7years) Conditions for Procurement: General untied (for consulting service, interest rate: 0.75%, repayment period: 40years (grace period: 10years))
Borrower / Executing Agency	The Government of the Slovak Republic/ National Motorway Company
Final Disbursement Date	December, 2008
Main Contractor (Over 1 billion yen)	Skanska DS (Czech Republic)・Taisei Corporation (Japan) (JV)
Main Consultant (Over 100 million yen)	Construction Project Consultants (Japan)
Feasibility Studies, etc.	Feasibility Study (F/S), DOPRAVOPROJEKT,a.s., 1996
Related Projects	The south motorway section from the end of the project section to Austria/Hungary (17.8km) and the east motorway section (6.5km) were constructed with assistance from EIB

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 9 – January 13, 2012 and May 17 – May 23, 2012

2.3 Constraints during the Evaluation Study

None

3. Results of the Evaluation (Overall Rating: B[6])

3.1 Relevance (Rating: ③[7])

3.1.1 Relevance with the Development Plan of Slovakia

At the time of project appraisal, construction of motorway networks was regarded as one of the most prioritized policies in the Development Program of Public Works Priorities until 2005, and in 1997 it was agreed among all the economic affairs ministers in the country that construction of the Lamacska - Staré Grunty section, which was targeted by the project, should be prioritized in the whole motorway network development plan[8].

On the other hand, at the time of ex-post evaluation, construction of motorway networks is still regarded important in the Development Program of Public Works Priorities for 2008-2010, and completion of the routes D1, D3, R1 and R2 etc. are particularly regarded important[9]. Moreover, in the Plan of Proceeding of Preparation and Construction of Motorways and Expressways for 2011- 2014, the route D1 which connects the capital city of Bratislava and Kosice, a major city in eastern Slovakia, is regarded as the most important section to be completed, and the route D4, the completion of which aims at reduction of traffic congestions in Bratislava, is also regarded important, and development of motorway networks centring the capital city of Bratislava seems still important[10]. Furthermore, in the Operational Programme Transport 2007-2013, the routes D1, D2 (including the project section) and D3, which are part of the European transport corridors, and R1 and R2 etc. are given priorities[11]. The total length of motorways and expressways in

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

7 ③: High, ② Fair, ① Low

8 Source: JICA appraisal document

9 Source: document provided by the Ministry of Transportation, Construction and Regional Development

10 Source: document provided by the Ministry of Transportation, Construction and Regional Development

11 Source: Operational Programme Transport 2007-2013

Slovakia is 606km as of January 2011[12], and the total of 1,840km of the motorway networks is planned to be constructed in the long run[13].

Therefore, construction of the motorway networks was/is prioritized in Slovakia's national plans and sector plans both at the time of project appraisal and ex-post evaluation, and thus relevance of this project remains high.

3.1.2 Relevance with the Development Needs of Slovakia

At the time of project appraisal, traffic conditions in Bratislava were rapidly worsened due to increased numbers of registered vehicles since 1990. At the time of ex-post evaluation, the numbers of registered vehicles in Bratislava have been largely increasing due to a progress of road networks development and improvement of living standards etc. The transition of the numbers of registered vehicles in Bratislava is shown below.

Table 1: The Numbers of Registered Vehicles in Bratislava

(Unit: vehicles)

	1990	1993	1996	2005	2008	2011
Passenger Cars	N/A	N/A	N/A	208,565	267,209	295,347
Large Vehicles	N/A	N/A	N/A	36,981	65,472	71,098
Total	123,817	149,570	170,959	245,546	332,681	366,445

Source: 1990-1996: JICA appraisal document, 2005-2011: document provided by the National Motorway Company (answer to the questionnaire)

At the time of project appraisal, in addition to the increase of the numbers of registered vehicles, the section of the motorway targeted by the project had been uncompleted and thus vehicles needed to get off the motorway, join the city road leading to the city centre and pass the crossing. Thus, there were chronic and heavy traffic congestions around the crossing (the Patrónka Crossing), and the traffic volume on the road around the crossing including both inbound and outbound traffics was approximately 46,600 vehicles per day (as of 1995), and the congestions heavily disturbed international transportation and regional economic activities[14]. On the other hand, at the time of ex-post evaluation, the annual average daily traffic on the project section (motorway) and adjacent city roads exceed the estimated volume in the project appraisal due to the large increase of registered vehicles and the city development etc.[15], and the importance of the project section is very high for the purpose of the completion of D2 and reduction of traffic congestions in the area. Moreover, Slovak economy has been dependent on trade with neighbouring countries as

[12] Source: document provided by the National Motorway Company
[13] Source: Operational Programme Transport 2007-2013
[14] Source: JICA appraisal document
[15] See "3.2 Effectiveness" for details

explained above, and there are many traffics leading to Prague and Bruno in Czech Republic using the motorways, and the only motorway leading to these cities is D2 at the time of ex-post evaluation, and hence the importance of the project which completed D2 is high from the perspective of smooth transportation. Therefore, the needs for the project remain high.

3.1.3 Relevance with Japan's ODA Policy

"The Official Development Assistance (ODA) Country Data Book" (2002) states that Japan has provided Slovakia with economic cooperation, focusing on democratization and market-oriented economic reforms in the country. And this project was to contribute to market-oriented economic reforms.

