# Ex-Post Project Evaluation 2016: Package IV-1 (Tunisia, Morocco)

March 2018

JAPAN INTERNATIONAL COOPERATION AGENCY

WASEDA UNIVERSITY

| EV |
| --- |
| JR |
| 17-55 |

Disclaimer

This report compiles the result of the ex-post evaluations. These are conducted by external evaluators to ensure objectivity, and the views and recommendations herein do not necessarily reflect the official views and opinions of JICA. JICA is not responsible for the accuracy of the English translation, and the Japanese version shall prevail in the event of any inconsistency with the English version.

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

Comments by JICA and/or the Borrower (including the Executing Agency) may be added at the end of the evaluation report when the views held by them differ from those of the external evaluator.

Republic of Tunisia

FY2016 Ex-Post Evaluation of Japanese ODA Loan

"Water Pipeline Construction Project in Northern Tunisia"

External Evaluators: Vincent GRAMMONT, Sadaharu KATAOKA, and Takeshi DAIMON,

Waseda University

## 0. Summary

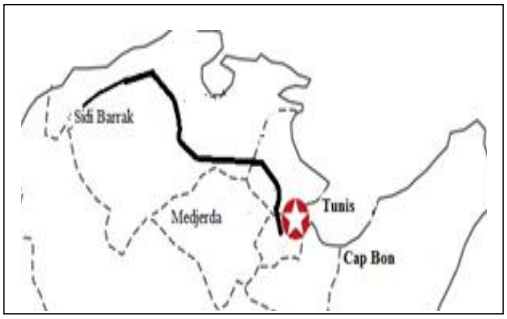
The aims of this project are to source the financial aid needed to construct water pipes (a total extension of about 90 km), undertake this extension of existing pump facilities, and source consulting services in the north of Tunisia; the endpoint of these aims is to provide high-quality drinking, industrial, and irrigation water to the Greater Tunis[1] Area and to the areas surrounding Tunis, Tunisia's capital city. As part of the Water Resources Development in accordance to the Master Plan drawn up by the government of Tunisia , this project also looks to contribute to measures that address the population growth and, hence, the increased water demand—as well as the expansion of agricultural production in the Greater Tunis Area and surrounding areas—by constructing water-supply pipes (triplication), extending the existing pump facilities in three sections (Sidi El Barrak–Sejnane, Sejnane–Joumine, and Joumine–Medjerda) which are located in the northern part from Tunis, and reinforcing the high-quality supply of waterworks and irrigation water for the area (Cap Bon, Sahel, and the Greater Sfax[2] Area).

The operation of this project is sufficiently consistent with Tunisia's development policy, Tunisia's development needs, and Japan's aid policy; as such, it is highly appropriate. Its outputs are completed nearly as planned. The operating cost is within the planned budget, but the timeframe of this project far exceeds that mentioned in the initial plan. Therefore, the project's efficiency is assessed as fair. At the time of this ex-post evaluation, the objective amount of water supply brought about by this project had not been achieved; it is expected to be achieved by 2019. However, other effectiveness indicators exceeded the objective values, and so, on balance, the project's effectiveness can be assessed as fair. Thus, the project effectiveness and impacts are assessed as fair. As expected at the time of the appraisal, the institutional, technological, and financial aspects of both management and operations have reached essential and sufficient levels, and both have been adequately carried out. Thus, project sustainability is considered high.

In light of these findings, this project's outcomes are assessed as being highly satisfactory.

[1] The Greater Tunis is a name of the large metropolitan area of Tunis and its environs.
[2] The Greater Sfax is a name of the large metropolitan area of Sfax and its environs

## 1. Project Description




Project Location
(Solid line shows water-supply pipeline)

Triplicated Water-supply Pipes (along the Medjerda River)
(Photo taken in April 2017)

1.1 Background

1.2 Project Outline

One-half of Tunisia is arid, and its yearly overall precipitation is scarce: in 2011, for example, it amounted to only 207 mm.[3] The value gets remarkably scarce in some years. Such scarcity can lead to water shortages. According to the documents of the Japan International Cooperation Agency (JICA) at the time of the appraisal, although Tunisia has 4,700 million $m^3$ of water resources comprising surface and underground water, almost 60% of the resources (i.e., 2,700 million $m^3$) converge in the northern mountainous region, which comprises the northernmost area and the Medjerda basin. Therefore, in terms of geography, precipitation, and annual available surface, water supplies are unevenly distributed.

Moreover, the Greater Tunis Area—which is in the northern region and the center of Tunisia's economic development—has suffered from impending demands for drinking water on account of its rapidly increasing population and a lack of irrigation water in the dry seasons. Thus, the Tunisian government has been carrying out an integrated water development plan for the whole northern area ("Water Resources Development Master Plan in Northern Tunisia" of 1975) to secure drinking water, industrial and irrigation water resources.

Based on this master plan, major water-supply channel and water conduit to each city have been installed. One example is the Cap Bon Canal, which connects the Medjerda River with Cap Bon (an area that produces citrus fruits which are major agricultural exports) in the southwest peninsula of Tunisia; another is the Sejnane–Joumine–Medjerda pipeline, which was built in the course of this project.

In 2004, water resource development in Tunisia had helped satisfy 80% of the developable amount of the water demand, and in the northern region, the resource amount

[3] See http://www.mlit.go.jp/common/001131547.pdf (2017-9-22 retrieved).

exceeded the gross demand. A dearth of pipelines, however, meant that these developed water resources were not being sufficiently distributed to the demanding areas (i.e., the Greater Tunis area and its environs [Cap Bon, Sahel, the Greater Sfax Area, and the like]). On the other hand, the water supplies in Sejnane–Joumine–Medjerda— was parts of this project —were expected to improve upon project completion of pipeline duplication ("The Project for the Development of Irrigated Areas of Northern Tunisia" L/A in February 1996, whose completion was originally planned for 2004). Originally, the approved amount for the project—JPY 14,130 million—was supplied in the form of a yen loan. In any case, in the case of droughts in some years, water supply capacity was unable to keep up with water demands, thus leading to water shortages. Therefore, triplication was needed to secure water supplies that would meet overall demands.

| | | |
|---|---|---|
| Loan Approved Amount/ Disbursed Amount | JPY 8,026 million/JPY 6,668 million | |
| Exchange of Notes Date/ Loan Agreement Signing Date | March 2004 / March 2004 | |
| Terms and Conditions | Interest Rate | 1.5% |
| | Repayment Period | 25 years |
| | (Grace Period) | (7 years) |
| | Conditions for Procurement | General Untied (Including Consultant) |
| Borrower / Executing Agency | Government of the Republic of Tunisia / Directorate General of the Dams of the Great Hydraulic Works, Ministry of Agriculture, Environment, and Water Resources[4] | |
| Project Completion | January 2017[5] | |
| Main Contractors (Over JPY 1 billion) | EL KANAOUET (Tunisia), BBMP (Tunisia), SOMATRA (Tunisia), CWE (China Inter Water Electric Corp; China), APLICO (Tunisia), SOCOOPEC (Tunisia), SAM (Tunisia), ADEV (Tunisia), STAFIM-PEUGEOT (Tunisia and France) | |
| Main Consultant (Over JPY 100 million) | STUDI (Tunisia) | |
| Feasibility Studies, etc. | SAPROF Water Resources Development Project in Northern Tunisia (II) (October 2003) | |
| Related Projects | Official Development Assistance (ODA) Loan Projects:<br>"Water Pipeline Construction and Irrigation Project in the North of Tunisia" (1996)<br>"Irrigated Project of Goubellat" (1998)<br>"Irrigated Project of Barbara" (1998)<br>"Water Resource Management Project" (1999)<br>"Sfax Sea Water Desalination Plant Construction Project" (July 2017) | |

[4] Currently, the name of this office is the Directorate General of the Dams of the Great Hydraulic Works, Ministry of Agriculture, Environment, and Fisheries (DG/BGTH) ( Direction Générale des Barrages des Grands Travaux Hydrauliques in French).

[5] At the time of appraisal, project completion was defined by the expiration of the guaranteed period. However, this ex-post evaluation defines completion in terms of the final transfer of the executing agency (see details in 3.2.2.2 "Project Period").

## 2. Outline of the Evaluation Study

### 2.1 External Evaluators

The external evaluators of this project are Vincent GRAMMONT, Sadaharu KATAOKA, and Takeshi DAIMON, all of Waseda University.

### 2.2 Duration of the Evaluation Study

This ex-post evaluation study was conducted according to the following schedule.

Study period: December 2016 – March 2018

Field study period: April 2, 2017 – April 15 and July 4, 2017 – July 19, 2017

### 2.3 Constraints during the Evaluation Study

As this project was expected to complete in 2017 the evaluators had no data—especially effectiveness data—regarding project effects for the two years following the project completion. Thus, prior to this ex-post evaluation, the evaluators collected as much data as possible, for as long of a period as possible, on the expressed effects of this project. Additionally, in areas for which there was a lack of data, they took account of estimated time-variance values.