This project has been highly relevant with Slovakia's development plan, development needs, as well as Japan's ODA policy, therefore its relevance is high.

3.2 Effectiveness[16] (Rating: ③)

3.2.1 Quantitative Effects (Operation and Effect Indicators)

3.2.1.1 Reduction of Traffic Congestions in Adjacent City Roads

Estimated and actual figures of annual average daily traffic (AADT) on the Lamacska - Staré Grunty section of city roads which are adjacent to the project section are shown below. The actual AADT on the city roads after the completion of the project exceeds the estimated volume in the project appraisal due to the increase of the numbers of registered vehicles in Bratislava and residential development in the city etc., as explained in "3.1.2 Relevance with the Development Needs of Slovakia". However, part of the traffic volumes on the city roads were shifted to the motorway (the project section) and thus the volumes decreased by approximately 20% to 42% after the project completion (at the time of ex-post evaluation)[17]. Moreover, as the Lamacska - Staré Grunty section of city roads[18] was heavily congested before the completion of the project section, local roads such as Karloveská street and Botanicka street that were adjacent to the project section were also used, and traffic volumes on these streets also decreased by approximately 17% to 19%

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16 Sub-rating for Effectiveness is to be put with consideration of Impact

17 The traffic volume on the Harmincova – Patrónka section decreased by approximately 20% after the project completion (2010) compared with that of before the project (2007), and the volume on the Patrónka - Staré Grunty section decreased by approximately 42% after the project completion (2010) compared with that of before the project (2006).

18 Road categories in Slovakia consist of motorway/expressway, city road (first class road, second class road and third class road) and local road etc., and the road in question is categorized as the first class road.

after the project completion[19]. Therefore, it can be said that the project contributed to the reduction of traffic congestions on the city roads.

Table 2: Estimated and Actual Volumes of AADT on the City Roads

(Unit: vehicles/day)

Section	Appraisal (1995, actual)	Before Completion (2006, actual)	Before Completion (2007, actual)	After Completion (2010, estimated)	3 Years After Completion (2010, actual)
Harmincova - Patrónka	46,600	62,591	69,959	49,119	56,152
Patrónka - Staré Grunty	22,410	34,741	N/A	15,256	20,067
Total	69,010	97,332	N/A	64,375	76,219

Source: 1995 actual and 2010 estimated: F/S, 2006/2007/2010 actual: Slovak Road Administration (SSC)/ National Motorway Company/ the Mayor's Office of Bratislava

3.2.1.2 Traffic Volumes on the Project Section

Estimated and actual figures of AADT on the motorway section constructed by the project are shown below. The actual AADT on the project section after the completion of the project largely exceed the estimated volume in the project appraisal due to traffics induced by the completion of motorway D2 as well as the increase of the numbers of registered vehicles in Bratislava and residential development in the city etc. Taking into account the decrease of traffic volumes on the adjacent city roads after the project completion as explained above, a considerable amount of traffics seems to have been shifted from the city roads and local roads to the motorway (the project section) after the completion of D2.

Table 3: Estimated and Actual Volumes of AADT on the Motorway (the Project Section)

(Unit: vehicles/day)

Section	After Completion (2010, estimated)	1 Year After Completion (2008, actual)	2 Years After Completion (2009, actual)	3 Years After Completion (2010, actual)
Polianky - Tunnel Sitina	26,905	31,204	34,088	35,146
Tunnel Sitina		44,328	48,236	49,264
Tunnel Sitina - Mlýnská Dolina		37,665	41,825	43,382

Source: 2010 estimated: F/S, 2008/2009/2010 actual: National Motorway Company

Note: The project section consists of the first and second sections and part of the third section (the National Motorway Company conducts traffic counts in each of the above section).

[19] Source: Slovak Road Administration (SSC)/ National Motorway Company/ the Mayor's Office of Bratislava

3.2.1.3 Reduction of Travelling Time

While the executing agency does not have data on travelling time, according to the interviews with the executing agency, there were chronic and heavy traffic congestions on the Lamacska - Staré Grunty section of city roads before the project implementation, and it required one to two hours to run the section during peak hours with extremely heavy congestions. On the other hand, the evaluator actually ran the section and measured time during the field survey in the ex-post evaluation, and it took approximately 5.5 to 7.5 minutes during peak hours (around 7:30 am – 8:00 am) on weekdays and it took approximately 5 minutes during off-peak hours on weekdays[20]. According to the executing agency, before the project implementation vehicles from three different directions (including D2) converged to one road at the Harmincova Crossing heading to the Patrónka Crossing and there were many large vehicles such as trucks that turn right at the Patrónka Crossing, which caused heavy congestions at the crossing. The width of these city roads is relatively narrow and large vehicles need to slow down when they turn right, which seems another reason causing congestions. On the other hand, after the project implementation, vehicles that converge at the Harmincova Crossing diverge into two directions (the city road and the motorway) due to the completion of D2, and large vehicles mainly use the motorway (the project section), which has led to the significant reduction of the numbers of large vehicles that turn right at the Patrónka Crossing, which in turn largely reduced waiting time at the traffic light and drastically eased traffic congestions[21]. Thus this project seems to have largely contributed to the reduction of travelling time, however, when a question was asked in the beneficiary survey regarding a reduction of travelling time on the Lamacska - Staré Grunty section of city roads after the project, as explained in "3.2.2 Qualitative Effects", 45% of respondents replied that the time shortened was 10 to 20 minutes and 25% replied that the time shortened was 5 to 10 minutes, and thus the average time shortened seems to be 5 to 20 minutes.

As for travelling time on the motorway section constructed by the project, while the executing agency does not have data, the evaluator actually ran the section and measured time during the field survey, and it took approximately 2.5 minutes during both peak hours (around 7:30 am) and off-peak hours on weekdays[22].

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[20] For peak hours, time measurement was conducted from the Harmincova Crossing at 7:30 am on January 12th, Thursday, to the point that crosses with Staré Grunty passing the Patrónka Crossing (Route 1: approximately 5.5 minutes) and for the opposite direction (from the point that crosses with Staré Grunty to the Harmincova Crossing passing the Patrónka Crossing) (Route 2: approximately 5.5 minutes). Time measurement was also conducted at 7:40 am on May 21st, Monday (Route 1: approximately 5.5 minutes and Route 2: approximately 7.5 minutes) and at 8:00 am on the same day (Route 1 and 2: approximately 5.5 minutes). For off-peak hours, time measurement was conducted at 2:00 pm on January 11th, Wednesday (Route 1 and 2: approximately 5 minutes).

[21] Source: interviews with the executing agency

[22] For peak hours, time measurement was conducted from the Harmincova Crossing at 7:20 am on January 12th,

3.2.1.4 Improvement of Velocity

While the executing agency does not have data on average velocity, according to the interviews with the executing agency, there were chronic and heavy traffic congestions on the Lamacska - Staré Grunty section of city roads before the project implementation, and the average velocity on the section was 5 to 10km/hour during peak hours with extremely heavy congestions. On the other hand, the maximum permissible speed on city roads at the time of ex-post evaluation is 70km/hour and the average velocity on the Lamacska - Staré Grunty section of city roads when the evaluator actually ran the section during the field survey was 60 to 70km/hour. As explained above, the large reduction of traffic congestions on the city roads by the project seems to have contributed to the improvement of average velocity.

As for the average velocity on the motorway section constructed by the project, while the executing agency does not have data, the maximum permissible speed on motorways is 90km/hour and that on tunnels is 80km/hour at the time of ex-post evaluation, and the average velocity on the project section when the evaluator actually ran the section during the field survey was approximately 80km/hour.

3.2.2 Qualitative Effects

One of qualitative effects realized by the project is the enhancement of the functionality of road network infrastructures due to the completion of motorway D2[23].

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

Thursday, to the point that crosses with Staré Grunty passing the Tunnel Sitina (Route 1: approximately 2.5 minutes) and for the opposite direction (from the point that crosses with Staré Grunty to the Harmincova Crossing passing the Tunnel Sitina) (Route 2: approximately 2.5 minutes). Time measurement was also conducted at 7:30 am on May 21st, Monday (Route 1 and 2: approximately 2.5 minutes). For off-peak hours, time measurement was conducted at 1:50 pm on January 11th, Wednesday (Route 1 and 2: approximately 2.5 minutes).

[23] See “3.3 Impact” for impacts realized by this.

[24] The beneficiary survey was conducted in the following manner. Time: February to March 2012, the number of samples: 101 in total (users of the motorway section constructed by the project and the city roads adjacent to the section: 84, residents: 8 and companies: 7 along the project section, people affected by land acquisition for the project: 2), method: questionnaire survey

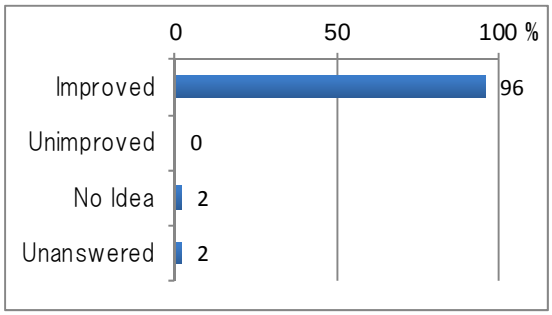

Figure 2: Traffic Congestions on the City Roads (from Harmincova to Staré Grunty) after the Project Completion

The number of samples: 84 road users + 15 residents and companies residing along the project section = 99 in total
Among the above, 26% replied that traffic congestions were substantially improved, 67% replied they were fairly improved, and 3% replied they were improved a little (4% unanswered).

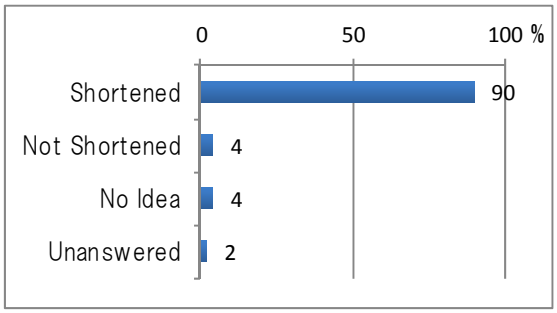

Figure 3: Traveling Time on the City Roads (from Harmincova to Staré Grunty) after the Project Completion

The number of samples: 84 road users
Among the above, 45% replied that the shortened time was 10-20 minutes, 25% replied it was 5-10 minutes, 10% replied it was 20-30 minutes, 6% replied it was over 30 minutes, and 5% replied it was approximately 5 minutes (or less) (10% unanswered).