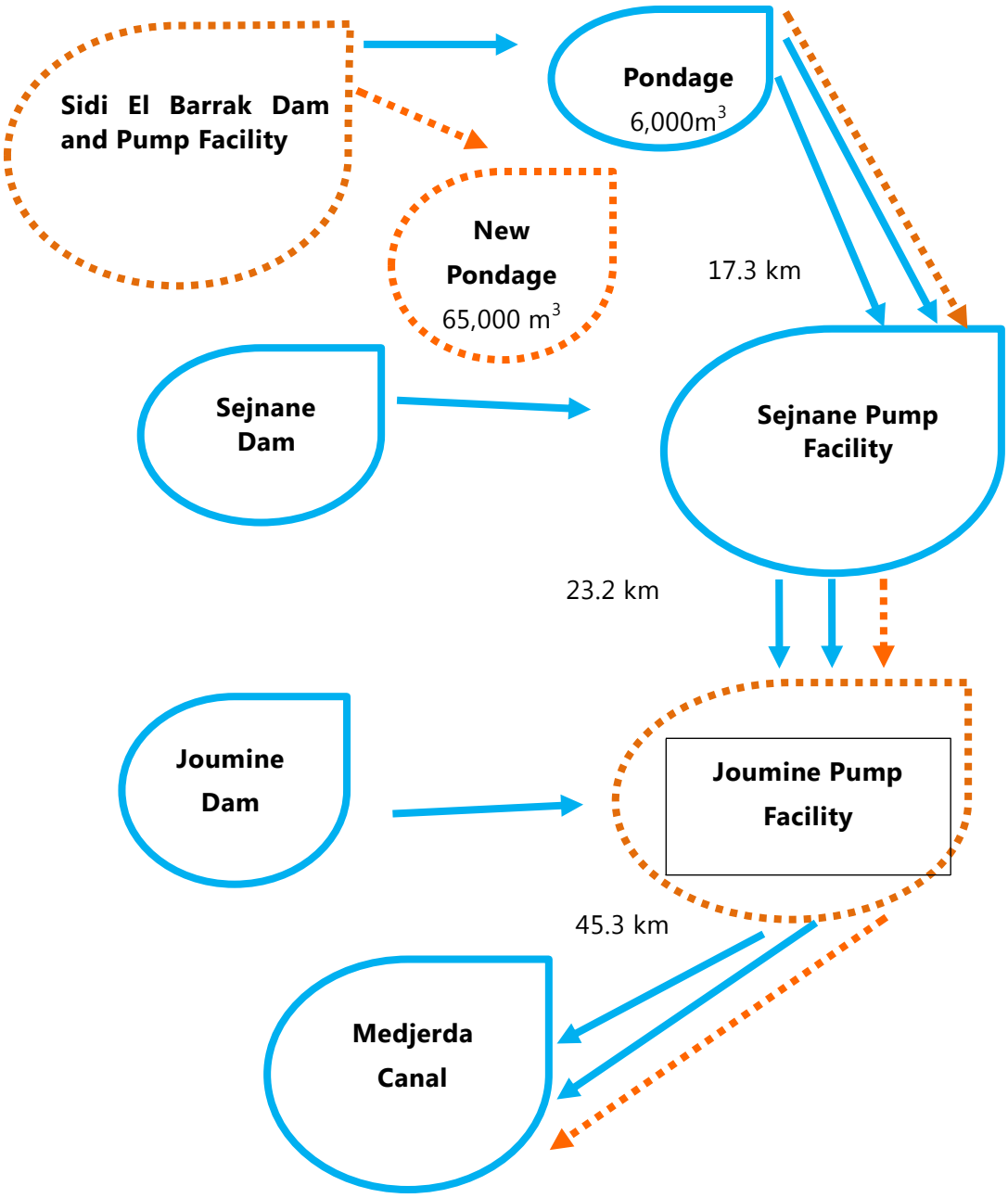



**Figure 1 Project Outline (Plan)**

Note: Facilities projected during this project are shown with dashed lines; existing facilities are shown with solid lines.

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

### 3.1 Relevance (Rating: ③[7])

#### 3.1.1 Consistency with the Tunisian Development Plan

The government of Tunisia has been executing an integrated water resource development project in the whole northern region ("The Project for the Development of Irrigated Areas of Northern Tunisia" of 1975) to secure water supplies for drinking, industrial use, and irrigation; this project featured the building of dams and water pipelines. Overall, 80% of the available water resources envisioned in the framework of this master plan (decided in 1975 and revised in 1982) have been realized. This framework featured three objectives: 1. Develop water resources to meet the growing need for drinking and irrigation water; 2. Improve water quality; and 3. Convey drinking and irrigation water from northern Tunisia to Gran Tunis, Nabeul, Souse, and the Sfax Area. As of this ex-post evaluation, this master plan has been succeeded by "Water in 2000" (Eau 2000) (a plan in 1990–2010) and "Water in the 21st Century" (Eau XXI) (plan for 2000–2030); water resource development for the north of Tunis remains a national priority policy.

On the other hand, the 11th Socioeconomic Development Plan (2007–2016)—which followed the 10th Socioeconomic Development Plan (2002–2006)—was decided, which confirmed the importance of water resource development. Moreover, this plan was followed by the Orientation Note for Strategic Development Plan ("Note d'orientation du plan stratégique de développement"), the latter of which was decided in 2015. This Note has been incorporated into the 5-year National Development Plan of 2016–2020 for the whole Tunisian government (Plan 2016-2020). The present project relates to this Note as issued in June 2016.

As mentioned, the policy importance of water resource development in northern Tunisia is consistently high, as of the time of appraisal and this ex-post evaluation. Therefore, this project is considered highly relevant to the country's development plan.

#### 3.1.2 Consistency with Tunisia's Development Needs

During the appraisal, it was found that the existing water-supply pipes cannot provide or convey sufficient water to various areas demanding water (e.g., the Greater Tunis Area, Cap Bon, the Sahel region, and the Greater Sfax Area). Although the duplication project for the pipeline of the existing Official Development Assistance (ODA) loan project "The Project for the Development of Irrigated Areas of Northern Tunisia" was completed, water-supply shortages were expected to occur in drought years. Thus, it was necessary to build new water pipes. In addition, reductions in salinity were expected, in line with environmental,

[6] The four-point scale used here is as follows: A, highly satisfactory; B, satisfactory; C, partially satisfactory; D, unsatisfactory.
[7] The three-point scale used here is as follows: ③, high; ②, fair; ①, low.

agricultural, health, and sanitation needs.

The water demand estimated during this project's preparation period and the present water-supply amount show the importance of water resource development and a water-supply project in northern Tunisia. Therefore, development needs in this sector remain high.

**Table 1 Water Demand in Tunisia**

| | Gross Demand (millions $m^3$) | | Water Resources (millions $m^3$) | |
|---|---|---|---|---|
| | For Drinking | For Irrigation* | Project Site** | This Project |
| 2004 | 212 | 509 | 1,283 | |
| 2014 | 303 | 727 (69) | 1,107 | 147 |
| 2015 | 306 | 734 (70) | 1,082 | 151 |
| 2016 | 311 | 746 (62) | 705 | 117 |

Source: Various documents provided by the executing agency.

Notes: *"Gross demand for irrigation water" values are estimated; the values in parentheses show actual amounts of water supplied (sold) for irrigation purposes. **Because of the constraints of data, "Project site" water resource amounts are from 2005.

**Table 2 Population (millions) of Various Areas, and Growth Rates (average % per year) of Project and Non-Project Sites**

| | 2004 | 2009 | 2014 |
|---|---|---|---|
| Greater Tunis Area | 2.250 | 2.399 (3.0%) | 2.548 (3.0%) |
| Cap Bon | 1.382 | 1.465 (1.7%) | 1.550 (1.7%) |
| Sahel Region | 1.381 | 1.506 (2.5%) | 1.636 (2.6%) |
| Greater Sfax Area | 2.238 | 2.421 (3.7%) | 2.611 (3.8%) |
| Non-project Sites | 4.059 | 4.173 (2.3%) | 4.228 (1.1%) |

Source: Various documents provided by the executing agency.

Note: Values in this table reflect the most recent data available as of this ex-post evaluation (from 2017).

As Table 1 shows, gross water demand—including that for drinking and irrigation—prompted a 77-million $m^3$ surplus in 2014; in comparison, there was a 42-million $m^3$ surplus in 2015. Additionally, the drought in 2016 led to a 352-million $m^3$ shortage. Except in 2016—which may be a special case—there has been a balance between demand and supply since 2014, when most of this project was completed. However, as Table 2 shows, the population growth rates of the project sites were higher than those of the non-project sites, and project-site populations have been increasing since the appraisal. Therefore, the selection of the project sites is appropriate.

Compared to southern water systems (e.g., present water sources, such as those in Sidi Salem), the northern water-system sources in this project (e.g., those in Sidi El Barrak,

Sejnane, and Joumine) contain less salt. Thus, sources have been appropriately selected for desalination. In addition, an ODA loan will be offered to desalinate water in the Sfax[8] Area post-project; this facility was expected to meet the water demands of the Sfax Area. As of this ex-post evaluation, the Sfax Area was already being supplied on account of this project.

Overall, this project is considered highly relevant to the country's development needs.

3.1.3 Consistency with Japan's ODA Policy

Tunisia enjoys stable economic growth (at the time of appraisal[9] the average annual economic growth rate was 4.5%), but it does suffer from some challenges, such as agricultural outcomes being affected by climate, high unemployment among young people, and growing socioeconomic inequality among the country's regions. In this context, the Japanese government has offered aids, centered on ODA loans and technical cooperation, especially in three important fields: level-up support for industry, support for water resource development and management, and support for environmental initiatives. Support for the current project is consistent with "Infrastructure improvement of water supply, transportation etc.," a field important to the government's Country Assistance Policy for Tunisia (decided in October 2002), the Operations Policy for Tunisia (in 2003), and the Overseas Economic Cooperation Operations Policy (in 2002–2004) of the JICA. Additionally, it corresponds with policies pertaining to "Infrastructure development for sustainable growth," "Support for reducing poverty," and "Reducing disparities among regions" in Tunisia. This is because issues in northern Tunisia have included how to tackle water-supply demand in those urban areas whose populations are expected to increase, how to increase the water-supply ratio in the northwest region, or how to tackle the demand for separate water supplies in rural areas.

Moreover, "Improvements to water, its supply, and transportation infrastructure" occupies an important part of the Country Assistance Program and Overseas Economic Cooperation Operations Policy, both of which are highly relevant to this project.

As mentioned before, the current project was and is necessary and relevant to Tunisia's development policy and to demands for water resources in northern Tunisia, as of the time of both this appraisal and this ex-post evaluation. Implementation of this project has been highly relevant to the country's development plan and development needs, as well as Japan's ODA policy. Therefore, its relevance is high.

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs

[8] "Sfax Sea Water Desalination Plant Construction Project" (JPY 366.76 billion) L/A in July 2017; this is slated to be completed in 2023.

[9] At the time of the Jasmine Revolution which took place in Tunisia from the end of 2010 to 2011, Tunisia's economic growth was negative growth. But since then it has turned to pick up.

Comparisons of outputs between the time of appraisal and the time of this ex-post evaluation are as follows, in Table 3.

**Table 3 Comparison of Planned and Actual Outputs**

| Items | Planned Outputs | Actual Outputs |
|---|---|---|
| ① Construction | (a) Sidi El Barrak–Sejnane ("S–S section"): 18.3-km triplication of water-supply pipe and building of pondage<br>(b) Sejnane–Joumine ("S–J section"): 23.2-km triplication of water-supply pipe<br>(c) Joumine–Medjerda ("J–M section"): 45.3-km triplication of water-supply pipe<br>(d) Sidi El Barrak–Joumine Pump Facility: procuring and building pump facility | (a) Sidi El Barrak–Sejnane ("S–S section"): 18.7-km water-supply pipe was built; however, building of pondage was canceled<br>(b) Sejnane–Joumine ("S–J section"): 22.9-km water-supply pipe was built almost as planned<br>(c) Joumine–Medjerda ("J–M section"): 42.5-km water-supply pipe was built almost as planned<br>(d) Sidi El Barrak–Joumine Pump Facility: Sidi El Barrak Pump Facility was expanded as planned |
| ② Consulting Services | (a) Review of detailed design<br>(b) Assistance for reviewing bidding procedure<br>(c) Management | All services were carried out as planned |

Joumine Dam

Joumine Pump Facility

With regards to the building of 65,000 $m^3$ of pondage—which was supposed to be built by the time of the appraisal—construction was suspended because of a neighboring resident's refusal[10]. During that suspension, an additional survey was carried out to look into geometrical problems. It was then decided that a pondage reduced in capacity (30,000 $m^3$) would be built, which was in consideration with soft-soil conditions and residents' opinions. Thereafter, attempts were made to initiate construction, but this had to be canceled because it was found that the construction would not be completed before expiration of the ODA loan terms. As of this ex-post evaluation, some parts of the building site had been dug, and machines intended for use were left behind, ready for resumption of construction[11].

However, the purpose of building the pondage was to facilitate and ensure the supply of private power facilities, to power the pumping of water resources from Sidi El Barrak, and ultimately to save power-generation costs. Therefore, this is not a critical factor affecting project evaluation.

As mentioned, the scope remained largely unchanged, and project outputs were almost as planned.

### 3.2.2 Project Inputs

#### 3.2.2.1 Project Cost

At the time of appraisal, the overall cost was JPY 10,701 million (JPY 5,331 million in foreign currency and JPY 5,370 million in domestic currency[12]), and the loan coverage was JPY 8,026 million (JPY 5,331 million in foreign currency and JPY 2,695 million in domestic

[10] According to the DG/BGTH, neighboring residents feared that the water of the pondage would leak and damage their residence and their land.
[11] This was confirmed in July 2017, during the field study.
[12] Approximately TND 60 million. As of March 2004, the exchange rate was TND 1 = JPY 89.50.

currency[13]). The planned amount to be paid by Tunisia was JPY 2,675 million.

**Table 4 Total Costs: Comparison of Planned and Actual Amounts**

| | Planned Amount | Actual Amount |
|---|---|---|
| Foreign Currency | JPY 5,331 million | JPY 6,668 million |
| Domestic Currency | JPY 5,370 million | JPY 2,757 million |
| Total | JPY 10,701 million | JPY 9,425 million |
| ODA Loan | JPY 8,026 million | JPY 6,668 million |
| Paid by Tunisia | JPY 2,675 million | JPY 2,757 million |

As of this ex-post evaluation, the total project cost was JPY 9,425 million,[14] and the ratio of the actual amount to the planned amount was 88%. Although the exchange rate changed (i.e., yen appreciation) and the costs of imported materials (e.g., steel) soared, the cost was within the plan parameters, as the scope had actually been reduced due to cancellation of the pondage project. Even if the pondage would have been built, the construction could have been carried out for less than an additional JPY 500 million. When taking into account this additional cost, the total cost was within the parameters stated by the appraisal. Therefore, the project efficiency from the viewpoint of project cost is high.

3.2.2.2 Project Period

The project period was supposed to be from March 2004 to December 2008 (4 years and 10 months; i.e., 58 months).[15] The project was defined as completed when the guaranteed period for the water-supply pipes, pump facility, and system services had expired.

As of this ex-post evaluation, the evaluators confirmed that the start date of this project was March 2004, that the final acceptance date[16] by the "Société d'exploitation du canal et des adduction des eaux du nord" (SECADENORD) was January 2017, and that the project period was 13 years and 11 months (i.e., 239% longer than planned). Clearly, the project period is significantly longer than planned.

The reasons for the delay are as follows.

(1) Resistance Movement by Local Residents

[13] Approximately TND 40 million.
[14] Approximately TND 135.5 million. The exchange rate was the International Monetary Fund average rate from March 2004 to the end of 2016; TND 1 = JPY 69.66 as of March 2004.
[15] While the project period (including the guaranteed period) was defined as ending in December 2009 at the time of appraisal, the guaranteed period did not end at the time of this ex-post evaluation. Because of that the evaluators applied the project period excluding the guaranteed period, as the project period both at the time of appraisal and at the time of the ex-post evaluation.
[16] This ex-post evaluation considered this project as completed upon final acceptance by the executing agency. In addition, because the sub-rating for the project period is considered low if it exceeds 150%, the subrating for the project period would not change even if the evaluators were to define this project as being completed after the guaranteed period.

Because local residents prevented the construction of the water-supply pipe from Sidi El Barrak to Sejnane[17] by force, construction was suspended. Thereafter, an administrative decree reinitiated the construction by executive order, whereupon it was finished in June 2016; the final transfer to SECADENORD took place in January 2017. The guaranteed period was supposed to be 12 months following the completion of the construction, which was meant to be finished in July 2017.[18]

Expansions of the Sidi El Barrak Pump Facility and the Joumine Pump Facility were completed in December 2014. However, the actual start of operations by these facilities was in June 2016, due to the resistance of local residents; the final transfer took place in January 2017.

(2) Rebidding by the Consultants

Because the consultants carried out rebidding[19] at the time of selection, the agreement related to the consulting service contract delayed 49 months.

(3) Soil Deterioration Due to heavy rain

Because the soil at the project site is soft, considerable volumes of rainwater remain whenever a sudden heavy rain occurs. If rainwater remains, construction works need to be suspended, and for this very reason, construction in Sidi El Barrak–Sejnane was delayed by 3.8 months, in Sejnane–Joumine by 3.1 months, and in Joumine–Medjerda by 2.8 months. The total delay was 9.7 months.

(4) Stagnation of Administrative Procedure due to Tunisian Revolution ("Arab Spring")

National rights awareness and an antigovernment attitude led to sabotage by the residents mentioned in point (1) above. In addition, many executives were exiled following the 2011 revolution; this led to overall stagnation in administrative procedures. However, this does not mean there was a total absence of administrative organization: indeed, line ministries in charge of basic infrastructure—including police, fire departments, and military—continued to hold their function.

Therefore, no subperiods should be removed from the project period as *forces majeure*.

3.2.3 Results of Calculations for Internal Rates of Return (Reference Only)

Because this project generates no financial profits (e.g., toll revenue), a quantitative analysis of the financial internal rate of return since the appraisal has not been possible. On the other hand, the economic internal rate of return (EIRR) was 11.4%. The methodology by which we calculated the EIRR considered the following factors.

[17] This will be explained in point (4), below.

[18] Upon the completion of the field study, the evaluators confirmed with the executing agency that the guaranteed period was expanded even as of October 2017.

[19] The executing agency took too many times to create a document of the request for the proposal to consultants and the submitted proposal and application form by consultant was completely deficient. For the executing agency, it was very difficult to evaluate this proposal and finally through the judgment of the government of Tunisia the executing agency has rebid.

Cost: Construction cost and management cost (in this project, for six dams in the northern region and for water-supply facilities)

Benefit: Increased profit due to increasing supplies of drinking, industrial, and irrigation water, and to increasing agricultural production by virtue of desalination

Project life: 50 years

As a reference, the evaluators recalculated EIRR based on costs, benefits, and project life as cited, and found it to be 18.9%. The EIRR increased because the actual profit of agricultural products in 2016 exceeded the forecast at the time of the appraisal. However, increases in the prices of agricultural products were not considered. Although the evaluators did consider the costs of managing those dams not covered by this project, these management costs were excluded, as they do not originate from this project. Additionally, the construction cost was calculated on a per-capita basis, as there were no materials relating to this factor.