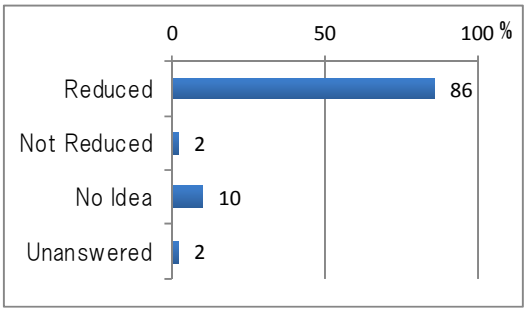

Figure 4: Travelling Cost on the City Roads (from Harmincova to Staré Grunty) after the Project Completion

The number of samples: 84 road users
Among the above, 12% replied that traveling cost was substantially reduced, 46% replied it was fairly reduced, and 31% replied it was reduced a little (11% unanswered).

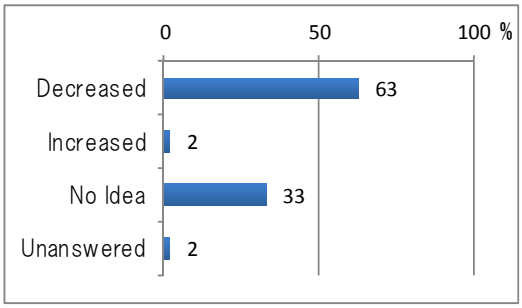

Figure 5: Numbers of Traffic Accidents on the City Roads (from Harmincova to Staré Grunty) after the Project Completion

The number of samples: 84 road users + 15 residents and companies residing along the project section = 99 in total

In the beneficiary survey, over 90% of respondents replied that traffic congestions on the city roads were improved and travelling time was shortened, and over 80% replied that travelling cost was reduced after the project completion. The numbers of traffic accidents on the city roads seem to have been decreased following the improvement of traffic congestions after the project completion. Moreover, 98% of road users replied that they are satisfied with the motorway section constructed by the project, and they raised reasons such as comfort in driving, reduction of congestions at the Patrónka Crossing and easier access to foreign countries etc.

3.3 Impact

3.3.1 Intended Impacts

3.3.1.1 Contribution to Smooth Transportations and Efficient Economic Activities in the Region

(1) Results of the Beneficiary Survey

The result of the beneficiary survey on the accessibility to key places in daily life such as offices (work places), schools, hospitals, markets and shops etc. is shown on the right. Over 70% of respondents replied that the accessibility to key places in daily life has been improved through reduction of traffic congestions in Bratislava.

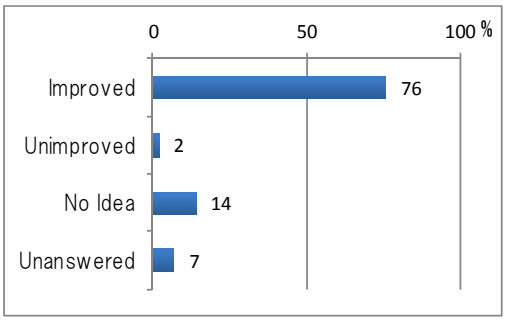

Figure 6: Accessibility to Key Places for Daily Life (Working Places/Offices, Schools, Hospitals, Markets and Shops etc.) after the Project Completion

The number of samples: 84 road users

Moreover, among 8 residents and 7 companies residing along the motorway section constructed by the project, 60% replied that local economic activities have increased after the project completion and they raised examples such as the increase of trading etc.

(2) Transitional Changes in Volumes of Trans-Border Traffics via Motorway D2 (for reference)

Transitional changes in volumes of trans-border traffics through the motorway D2 including the section constructed by the project are shown below. The volumes of trans-border traffics have been increasing since the following year after the opening of the section constructed by the project (2008) except for the section II (Brodske - Breclav: the border with Czech Republic) in 2008. There seem to be various factors affecting the increase of trans-border traffics, and thus it is difficult to indicate to what extent this project contributed to such increase, however, the fact that travelling from and to neighbouring countries became easier due to the completion of D2 is considered as one of the factors contributing to the increase to a certain extent.

Table 4: Volumes of Trans-Border Traffics from and to Neighbouring Countries via Motorway D2

(Unit: vehicles/year)

Year	I. D2 : Cunovo-Rajka (border with Hungary)		II. D2 : Brodske-Breclav (border with Czech Republic)		III. D4 : Kittsee –Jarovce (border with Austria)	
	Total	Growth Rate	Total	Growth Rate	Total	Growth Rate
1999	893,811	-	4,516,440	-	432,217	-
2002	935,071	4.6%	4,359,000	-3.5%	194,580	-55.0%
2005	1,439,711	54.0%	6,662,000	52.8%	2,530,876	1,200.0%
2008	2,113,232	46.8%	4,615,240	-30.7%	2,989,825	18.1%
2011	3,166,532	49.8%	5,606,449	21.5%	5,101,166	70.6%

Source: document provided by National Motorway Company

Note:
1. Traffic volumes of 1999-2007 (until 2004 for the section I only) are the actually counted volumes provided by the Customs Directorate, however, traffic volumes after 2008 are not available and thus the volumes after 2008 were calculated based on the traffic census (on AADT) conducted in 2005 and 2010 and database of toll collection etc.
2. Traffic volumes provided by the Customs Directorate are the sum of volumes on motorways and lower category roads, and volumes on motorways only were calculated based on the traffic census conducted in 2005 and/or 2010 etc., and thus the table above seems to contain some margin of errors.
3. The route D4 above is shown as a reference as it diverges from D2.
4. D4 was opened to public in 1999, however, it had not been used much for a long time until the motorway section connecting Vienna and Budapest was completed in Austria. The large increase of traffic volumes in 2005 seems to be due to the opening of the Vienna and Budapest section.

3.3.2 Other Impacts

3.3.2.1 Impacts on the Region and Residents

Taisei Corporation was responsible for the portion of tunnel construction in this project and Skanska BS was involved in the construction work as a subcontractor. Technologies on road construction including tunnel construction were transferred from Japanese engineers to local staff during the project implementation[25]. Moreover, over 500 local workers were employed during the peak time of the project, which led to the revitalization of the local economy[26].

3.3.2.2 Impacts on the natural environment

At the time of project appraisal, an environmental assessment was required for all motorway construction projects according to the domestic legislation of Slovakia (established in 1994), and the assessment report for this project was completed in 1996 and it was disclosed to public at the municipal office of Bratislava[27]. The tunnel portion was located on a low hill and thus cutting through the hill instead of building a tunnel was technically possible, however, the project section needed to pass through part of lands of a

[25] Source: document provided by the executing agency and interviews with Skanska BS staff
[26] Source: document provided by the executing agency
[27] Source: JICA appraisal document

zoo and a national research institution, and thus the tunnel option was adopted in order to keep green areas belonging to these institutions[28]. Moreover, a noise barrier wall was to be installed where a noise impact was assumed[29].

In the actual implementation of the project, a noise barrier wall (1,111 m in total) was constructed along Mlýnská Dolina as planned in the project appraisal, and results of environmental monitoring were reported to JICA through progress reports[30]. Negative impact on environment was not reported in the beneficiary survey.

3.3.2.3 Land Acquisition and Resettlement

At the time of project appraisal, there was an entrance of the zoo at the exit of the tunnel planned by the project, and a basic agreement was reached with public institutions on land acquisitions including that the cost for relocation of necessary facilities would be covered by the city of Bratislava etc., and the project also required acquisition of private lands used for commercial purposes and the negotiations with landowners were planned to be initiated from October, 1998[31]. Resettlement was not planned, as there was no residential area in the areas covered by the project[32].

On the other hand, two houses (96m^2 and 125m^2), some part of a zoo, the Slovak Academy of Science, a gas station and a car repair factory etc. became subject to the land acquisition for the project implementation, and compensation fees were paid to those affected by the land acquisition, and rental housings were also provided by the city of Bratislava to the residents of these two resettled houses[33]. Two people who were resettled due to the project cooperated for the beneficiary survey, and both of them are not satisfied with the resettled place or the amount of compensation fee (they claimed that while they used to live in houses with a garden before the resettlement, the current housing is small and that the amount of compensation paid is a lot less than the market value)[34]. An interview was made with the executing agency regarding this point, and it explained that a valuation of lands and houses were conducted by experts of the Ministry of Justice in the land acquisition, and that while people affected by land acquisition could apply for arbitration if they were not satisfied with the conditions, there was not such claim or application in this project.

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28 Source: same as above
29 Source: same as above
30 Source: document provided by the executing agency and interviews with the executing agency
31 Source: JICA appraisal document
32 Source: same as above
33 Source: interviews with the executing agency
34 Source: the beneficiary survey

This project has largely achieved its objectives, therefore its effectiveness and impact are high.

3.4 Efficiency (Rating: ①)

3.4.1 Project Outputs

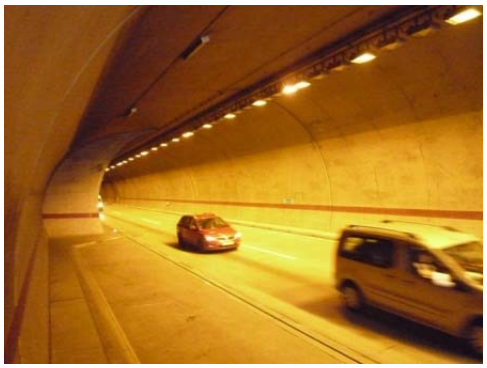
Outputs of the project (planned and actual) are shown below. Planned outputs written in the JICA appraisal document and presented below were taken from the F/S, and there are some differences between the plan and actual, as outputs were not planned in detail in the F/S. However, actual outputs are more or less consistent with planned outputs written in the building permit application document made in October 1999. As the F/S concentrates on examinations of plural options regarding routes of the motorway section to be constructed in the project, and lengths of motorway, tunnel and bridges etc. are not examined in detail for each option, and thus planned outputs should be set based on a building permit application document etc. which are made with a larger scale.