As mentioned, all of the outputs—save for the cancelled pondage construction—were completed. Although the project cost was within the plan parameters, the project duration exceeded that of the plan. Therefore, the project efficiency is assessed as fair.

### 3.3 Effectiveness[20] (Rating: ②)

#### 3.3.1 Quantitative Effects (Operation and Effect Indicators)

At the time of appraisal, the target values when we evaluated this project were 200 million $m^3$ for the amount of water taken from the Medjerda River 2 years post-completion; 211 million $m^3$ for the amount of water conveyance from the triplication pipes between Sidi El Barrak and Sejnane; 244 million $m^3$ between Sejnane and Joumine; and 290 million $m^3$ between Joumine and Medjerda. Moreover, the target value of the land utilization rate was set as 120%, that for the rate of salinity concentration of Cap Bon (g/l) (maximum in a month) as 1.0 g/l, and that of the water-supply salinity concentration (g/l) (maximum in a month) as 1.0 g/l. The evaluation results are shown in Table 5.

[20] The subrating for effectiveness is to be grouped with a consideration of impact.

**Table 5 Indicators of the Effects of the Operation (Target and Actual Values)**

| Year | Reference Value 2002 | Target Value Two Years Post-completion | Actual Value 2010 | Actual Value 2014 | Actual Value 2016 | Actual Value 2017 Post-completion | Estimated Value 2017 |
|---|---|---|---|---|---|---|---|
| Amount of Water Taken from Medjerda River (1 million $m^3$/year) | 163 | 200 | 135 | 218 | 249 | n/a | n/a |
| Amount of Water Conveyed by Triplicated Pipe | | | | | | | |
| S–S (1 million $^3$/year) | 0 | 211 | 7.5 | 10.5 | 61 | 140 | 196–201 |
| S–J (1 million $^3$/year) | 33 | 244 | 95 | 100 | 103 | 198 | 234–243 |
| J–M (1 million $^3$/year) | 62 | 290 | 158 | 142 | 117 | 200 | 234–291 |
| Land Utilization Rate (%) | 108 | 120 | n/a | n/a | 117 | n/a | n/a |
| Salinity Concentration of Cap Bon (g/l) | 1.5 | 1.0 | 1.5 | 1.5 | 1.5 | n/a | n/a |
| Tap Water Salinity Concentration (g/l) | 1.3 | 1.0 | n/a | 1.0 | 1.0 | n/a | n/a |

Source: Evaluation materials from the organization.

Note 1: While this projected is not estimated to increase the amount of water taken from the Medjerda River, this project does assume that needs are satisfied by both the water from the Medjerda River and by the project's increased water-conveyance volumes. Therefore, we use the amount of water taken from the Medjerda River to analyze the factors of the water supply of the area of demand and salinity concentration. The target value is set as the maximum value in order to maintain that salinity concentration of the lower stream (upper water and irrigation) is under 1.0g/l.

Note 2: Land Utilization Rate: total crop acreage divided by cultivated acreage.

Note 3: 2017 data comes from the timeframe ranging from July 2016 (i.e., following the completion of the construction) to August 2017. All other data is annual.

At the time of the ex post evaluation as we have previously mentioned within "2.3 Constraints during the Evaluation Study", this project did not achieve to the targeted year (two years following the project completion). Because of that we confirmed the following points by considering the estimated value with a secular change.

First of all, although the amount of water taken from the Medjerda River is not a result of

this project and acts only as a reference, the results suggest that the target value was reached since 2014 as shown in Table 5.

Second, with regard to the amount of water conveyed from the triplication pipe, although the real values do not reach the target for S–S (66% of the target value) or for J–M (69%), that for S–J has been nearly realized (i.e., 81%). However, the estimated value for S–S in 2019 which we have calculated by using the existing data is in the range of 201 million $m^3$ (upper bound) and 196 million $m^3$ (lower bound) (when little rain falls) per year, and that way we can attain the target value if it is an upper-bound case[21]. On the other hand, we can reach the target value regardless of whether it is an upper (243) or lower-bound (234) case. Even if we assume the lower-bound case, the target values will be achieved in all sections. We can estimate that 80% of target will be achieved 2 years post-completion either in any section or in the lower-bound case.

Third, the target value of the land utilization rate has been almost reached. Given that some citrus fruit and vegetables derive from double-cropping, the total crop acreage exceeds the cultivated acreage, and the percentage was achieved to 117% in the actual value of 2016. Moreover, when one considers that land utilization rate is directly proportional to the water-conveyance amount, the land utilization rate is less likely to decrease from 2016 on, in accordance with data on the water-conveyance amount. We can therefore estimate that the target value will also be achieved in 2019.

Fourth, regarding salinity concentration, the real values in 2016 did not achieve the target value in Cap Bon, but water-supply targets were achieved. Assuming an increase in water conveyance, we can attain the target value of the water-supply salinity concentration, but we cannot estimate whether the Cap Bon value will be attained: this will depend on the quality of the southern water system. However, since the southern water system is not covered by this project, we should consider the salinity concentration of the Cap Bon as a reference value.

### 3.3.2 Qualitative Effects (Other Effects)

The target value was not set both at the time of the appraisal and of the ex-post evaluation.

As one can see, with regards to the water-conveyance amount, although the real values in 2017 did not reach the target values (save for those between Sejnane and Joumine), it can be estimated that over 80% of the target values will be achieved by 2019, even in a lower-bound scenario. Additionally, the target value for the land utilization rate has been nearly achieved; it is estimated that this value will be attained in 2019, assuming that the water-conveyance

[21] We calculated the upper and lower-bound estimated values based on certain assumptions, based on the (monthly) real values of 2016–2017: in the upper-bound case, the water-source dams will fill with water and be fully operational, and in the lower-bound case, a certain portion of the dams (e.g., the Sejnane Dam, which flows into Ichkeul Lake) will be unusable.

amount increases. Additionally, the target value of the amount of water taken from the Medjerda River has already been achieved. As for salinity concentration, the plan's value for tap water has already been attained and, considering the estimated increase in water-conveyance amount, we can assume that that value will be sustained. Therefore, the effectiveness of the project is assessed as fair.

3.4 Impacts

3.4.1 Intended Impacts

3.4.1.1 Quantitative Impacts

Upon the appraisal, the target values for water consumption, water-supply population, piped water-supply coverage ratio, and farm products were set as quantitative impacts. Upon the ex-post evaluation, as one can see in Table 6, it can be assumed that, in those circumstances, most of the construction of all pipelines except for a storage pump was completed by 2014 and that water was conveyed without storage pumps thereafter; therefore, a portion of the impact can be observed. Because project completion was planned for 2017, it does matter whether the impacts can be sustained until 2019. However, using the estimated water-conveyance volume for 2019—based on the efficiency level calculated in the previous section—one can predict that water consumption and water-supply population will increase, and that the quantity and quality of citrus production in Cap Bon will be sustained.[22]

**Table 6 Post-evaluation Values**

| Year | Standard Value | Target Value | Real Value | | Year of Completion |
|---|---|---|---|---|---|
| | 2002 | 2010 | 2010 | 2014 | 2016 |
| Water Consumption (1 million $m^3$/year) | 195 | 256 | 272 | 303 | 311 |
| Water-supply Population (1 million) | 4.4 | 5.6 | 6.3 | 6.7 | n/a |
| Piped Water-supply Coverage Ratio (%) | 100 | 100 | 100 | 100 | 100 |
| Citrus Fruit Output in Cap Bon (1,000 tons/year) | 240 | <240 | n/a | 328 | 450 |
| Main Farm Products Unit Crop in Cap Bon (Citrus Fruit) (tons/ha/year) | 15 | 17 | n/a | 18 | 24 |
| Amount of rainfall (in Cap Bon) (as a reference)(㎜/year) | 317 | 462 | 462 | 419 | 468 |

Source: Various documents provided by the executing agency.

Note: The numerical values of "Water Consumption", "Water supply population" and "Piped Water-supply

[22] We include contributions other than those of this project, such as those of the southern water system.

Coverage Ratio" are the data of the whole project area (Greater Tunis). The target values are assumed to be two years after the completion (2019); however, because the year 2019 is not suitable for predicting sector-based change, for convenience, we evaluated its impacts based on values from 2016. And as we have conducted the field survey in 2017, we are not able to obtain the year 2017 data.

#### 3.4.1.2 Qualitative Impacts

In the evaluation, qualitative effects were evaluated in terms of increases in water supply to local residents, improvement of health and sanitation conditions, and improvement of standard of living, all by virtue of improving the water quality.

Following the evaluation, we confirmed that this project had contributed to an increase in the supply of higher-quality water, given that the water-conveyance target values had been achieved. However, while salinity concentration had improved in the northern water system, the salinity concentration value was not reached to target value in Cap Bon because of the confluence of the southern water system.

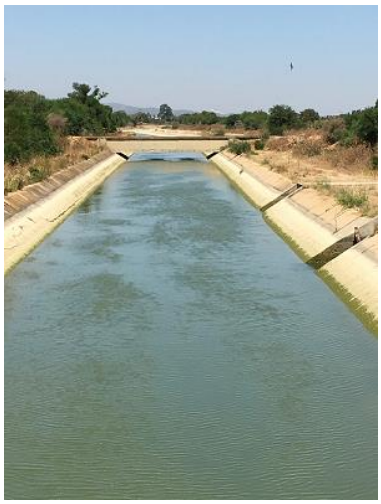
As there was no objective data before and after the project concerning public health, improvements to sanitation, or improvements to standards of living, the evaluators inquired about the standard of living in a beneficiary survey (as discussed below); they concluded that there had been improvements. Likewise, as there was no objective data about the impact of water supply on socioeconomic aspects, the evaluators asked about similar topics; they generally found good results. Additionally, as Table 6 shows that both the production price and unit income of citrus products had increased[23], and that price is rather rising, thus giving rising to an upward trend in agricultural income. Therefore, it can be said that this project contributes to improvements in the local standard of living.

For the beneficiary survey[24], the evaluators selected six available sites within the overall area that objectively benefit from pipe triplication.[25] The number of effective respondents comprised 117 households. The number of drinking water users was 90 households, and that of irrigation water was 27 households. The evaluators sampled two areas for irrigation water (Talef, which has a pump facility, and its neighboring city, Sidi Othmane) and four areas for drinking water (the northern and southern parts of City Mateur, Aryanah, and Ben Arous). The populations of City Mateur, Aryanah, and Ben Arous are 32,000, 115,000, and 88,000, respectively; Aryanah and Ben Arous are located in the Grand Tunis area. Regarding gender distribution, 30% of all respondents were found to be female.[26]

[23] Many of the citrus fruit to be exported and generally the export price is higher than the domestic price.
[24] The water supply to the residents did not take place with this project. Therefore, there is a possibility that the result of the beneficiary survey is not the effect of this project and we should treat it as a reference.
[25] Random sampling was impossible, given the difficulty of sourcing the resident register. We therefore targeted representative households living within 100–200 m of the conduit pipes, and nonrandomly selected respondents.
[26] Occupationally, the beneficiaries covered by this survey could be broken out as follows: corporate managers, 3%; merchants, 11%; self-employed people, 11%; public servants, 9%; and farmers, 22%.

(1) Drinking Water (90 Households)

Many survey respondents said that there had been no water-supply outage. However, a portion of them—especially those living at high altitudes—answered that there had been a drop in water pressure. One-half of residents responded that they drink tap water, while the other half responded that they do not because they do not trust its quality. One-half of the residents answered that they were satisfied with the quality of the drinking water.



Medjerda River

Planned Site of New Pondage
(Sidi El Barrak)

**Table 7 "Has there been any change in water pressure, such as water outage?" (Multiple selections allowed)**

| Water Outage | Change in Water Pressure | None |
|---|---|---|
| 19 | 14 | 56 |

Note: One household did not answer the question.

Source: Beneficiary survey.

**Table 8 "Can you drink the tap water?"**

| Yes, I can. | No, I cannot. | I don't know. |
|---|---|---|
| 41 | 48 | 1 |

Source: Beneficiary survey.

**Table 9 "Are you satisfied with the water pipe services?"**

| Satisfied. | Not Satisfied. | I don't know. |
|---|---|---|
| 45 | 41 | 4 |

Source: Beneficiary survey.

(2) Irrigation Water (27 Households)

This project has four supply points for irrigation water, and the *Commissariat régional de développement agricole de Bizerte* (CRDA) manages each of them. A beneficiary survey was conducted in the vicinity of these points. According to the results, regarding the target of increasing the water supply to area residents, 26 of the 27 households were satisfied with the current water quality, 23 with water-supply services, and 26 with economic activities. Although this data only complements the water-quality data, given that 80% of the respondents showed satisfaction, it can be said that the targets have been roughly achieved.

3.4.2 Other Positive and Negative Impacts

3.4.2.1 Impacts on the Natural Environment

At the time of the appraisal, this project was categorized as B, based on the "JBIC Environmental Guidelines for ODA Loans." Additionally, an assessment report based on the *Tunisian Environmental Assessment Act* was issued, and it was approved by the National Agency of Environment Protection. Some of the water induced during this project was used to desalinate Ichkeul Lake in order to mitigate salt damage incurred by the lake. (This lake had been cited in the list of World Heritage in Danger issued by the United Nations Educational, Scientific and Cultural Organization (UNESCO), and in 1994, the number of wintertime migratory birds reduced by 90% compared to the 1980s (about 200,000 birds).)

Our ex-post evaluation confirms that that this project incurred no adverse environmental effects. Additionally, according to results of the beneficiary survey, a large proportion of the residents answered that they had experienced no problems, such as noise, during the construction phase.

**Table 10 Did you have noise problems during the construction?**

| Yes, I did. | No, I did not. | I have no idea. |
|---|---|---|
| 3 | 22 | 2 |

Source: Beneficiary survey.

Note: Total number of respondents: 27 households (i.e., the beneficiaries of irrigation water).

While the salinity concentration percentage of Ichkeul Lake was 10 g/l and more at the time

of the appraisal, this number reduced[27] to 2 g/l and less at the time of the post evaluation. The number of migratory birds to the Ichkeul Lake in the winter was not the object to be monitored in this project. Just for reference we asked the confirmation to the Ministry of Environment. According to the Ministry of the Environment the number of migratory birds to the Ichkeul Lake in the winter from 2006 was restored from 200,000 to 400,000. Therefore Ichkeul Lake was removed from UNESCO's World Heritage in Danger list in July 2006 and the survey of collecting data of migratory birds was canceled.

Consequently, this project contributed to the desalination and the salt damage mitigation of Ichkeul Lake.

3.4.2.2 Land Acquisition and Resettlement

When we evaluated the already-acquired land, we determined that no residents had been resettled on account of the project; the results of the ex-post evaluation further support this assertion.

Land used to construct water conduits between Joumine and Medjerda were expropriated by Tunisia's government in 1987 when the first water conduits were constructed in the same region. Therefore, land acquisition did not take place during this project. Local residents protested further land expropriation in a neighboring area before the start of the 1987 project. Their descendants again raised this issue and demanded compensation after the start of this project. In April 2011, these residents sabotaged the construction of a water-supply pipe from Joumine to Medjerda; thus, although materials had been procured in July 2012, the construction had yet to start. Eventually, the construction of the water-supply pipe started at the behest of an administrative order; it was completed in July 2016 and transferred to SECADENORD in January 2017. As a salient opposite action did not take place after the completion of this project, we confirm that there was not a big negative impact.

3.4.2.3 Unintended Positive and Negative Impacts of the Project

During the appraisal and ex-post evaluations, the project was not found to have any other impact, whether positive or negative.

As mentioned, the real values of water conveyance in 2017 did not reach the target values, save for that of the Sejnane and Joumine section; however, it is highly likely that80% of the targets will be achieved at least in 2019. Additionally, the land utilization rate and salinity concentration objectives have been nearly achieved, and regarding land utilization rate, the probability of the deterioration of target achievement status will be low (under the assumption that water conveyance will increase). However, the salinity concentration target value has not been reached in one of the two areas, and it cannot be said that it will be reached before 2019.

[27] According to the public data of the Tunisian Ministry of the Environment.

Therefore, the effectiveness of the project is assessed as fair.

Moreover, targets regarding the water supply, water-supply population, citrus fruit outputs in Cap Bon, and unit crops had already been achieved in 2016.[28] Therefore, while quantitative data suggest the project's high impact, the impact was more moderate.

While the project's impact tends to be high, when we combine the effectiveness and the impact, the proportion of the effectiveness is relatively large. Therefore, the project's effectiveness and impact are assessed as fair.

### 3.5 Sustainability (Rating: ③)

#### 3.5.1 Institutional Aspects of Operation and Maintenance

The appraisal cites DG/BGTH as the executing agency until the completion of this project; following its completion, SECADENORD took over the operation and management of each facility. At the end of 2016, SECADENORD had 445 workers in total, and occupationally, they can be described as follows: 9 executives, including the president; 10 bureau chiefs; and 13 chief engineers, with the remainder comprising normal engineers (about 20% of whom are qualified engineers) and clerical employees. SECADENORD is a public corporation, and its organization is similar to that of Tunisia's bureaucracy with a top-down chain of command. However, when one considers its accountability among intra and inter-organizations, there appears to have been no particular problems with regards to policy-making mechanisms and decision-making processes. The results of the ex-post evaluation confirm that the management system has not changed since the appraisal.

Therefore, we confirm that this project involves a sufficient management system.

#### 3.5.2 Technical Aspects of Operation and Maintenance

According to SECADENORD's org chart, the maintenance division that executes large projects operates under the auspices of the technical station. Additionally, based on the activity reports of SECADENORD for 2014–2016, we can confirm that the plan for developing technicians was documented and the budget was distributed.[29]

[28] Contributions other than those of this project (e.g., those of the southern water system) are included.
[29] This information is based on domestic records from SECADENORD.

**Table 11 SECADENORD Materials**

| | FY2016 | FY2017 |
|---|---|---|
| Training (Budget) | TND 121,400 | TND 124,100 |
| Content | Budget management and financial training, training on the law for land management, and technical training (such as techniques for the management of water sources) | Same as in FY2016 |

Source: SECADENORD.

According to the annual activity reports, the charge of each engineer is described in detail based on job classification. The classes are on a 10-point scale in accordance with the level of the acquisition of technique quality and the management level; promotions are based on experience and techniques.

Save for a guidebook written by the contractor, there are no manuals regarding the parts or machines used; however, upon being tasked with operational maintenance at the pump stations, workers are trained on the job, and they face no special technical difficulties. Moreover, based on their needs, they can acquire some techniques through external organizations, such as manufacturers and universities[30].

Therefore, we assess the operational and maintenance technical level as being high.

3.5.3 Financial Aspects of Operation and Maintenance

At the time of the appraisal it was found that this project was given high priority under the 10th five-year plan; no problems were found with regards to local currency budget allowances. The ex-post evaluation confirmed that project maintenance budgets were defined by section (Table 12).