Table 5: Comparison of Outputs (Planned/ Actual)

Item		Planned	Actual
Civil Works	Motorway Length	3,050m	3,658m
	Motorway Width	26.5m, 4 lanes	26.5m, 4 lanes
	Tunnel Length	1,355m each, 2 lanes in both directions	1,428m each, 2 lanes in both directions
	Bridges	7 sections, 801m in total	7 sections, 606m in total
	Other	Relocation of public facilities and the entrance of the zoo	Same as left
Consulting Service	Contents	Review of detailed design Procurement assistance Assistance for supervision of civil works Assistance for environmental monitoring etc.	Same as left
	Mans-Month	88M/M	128M/M

Source: planned: JICA appraisal document, actual: document provided by National Motorway Company
Note: lengths of the motorway, tunnel and bridges are the axis of the motorway, tunnel and bridges.

In front of the Tunnel



Inside of the Tunnel

3.4.2 Project Inputs

3.4.2.1 Project Cost

The planned project cost at the time of project appraisal was 14,792 million yen (foreign currency: 3,049 million yen, local currency: 11,743 million yen), of which Japan's ODA loan portion was 11,094 million yen[35]. On the other hand, the actual project cost was 23,077 million yen (foreign currency: 15,302 million yen, local currency: 7,775 million yen)[36], of which Japan's ODA loan portion was 11,093 million yen, and it was significantly higher than planned (156% against the plan). The major reason for the actual project cost largely exceeding the planned cost was that types of soil in the areas where the tunnel was constructed turned out to be different from those identified in the geotechnical survey, which necessitated additional surveys and works. In addition, in tunnel construction additional cost was required for relocation of water and sewerage pipes and gas pipes etc. connected to the zoo and private lands in the neighbouring area, and in motorway construction additional works were required for installing guardrails, fences and traffic lights and changes of pavement surfaces etc., all of which led to the increase of project cost[37]. The actual project cost has not been finalized yet, as arbitrations are carried out between the executing agency and the contractor.

3.4.2.2 Project Period

The planned project period at the time of project appraisal was 67 months in total from February 1999 to August 2004 (the completion of the project was defined as the end of consulting services)[38]. On the other hand, the actual project period was 106 months in total from February 1999 to November 2007 (the end of consulting services)[39], and it was significantly longer than planned (158% against the plan). The motorway section constructed by the project was opened to traffic in June 2007 and all the civil works were completed in September 2007[40]. Reasons for the actual project period largely exceeding the planned period was that a selection process of a consultant was delayed as the Slovak government was not accustomed to the procedures required in Japanese ODA loans, that a procedure to change the loan agreement (L/A) for changing disbursement methods between JICA and the Slovak government required a long time (this in turn delayed the process for

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35 Source: JICA appraisal document

36 Calculated by multiplying the actual cost as of March 2012 by the average exchange rate of 1SKK=3.40JPY (the average exchange rate of the Japanese ODA loan disbursement period of February 15, 1999 – December 8, 2008), based on document provided by the National Motorway Company. The local currency portion includes payments by Slovak koruna only and payments by euro and Japanese yen are included in the foreign currency portion.

37 Source: JICA internal documents and interviews with the executing agency

38 Source: JICA appraisal document

39 Source: document provided by the executing agency and interviews with the executing agency

40 Source: document provided by the executing agency and interviews with the executing agency

contracting with a consultant), that acquisition of a building permit was delayed, that the tunnel design was required to be changed in accordance with a new fire protection law which was revised based on the changed EU standards following the tunnel accident occurred in Europe, that the tendering process for contractors was delayed and that additional geotechnical surveys and works were required for tunnel construction etc.[41]. It would have been difficult to predict these factors at the time of project appraisal, however, JICA should consult with an executing agency on risk management measures in advance if there is a risk of delay because the executing agency is unfamiliar with Japan's ODA loan procedures etc.

Table 6: Comparison of Planned and Actual Project Period

Content	Planned	Actual
Selection of Consultant	March 1999 - August 1999 (6 months)	September 1999 - April 2001 (20 months)
Detailed Design	March 1999 - October 1999 (8 months)	June 2001 - September 2001 (4 months)
Procurement of Civil Works	September 1999 - June 2000 (10 months)	December 2001 - March 2003 (16 months) Tunnel M&E contractor: May 2004 - May 2005 (13 months)
Civil Works	June 2000 - June 2004 (48 months)	March 2003 - September 2007 (55 months)
Consulting Service	September 1999 - August 2004 (60 months)	April 2001 - November 2007 (80 months)

Source: planned: JICA appraisal document, actual: document provided by the executing agency and interviews with the executing agency

3.4.3 Results of Calculations of Internal Rates of Return (IRR) (for reference)

(1) Financial Internal Rate of Return (FIRR)

FIRR was not calculated in the project appraisal, as the motorway section constructed by the project is not subject to tolls.

(2) Economic Internal Rate of Return (EIRR)

Results of EIRR calculation at the time of project appraisal and ex-post evaluation are shown below. EIRR at the time of ex-post evaluation exceeds that of project appraisal, as traffic volumes largely increased, despite of the actual project cost exceeding the planned cost.