**Table 12 Management Budget (Unit: TND)**

| Year / Section | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|
| S–S | 431,700 | 336,900 | 285,280 | 298,430 |
| S–J and J–M (Combined) | 707,300 | 788,200 | 1,100,600 | 914,700 |
| Total | 1,139,000 | 1,125,100 | 1,385,880 | 1,213,130 |

Source: SECADENORD.

[30] This information is based on hearings to SECANDENORD.

**Table 13 Financial Statements (FY2014–FY2016)**

| | 2014 | 2015 | 2016 |
|---|---|---|---|
| Owned Capital | 3,630 | 3,630 | 3,630 |
| Annual Reserve Funds | 244 | 290 | 288 |
| Carried Forward | 12,407 | 14,293 | 16,412 |
| Net Profits before Taxation | 18,208 | 20,333 | 20,526 |
| Total Debt | 9,169 | 9,411 | 12,973 |
| Total Assets | 27,378 | 29,744 | 33,500 |

Source: SECADENORD.

Note: Unit is millions of TND.

Fiscal resources are based on fee revenues. As Table 13 shows, with regards to financial statements, SECADENORD does not operationally rely upon loans as the organization, but rely on revenues from clients. For example, "pre-tax net income" (fee revenues) in Table 13 accounts for 60% of all revenues.) Therefore, the project's financial condition can be considered healthy. For management, the budget allocated until FY2017 will suffice in executing this project. Therefore, there are no particular finance problems, and considering the sufficiency of the fee revenues and reserve funds, the project's financial resources will be sustainable in the foreseeable future.

In conclusion, the project does not have any problem in terms of financial management.

3.5.4 Current Status of Operations and Maintenance

Our evaluation confirmed that this project's conduit pipes are regularly subject to on-the-spot investigations. Additionally, the maintenance budget has remained unchanged. Maintenance, repairs, and other work has been conducted, and as needed, the control office of each dam informs SECADENORD's head office in Tunis about the maintenance. However, there is no online monitoring system, in cases where repairs are necessary, communication is restricted to telephone and email. SECADENORD intends to use online (remote) monitoring systems at each dam regulated by the Central office and hopes for donor aid to finance them.[31]

On the other hand, we confirmed that on-the-spot investigations had been executed and updated at each watering place under the management plan (i.e., 24-hour treble-shift system), and that inspections, repairs, and other duties have been carried out. Spare parts are stored at each pump facility and, if they are in short supply, they are provided domestically or by other

[31] This information is based on hearings to the executing agency.

countries (mainly Germany).

In essence, we report that there have been no major problems with this project's operation or maintenance.

In conclusion, no major problems have been observed regarding institutional, technical, or financial aspects of this project, or in the current status of the project's operation and maintenance system. Therefore, the sustainability of the project's effects is considered high.

## 4. Conclusion, Recommendations, and Lessons Learned

### 4.1 Conclusion

The aims of this project are to source the financial aid needed to construct water pipes (a total extension of about 90 km), undertake this extension of existing pump facilities, and source consulting services in the north of Tunisia; the endpoint of these aims is to provide high-quality drinking, industrial, and irrigation water to the Greater Tunis Area and to the areas surrounding Tunis, Tunisia's capital city. As part of the Water Resources Development in accordance to the Master Plan drawn up by the government of Tunisia , this project also looks to contribute to measures that address the population growth and, hence, the increased water demand—as well as the expansion of agricultural production in the Greater Tunis Area and surrounding areas—by constructing water-supply pipes (triplication), extending the existing pump facilities in three sections (Sidi El Barrak–Sejnane, Sejnane–Joumine, and Joumine–Medjerda) which are located in the northern part from Tunis, and reinforcing the high-quality supply of waterworks and irrigation water for the area (Cap Bon, Sahel, and the Greater Sfax Area).

The operation of this project is sufficiently consistent with Tunisia's development policy, Tunisia's development needs, and Japan's aid policy; as such, it is highly appropriate. Its outputs are completed nearly as planned. The operating cost is within the planned budget, but the timeframe of this project far exceeds that mentioned in the initial plan. Therefore, the project's efficiency is assessed as fair. At the time of this ex -post evaluation, the objective amount of water supply brought about by this project had not been achieved; it is expected to be achieved by 2019. However, other effectiveness indicators exceeded the objective values, and so, on balance, the project's effectiveness can be assessed as fair. Thus, the project effectiveness and impacts and impacts are assessed as fair. As expected at the time of the appraisal, the institutional, technological, and financial aspects of both management and operations have reached essential and sufficient levels, and both have been adequately carried out. Thus, project sustainability is considered high.

### 4.2 Recommendations

#### 4.2.1 Recommendations to the Executing Agency

Regarding the new pondage whose construction was interrupted, in consideration of the environmental effects in the surrounding areas, we can reduce the scale and mitigate environmental damage. Additionally, it must be stated that even an abrupt power cut happens the new pondage can continue to work without stopping the function of the pump station. Therefore, the agency should make the efforts to examine the future orientation by making continuing the dialogue with the residents.

### 4.2.2 Recommendations to JICA

We have no recommendations to make to JICA.

## 4.3 Lessons Learned

Follow-up for the projects with final disbursement before the project completion.

During each term of this project, the executing agency submitted a progress report to the JICA Tunisia office; this progress report pointed out the possibility that a part of the project would not be completed before the final disbursement, given resident opposition. JICA also recognized this and called upon the executing agency to expedite the project. However, the executing agency did not submit request for the (re)extension of the loan period, and the time limit of the final disbursement was reached. JICA had continued dialogue with the executing agency on the uncompleted component of the ODA loan. However, there was no official agreement on change of scope for defining project completion, budgetary measurement of Tunisian Government or schedule for the project completion. In the future, when the project is uncompleted by the final disbursement, it is recommended to have written official agreement on responsibilities for the executing agency. So that the effective follow-up would be possible.

**Comparison of Original and Actual Project Scopes**

| Item | Planned | Actual |
|---|---|---|
| 1. Project Outputs | ① Engineering Works<br>(a) Triplication of 18.3 km of water pipes between Sidi El Barrak and Sejnane, and the construction of regulating reservoir<br>(b) Triplication of 23.2 km of water pipes between Sejnane and Joumine<br>(c) Triplication of 45.3 km of water pipes between Joumine and Medjerda<br>(d) Pump stations in Sidi El Barrak and Joumine; procurement and installation of water-lifting devices<br><br>② Consulting Services<br>(a) D/D review<br>(b) Bidding evaluation support<br>(c) Management of operations | ① Engineering Works<br>(a) Construction of 18.7 km of water pipes between Sidi El Barrak and Sejnane; construction of the regulating reservoir was stopped<br>(b) Construction of 22.9 km of water pipes between Sejnane and Joumine<br>(c) Construction of 45.3 km of water pipes between Joumine and Medjerda<br>(d) Pump stations in Sidi El Barrak and Joumine constructed as planned<br><br>② Consulting Services: executed as planned |
| 2. Project Period | March 2004–December 2009<br>(58 months) | March 2004–January 2017<br>(167 months) |
| 3. Project Cost<br>Amount Paid in Foreign Currency<br>Amount Paid in Local Currency<br><br>Total<br>ODA Loan Portion<br>Exchange Rate | <br>JPY 5,331 million<br><br>JPY 5,370 million<br><br>(TND 60 million)<br>JPY 10,701 million<br>JPY 8,026 million<br>TND 1 = JPY 89.50<br>(As of March 2004) | <br>JPY 6,668 million<br><br>JPY 2,757 million<br><br>(TND 40 million)<br>JPY 9,425 million<br>JPY 6,668 million<br>TND 1 = JPY 69.66<br>(Average of IMF exchange rate between March 2004 and the end of 2016) |
| 4. Final Disbursement | July 2014 | |

<End>

Kingdom of Morocco

FY 2016 Ex-Post Evaluation of Japanese ODA Loan Project

"Mediterranean Road Construction Project" "Mediterranean Road Construction Project (II)"

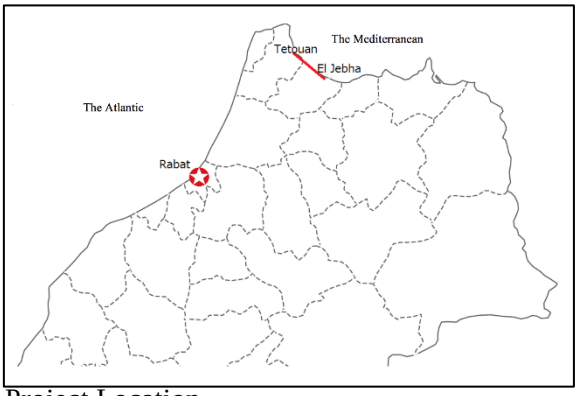
External Evaluator: Takeshi Daimon, Waseda University

## 0. Summary

The objective of this project was to improve accessibility to economic/social infrastructure for local residents by developing a new road and widening/strengthening the 120 km stretch of existing road between Tetouan and El Jabha within "the Mediterranean Road Construction Plan" (550 km), thereby contributing to redressing of regional disparities. The implementation of the project has been highly relevant to Morocco's development policy and development needs as well as Japan's ODA policy. Therefore, its relevance is high. The outputs were made mostly as planned, but the project cost and project period exceeded the plan substantially, and the efficiency is low. The project effects (effectiveness) estimated at the time of appraisal achieved the target by increasing traffic volume. The impacts estimated at the time of appraisal mostly achieved the target, which was supported by objective evidence, including a reduction of the poverty rate. While some suits over the amount of compensation for land acquisition were filed at the administrative court, resident relocation did not cause major problems because Morocco's administrative procedure was followed. On the other hand, after the road development, quite a few residents had safety concerns such as traffic accidents, and the number of accidents is increasing. Therefore, this project has largely achieved the onset of effect as planned, and the effectiveness and impact are high. As above, a sufficient level was secured in terms of the institutional, technical, and financial aspects of the operation and maintenance as estimated at the time of appraisal. Including the mobilization of the maintenance team when a problem occurred, the operation and maintenance was conducted properly. Therefore, sustainability of the project effects is high.