[41] Source: JICA internal documents and interviews with the executing agency

Table 7: Comparison of EIRR

Time of Calculation	Conditions for Calculation	Result
Project Appraisal (1999)	Cost: investment cost, operation and maintenance cost etc. Benefit: reduction of travelling cost, saving of travelling time, reduction of cost related to decreases of traffic accidents etc. Project life: 30 years	11.5%
Ex-Post Evaluation (2012)	Same as above	14.6%

Source: 1999: JICA appraisal document, 2012: document provided by National Motorway Company

Both project cost and project period were significantly exceeded the plan, therefore efficiency of the project is low.

3.5 Sustainability (Rating: ③)

3.5.1 Structural Aspects of Operation and Maintenance

At the time of ex-post evaluation, a state-owned company, the National Motorway Company is in charge of operation and maintenance (O&M)[42], and the company has 13 maintenance centres nationwide which have the function of O&M of motorways[43]. The total number of staff of the company is 1,307 as of January 2012, of which the number of staff in charge of O&M of the motorway section constructed by the project is 25[44]. Maintenance of the facilities which require special technical skills such as monitoring cameras in the tunnel, a central control system and automatic traffic count system etc. is outsourced to private companies such as Eltodo and Nope etc.[45]. Considering the length of the motorway section constructed by the project (approximately 3km) and actual O&M status in the field, a sufficient number of staff is assigned and no major problem is seen in the O&M system.

3.5.2 Technical Aspects of Operation and Maintenance

The breakdown of 25 staff who are in charge of O&M of the motorway section constructed by the project is the head of the maintenance unit, the head of the Tunnel Sitina unit, two engineers, 12 skilled operators and 9 operation staff[46]. Training on O&M of the Tunnel Sitina was provided for all O&M staff in March 2007, and O&M of the tunnel is conducted according to the operation manual provided by Eltodo in June 2008[47].

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42 At the time of project appraisal, the Slovak Road Administration (SSC) was to be in charge of O&M, however, the responsibility for O&M was transferred from SSC to the National Motorway Company due to the organizational change in 2004 (source: JICA internal document).

43 Source: interviews with the executing agency

44 Source: same as above

45 Source: same as above

46 Source: same as above

47 Source: same as above

Considering the ratio of technical staff to the O&M staff in total, the fact that maintenance of the facilities which require special technical skills is outsourced to private companies and actual O&M status in the field, no major problem is seen in technical aspects of O&M.

3.5.3 Financial Aspects of Operation and Maintenance

Budget required for O&M of roads conducted by the National Motorway Company is covered mainly by toll revenues, sales revenues of toll stickers and government subsidies etc. At the time of ex-post evaluation, for vehicles up to 3.5t a toll sticker that is valid for certain period of time must be purchased and displayed on a car window on motorways. Prices of toll stickers are 10 euro + VAT 1.67 euro for a 10 days sticker, 14 euro + VAT 2.33 euro for a one month sticker, and 50 euro + VAT 8.33 euro for a one year sticker[48]. A toll system was introduced in mid-2009 for vehicles with a total weight of 3.5t and more on motorways (and expressways) and first class roads (except for inside of the city of Bratislava) and a toll collection is outsourced to a private company called Skytoll[49]. Toll rates are determined according to weights and emission classes of vehicles etc. and for example, a toll rate on a motorway for a truck with a total weight of 3.5t to 12t and the emission class of EURO 0-II is 0.093 euro (+VAT)/km[50].

The profit and loss statement of the National Motorway Company is shown below. Sales revenue mainly includes sales revenues of toll stickers, toll revenues, revenues from O&M of road sections that are under the jurisdiction of municipal governments and the Slovak Road Administration etc.[51]. Other operating revenue includes government subsidies, contract fines paid by contractors when they breach terms and conditions of a contract, compensation payment for damages made to properties owned by the National Motorway Company, and revenues from the Public-Private Partnership (PPP) projects etc.[52]. Government subsidies are allocated to certain items every year, and the amount of subsidy allocated for road maintenance was approximately 17 million euro in 2008, approximately 14 million euro in 2009 and approximately 17 million euro in 2010[53].

48 Source: document provided by the executing agency
49 Source: interviews with the executing agency
50 Source: document provided by the executing agency
51 Source: interviews with the executing agency
52 Source: same as above
53 Source: document provided by the executing agency. The total amount of government subsidies included in other operating revenue is approximately 30 to 40 million euro every year including investment related cost etc.

Table 8: Profit and Loss of the National Motorway Company

(Unit: Euro)

Item	2008	2009	2010
Sales revenue	81,308,547	80,343,411	184,646,689
Sales expense	▲38,474,167	▲42,959,414	▲140,955,863
Gross Profit	**42,834,380**	**37,383,997**	**43,690,826**
Personnel expense	▲19,288,709	▲21,011,664	▲25,427,547
Taxes and fees	▲984,085	▲765,467	▲587,396
Depreciation cost	▲55,073,193	▲65,687,106	▲71,310,590
Revenue and loss from sales of fixed assets and materials	▲1,338,499	1,911,925	▲475,293
Value adjustments to receivables	▲40,646	▲58,344,322	▲18,295,000
Other operating revenue	36,570,195	103,149,479	262,629,989
Other operating expenses	▲14,367,449	7,435,144	▲154,129,235
Operating profit	**▲11,688,006**	**4,071,986**	**36,095,754**
Non-operating profit	6,220,917	77,218	15,777
Non-operating expense[54]	▲23,622,178	▲16,013,918	▲10,261,053
Profit of the term before tax	**▲29,089,267**	**▲11,864,714**	**25,850,478**
Taxes	6,086,604	2,068,135	▲6,419,391
Profit of the term after tax	**▲23,002,663**	**▲9,796,579**	**19,431,087**

Source: calculated based on documents provided by the National Motorway Company

The maintenance cost of the Tunnel Sitina is shown below.