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

## 1. Project Description




Project Location

Image representing the Project

## 1.1 Background

Economic activities through Morocco's transport sector played a major role in the economic and social activity of the country, at the time of appraisal on "Mediterranean Road Construction Project" (hereafter referred to as "Project (I)" or (I)), accounting for approximately 6% of the GDP, while giving rise to 10% of employment in urban areas and 15% of the national budget. With regard to land transportation in particular, 90% of intercity passenger transport and 75% of freight were conveyed by road. The market for land transport was restricted until 2003 when the Transportation Act became effective, but it went through liberalization measures at the time of appraisal on "Mediterranean Road Construction Project (II)" (hereafter referred to as "Project (II)" or (II)). This liberalization was expected to accelerate land transport between urban and rural areas, and to broaden the transport sector of the country.

The Moroccan government has implemented rural development programs such as rural road improvement projects, rural electrification projects, and rural water supply projects since the mid-1990s. The Moroccan government has attached great importance to the assistance of infrastructure development in the northern area where development was lagging and economically isolated. The above-mentioned projects were implemented with support from international organizations and donors such as Japan.

The "Northern Area National Development Program" was developed in 1999, and Tanger port development, infrastructure development in the neighboring area, special economic zone establishment, and the "Mediterranean Road Construction Plan (1999)" including Projects (I) and (II) were prepared. The overall plan was to construct and improve the 550 km stretch of road between Tanger and Saidia. This plan had the national importance of the northern area development. Moreover, this plan had an international aspect of reinforcing the links between Maghreb region and Europe because products are exported from Maghreb, including from Algeria, Tunisia, and Libya, to Europe across the Straits of Gibraltar. This plan was positioned to create a synergy effect for rural industrial roads and tourism promotion in the area, and Project (I) was requested as part of the above-mentioned "Mediterranean Road Construction Plan," and afterward, Project (II) was requested to complete the plan.

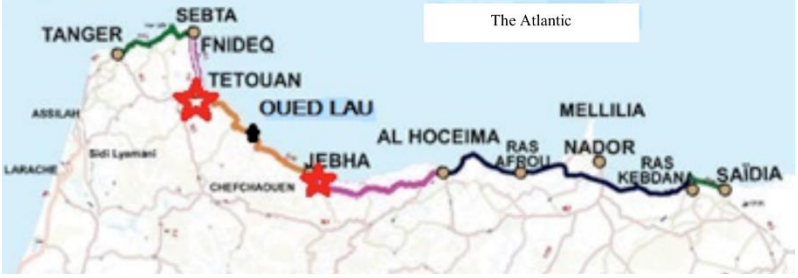


Figure 1. Map for the Project

Note: This project targeted the section between the stars (⋆Tetouan – ⋆El Jabha)

## 1.2 Project Outline

The objective of this project was to improve the access of local residents to economic/social infrastructure by developing a new road and widening/strengthening the 120 km stretch of road between Tetouan and El Jabha within "the Mediterranean Road Contraction Plan" (550 km)[1], thereby contributing to redressing regional disparities.

| | | |
|---|---|---|
| Loan Approved Amount/ Disbursed Amount | (I) 12,764 million yen / 12,587 million yen<br>(II) 8,455 million yen / 7,738 million yen | |
| Exchange of Notes Date/ Loan Agreement Signing Date | (I) June 2001 / September 2001<br>(II) March 2010 / March 2010 | |
| Terms and Conditions | Interest Rate<br>Repayment<br>(Grace Period<br>Conditions for Procurement | (I) 2.2% (II) 1.4%<br>(I) 30 years (II) 25 years<br>(I) 10 years (II) 7 years)<br>(I) General Untied<br>*Special Environmental Interest Rate<br>(Consultants, Bilateral Tied)<br>(II) General Untied<br>(Same for consultants part) |
| Borrower/Executing Agency | Government of the Kingdom of Morocco / Ministry of Equipment, Transportation, Logistics and Water, Road Department (Ministère de l'Equipement, du Transport, de la Logistique et de l'Eau, Direction des Routes) | |
| Project Completion | June, 2012 | |
| Main Contractor (s) | Tetouan - El Jebha Section (Lot 1): Bruessa Construccion S.A./ Sintram<br>El Jebha- Oued Laou Section (Lot 2): The Arab Contractors Osman Ahmed Osman & Co./ El Haji Abdellah / Société Seprob S.A / Société D'entreprise Houar/ La Route du Nord | |
| Main Consultant (s) | Nippon Koei (Japan) | |
| Related Studies (Feasibility Studies, etc.) | Feasibility Study (F/S) (October 1999) | |
| Related Projects | ODA Loan Projects<br>"Road Improvement Project (March 1995)"<br>"Rural Road Improvement Project I (March 2008)"<br>"Rural Road Improvement Project II (July 2011)"<br><br>Technical Cooperation Projects<br>"Training Institution of Equipment and Road Maintenance (Institut de Formation aux Engins et a l'Entretien Routier Skhirat) (IFEER) Program (1992 – 1997)"<br>Group Training in the Third Country for "Capacity Enhancement for Road Maintenance Skills (1999 – 2003)"<br>Group Training Course in the Third Country for "Road Maintenance and Construction Skills in IFEER, Phase2 (2005 – 2010)"<br>Group Training Course in the Third Country for "Road Maintenance and Construction Management, Phase3 (2009 – 2012)" | |

[1] Widening/improving of the existing 300 km road, and developing the new 250 km national road (Approximately 550 km in total). The total length was changed to 510 km at the time of (II) provision.

| | |
|---|---|
| | ODA Grant Projects<br>"The Project for the improvement of equipment of IFEER in Morocco" (February 2005) |

## 2. Outline of the Evaluation Study

### 2.1 External Evaluator

Takeshi Daimon, Waseda University

### 2.2 Duration of Evaluation Study

This ex-post evaluation study was conducted with the following schedule.

Duration of the Study：December 2016 – December 2017

Duration of the Field Study：March 20 – April 1, 2017, July 3 – July 8, 2017

## 3. Results of the Evaluation (Overall Rating: B [2])

### 3.1 Relevance (Rating: ③[3])

#### 3.1.1 Consistency with the Development Plan of Morocco

The Moroccan government developed the "Northern Area Development Program" in 1999. This program was positioned as a core program to achieve the objectives in the "Economic and Social Development Plan (2000 – 2004) which was formulated afterward." Within this context, the "Mediterranean Road Construction Plan" was positioned as the most important project to promote economic development in the northern area where development was lagging. This project aimed to finance a portion of the "Mediterranean Road Construction Plan," and the project has been relevant to Morocco's development plan.

At the time of the ex-post evaluation, the "Northern Area Development Strategy 2013 – 2018" (Plateforme Stratégique) [4], positioned as the succeeding program to the above-mentioned "Northern Area Development Program," pointed out that northern area development remained important. The strategy pointed out the consistent importance of infrastructure development, including road development, and the importance of developing transport infrastructure to alleviate the northern area's isolation from other economic blocks. Mediterranean roads have been a core part of the northern area development since the "Northern Area Development Program," the predecessor of the above-mentioned plan, was formulated.[5] Therefore, the project has been highly relevant to Morocco's development plan.

---

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

[3] ③: High, ②: Fair, ①: Low

[4] (Website of the Agency for the Promotion and Development of the North) (Accessed on February 17, 2017)

[5] http://www.equipement.gov.ma/routier/Pages/Tous-les-Projets.aspx?IdNews=16 (Website of the DRCR) (Accessed on February 17, 2017)

### 3.1.2 Consistency with the Development Needs of Morocco

At the time of appraisal, more than 80% of Morocco's major roads (highways, national roads and regional roads) were paved. However, there was a conspicuous disparity between urban and rural areas, with the rate of paving for provincial roads at 45.9% (2005). The implementation of this project was expected to improve accessibility to economic/social infrastructure for local residents by completing the construction of all the road sections on the coast of the Mediterranean Sea, thereby contributing to redress of regional disparities. This project addressed the need to develop the northern area where infrastructure development has been left behind due to the isolation of the mountainous area, and the need to redress the economic and social disparity in the areas with high poverty rates. Coordination with other donors such as the EC was also planned.

Compared to the western areas which are economic hubs including Rabat, Casablanca, and Marrakech, at the time of the ex-post evaluation, the northeastern areas, which face the Mediterranean, were still economically lagging. On the other hand, infrastructure development in the coastal area of the Mediterranean Sea was an important task facing the country[6] because the area is of strategic importance for trade with the EU and for globalization. In order to promote a special economic zone, accessibility to Tanger port, which is a hub for trading with the EU, development of transport facilities in the area was essential for Mediterranean trade, and development needs were still high. Therefore, it was recognized that traffic access for inhabitants of roadside communities had to be improved by developing the roads in the area, and there were constant needs to improve the living conditions of local residents and alleviate regional disparities.