Table 9: Maintenance Cost of the Tunnel Sitina

(Unit: Euro)

	2009	2010	2011
Maintenance cost	785,777	817,024	697,380
Technical service cost	730,000	660,000	650,000
Total	1,515,777	1,477,024	1,347,380

Source: document provided by the National Motorway Company

As explained above, a toll system was introduced in mid-2009 for vehicles with a total weight of 3.5t and more on motorways (and expressways) and first class roads, which largely increased sales revenue of the National Motorway Company in 2010 compared with those of previous years, and the status of profit and loss of the company has been improved year by year. Profit of the term after tax is in surplus in 2010 and operating profit has been in surplus since 2009, and thus there seems to be no major problem regarding the financial status of the company. The maintenance cost of the tunnel constructed by the project is approximately 1.5 million euro per year (approximately 160 million yen) as presented above, and considering that the maintenance cost is covered by sales revenue of the company and government subsidy, and that maintenance of the motorway section constructed by the project is highly emphasized in the company, in order to avoid serious

[54] Non-operating expense includes interest expenses and exchange losses etc.

traffic congestions on the section due to traffic accidents etc., there seems to be no major problem in securing maintenance budget for the section.

3.5.4 Current Status of Operation and Maintenance

As daily maintenance, removal of garbage on roads, visual checks of street lights, road signs and technological equipment in the tunnel, and checks of the emergency cabin inside of the tunnel etc. are carried out[55]. As monthly maintenance, cleaning of street lights and road signs, checking and repairing of road fences, checking of fire extinguishing equipment in the tunnel, checking and cleaning of escape ways in the tunnel etc. are carried out[56]. Moreover, sweeping of carriageways with machines, cleaning of drainages, and repairing of technological equipment on roads and in the tunnel are carried out in every spring and autumn[57].

Site inspection of the motorway and the tunnel constructed by the project was conducted by the evaluator during the field study in ex-post evaluation, and both the motorway and the tunnel were maintained properly. There are many cameras in the Tunnel Sitina and they are monitored on displays in the maintenance centre for 24 hours, as there is large volume of traffics in the project section.

No major problems have been observed in the operation and maintenance system, therefore sustainability of the project effect is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project aimed at the completion of the motorway network in the capital city and the reduction of traffic congestions in adjacent roads of the section targeted by the project, by constructing approximately 3km of a motorway in the capital city of Bratislava.

Relevance of this project is high, as the project is consistent with priority areas of Slovakia's development plans and Japan's ODA policy, and moreover development needs for the project are high. The current traffic volume of the project section largely exceeds the volume expected at the time of project appraisal due to traffics induced by the project and shifted from adjacent city roads. Moreover, traffic congestion in adjacent city roads was largely reduced and beneficiaries also showed high level of satisfaction with this project, and thus, effectiveness and impact of the project are high. Sustainability of the project is also high, as no major problem has been observed in institutional, technical and financial aspects of the operation and maintenance

[55] Source: interviews with the executing agency
[56] Source: same as above
[57] Source: interviews with the executing agency

(O&M) and current O&M status. On the other hand, efficiency of the project is low, as both actual project cost and period largely exceeded the planned cost and period.

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

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

None

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

During the project implementation, types of soil in the areas where the tunnel was constructed turned out to be different from those identified in the geotechnical survey, and additional surveys and works were required, due to which both the actual project cost and the project period exceeded the plan largely. Boring surveys seem to have been conducted at the entrance and exit of the tunnel only before the project implementation, however, possibilities to conduct more detailed geotechnical surveys including boring surveys should be carefully examined in order to avoid a large increase of project cost and period.

Comparison of the Original and Actual Scope of the Project

Item	Original	Actual
1. Project Outputs	・ Motorway Length: 3,050m ・ Motorway Width: 26.5m, 4 lanes ・ Tunnel Length: 1,355m each, 2 lanes in both directions ・ Bridges: 7 sections, 801m in total ・ Relocation of public facilities and the entrance of the zoo	・ Motorway Length: 3,658m ・ Motorway Width: as planned ・ Tunnel Length: 1,428m each, 2 lanes in both directions ・ Bridges: 7 sections, 606m in total ・ As planned
2. Project Period	February 1999 – August 2004 (67 months)	February 1999 – November 2007 (106 months)
3. Project Cost Amount paid in Foreign currency Amount paid in Local currency Total Japanese ODA loan portion Exchange rate	 3,049million yen 11,743million yen (3,131million koruna) 14,792million yen 11,094million yen 1 koruna = 3.75yen (As of March 1998)	 15,302million yen 7,775million yen (2,287million koruna) 23,077million yen 11,093million yen 1 koruna = 3.40 yen (Average between February 1999 and December 2008)