The other donors have already started their aid projects, and the sections Japan supported were the section left behind in terms of development. Without completion of these sections, the whole project (of the Mediterranean roads) could not be completed. There were no particular problems when Japan selected its target sections and coordinated with other donors. Moreover, at the time of appraisal of Project (I), a number of the Mediterranean road sections, except for the sections targeted by the yen loan project, were open to traffic due to aid from other donors. The sections of the project were requested for the yen loan. While there were not any choices left in section selection, the sections assigned could complete all the Mediterranean roads. This possible connection of the "missing links" matched Morocco's development needs in the northern area. Therefore, the project was relevant to Morocco's development needs.

### 3.1.3 Consistency with Japan's ODA Policy

At the time of the appraisal on Project (I), this aid project was relevant to the priority

[6] Interview with the Agency for the Promotion and Development of the North (On March 2017)

areas of "The Medium-Term Strategy for Overseas Economic Cooperation Operations" (April 2000) stating rural development for the reduction of disparities between urban and rural areas, development of agriculture and marine industry, and improvement of infrastructure for sustainable economic growth, enhancement of the international competitiveness, and private investment promotion. These items were Japan's aid priorities for Morocco consistent with the agreement over six "priority areas" (on July 1999).[7] Over the agreement, this project was relevant to "improvement of infrastructure" and "rural development for the reduction of disparities between urban and rural areas."

Moreover, this project was consistent with "A Foundation for Sustained Growth" and "Poverty Reduction" stated in JICA's "New Medium-Term Strategy for Overseas Economic Cooperation Operations" (April 2005), and with "Reducing regional disparities" in Morocco, at the time of the appraisal on Project (II). Among the priority assistance areas of the Japanese government,[8] this project has been relevant to "the Reduction of Economic/Social Disparities" and "Enhancement of Economic Competitiveness and Sustainable Economic Growth" at the time of appraisal on the Project (II).

In light of the above, this project has been highly relevant to Morocco's development plan and development needs, as well as Japan's ODA policy. Therefore, its relevance is high.

### ３.２ Efficiency (Rating: ①)

#### ３.２.１ Project Outputs

At the time of appraisal, the project outputs were planned as follows.

① Public engineering works

(a) Improvement of national roads and development of new roads: Tetouan-Oued Lau section (46 km) and Oued Lau-Jebha section (74 km) width 12 m: two-lane road (3.5m×2＝7.0m, asphaltic pavement), road shoulders (2.5m×2＝5.0m), among which development of new roads (20 km), improvement of the existing roads (100 km).

(b) Bridge: About 62 locations (The concrete number was to be examined in the detailed design.)

(c) Slope protection

(d) Structural objects (Drainage, transverse drainage pipe, etc.)

② Consulting service

(a) Detailed design review

[7] At the comprehensive economic cooperation policy consultation in July 1999, there was an agreement with the Moroccan government on the following priority areas: ①development of agriculture and marine industry; ②water resource development; ③improvement of infrastructure; ④rural development for the reduction of geographical disparities and for poverty reduction; ⑤environment; and ⑥social development.

[8] Based on description in "ODA Databook by Country 2010: Morocco"

(b) Supervision on construction (Site supervisor, inspection, progress management, writing reports, etc.)

(c) Environmental consideration (Management and monitoring)

At the time of the ex-post evaluation, the implementation was confirmed as shown below.

① Public engineering works

(a) Improvement of national roads and Development of new roads: All the sections (in 120 km, Tetouan-Oued Lau section (46 km) (Lot 1) Oued Lau-Jebha section (74 km) (Lot 2)) Opening (June 2012) width 12 m: two-lane road (3.5m×2＝7.0m, asphaltic pavement); road shoulders (2.5m×2＝5.0m). However, after additional financing, land formation was simplified, and drainage performance was strengthened.

(b) Bridge: As a result of the detailed design (hereafter referred to as D/D), it decreased from the estimation (about 62 locations) at the time of appraisal in 2000 to 15 locations (6 sites in Lot 1, and 9 sites in Lot 2). However, after the project optimization study, it became 13 locations (3 sites in Lot 1 and 10 sites in Lot 2) in the end.

(c) Slope protection: After additional financing, cement revetment was reduced, and slope was lessened.

(d) Structural objects (Drainage, transverse drainage pipe, etc.): Culverts were used in place of bridges for the purpose of simplification

② Consulting service

(a) Detailed design review

(b) Supervision on construction (Site supervisor, inspection, progress management, writing reports, etc.)

(c) Environmental consideration (Management and monitoring)

(d) Implementation of a project optimization study

Output results at the (detour) sections where the new road (20 km) was constructed were examined during the field study. The completion following the plan was confirmed.

The other changes in the scope were also based on the readjustment at the time of the D/D and only a minimum change was made in the end.

Moreover, in the project optimization study that was added as a consulting service, the project scope was reviewed and the project cost was optimized (saved). This was not a study that the executing agency added afterward, but one that was planned from the beginning. Therefore, there have been no reports published for this particular study.

As explained above, there have been no major changes in the scope and the outputs were made mostly as planned in the original loan (Project (I)).

### ３．２．２ Project Inputs

#### ３．２．２．１ Project Cost

At the time of appraisal, the total project cost was 17,019 million yen (amount paid in foreign currency was 9,337 million yen, and amount paid in local currency was 7,682 million yen[9]). The yen loan amount was 12,764 million yen (amount paid in foreign currency was 9,337 million yen, and amount paid in local currency was 3,427 million yen[10]). It was financed based on the criteria of the loan ratio (87%) and the Moroccan Government shared the cost of 4,255 million yen.

Table 1. Total Project Cost, Comparison Table on Planned and Actual Values

| | Plan | Actual |
|---|---|---|
| Amount Paid in Foreign Currency | 9,337 million yen | 1,138 million yen |
| Amount Paid in Local Currency | 7,682 million yen | 26,647 million yen |
| Total | 17,019 million yen | 27,785 million yen |
| ODA Loan Portion | 12,764 million yen | 20,325 million yen |
| Cost Shared by Moroccan Government | 4,255 million yen | (Note) 7,460 million yen |

Note: Total Loan Amount Disbursed: 12,587 million yen in Project (I) and 7,738 million yen in Project (II)

As a result of the optimization study in 2006, because prices of materials and equipment had escalated and exchange rates had risen since 2011, the cost of construction work was 23,628 million yen, which was higher by 11,137 million yen than the estimation of 12,491 million yen at the time of the appraisal on Project (I). While the estimated cost of the project was 17,019 million yen at the time of appraisal, it increased by 19,536 million yen because of the cost increase in consulting service (571 million yen), reserve fund (1,090 million yen), price escalation (1,262 million yen), interest during construction (1,090 million yen), cost of acquiring land (273 million yen), administration cost (278 million yen), tax (3,830 million yen), and commitment charge (5 million yen). As a result, at the time of the appraisal on Project (II), the project cost was estimated to be 36,555 million yen (amount paid in foreign currency: 1,838 million yen, and amount paid in local currency: 34,717 million yen).[11] For the additional financing , in 21,219 million yen (loan ratio: 58%) for construction cost and consulting service, the project cost was provided at a maximum of 8,455 million yen except for 12,764 million yen (amount of the loan for the Project (I)).

The increase in the total project cost was mostly caused by fluctuations in exchange rates. Other major causes for the total project cost increase were the following factors: soil at the target sections was more fragile than expected; the cost for land formation, drainage, water distribution, and strengthening ground, including slope, significantly increased; and the cost of public engineering works escalated.

When examined at the time of the ex-post evaluation, the cost of acquiring land roughly

[9] Approximately 761 million Moroccan dirham (MAD). As of December 2000, exchange rate: 1MAD=10.09 yen.
[10] Approximately 340 million MAD.
[11] Approximately 2,822 million MAD. As of January 2010, exchange rate: 1MAD=12.30 yen.

tripled.[12] However, the total project cost was 27,785 million yen (amount paid in foreign currency was 1,138 million yen, and amount paid in local currency was 26,647 million yen[13]). This was 163% of the total project cost planned at the time of appraisal on Project (I).

The area to process water drainage was initially planned to be 25,000 ㎥ but the area was expanded to be 270,000 ㎥, which caused an increase in construction cost. On the other hand, the number of bridges decreased from 62 in the initial plan to 13, and the project cost was within the plan of Project (II).

However, if the total project cost at the time of appraisal on (I) is used as the base, the project cost was significantly higher than planned.

#### ３．２．２．２ Project Period

At the time of appraisal, the project period was estimated to be from the signing of the loan agreement in September 2001 up to October 2005 (4 years and two months) (50 months). Completion of public engineering works (except for the maintenance period) was planned to be the project completion.

When examined at the time of the ex-post evaluation, the construction was completed in June 2012 (10 years and 10 months) (130 months). The project period was 260% longer than initially planned.

The executing agency spent longer than expected selecting consultants because of the approval process within the Moroccan government. Moreover, the construction was thought to be delayed because the additional financing required the construction cost to be estimated again, and there was also a project optimization study. Japanese-descended consultants were selected but had frequent communication problems with the executing agency due to the lack of experience of the yen loan project. The situation worsened when a project manager took extended sick leave during the project and there was a need for a replacement. There was also the same problem between contractors for Project (I) and the executing agency.[14]

In light of the above, the project period was significantly longer than planned.

### ３．２．３ Results of Calculations for Internal Rates of Return (References only)

Due to the nature of the project not drawing financial revenues, such as toll receipts, the financial internal rate of return (FIRR) has not been calculated at the time of the appraisal. On the other hand, at the time of the appraisal, the economic internal rate of return (EIRR) of the sections targeted by this project was 4.98% based on the following premises.

---

[12] The estimated cost of acquiring land was 71 million yen at the time of appraisal on (I), and 344 million yen at the time of appraisal on (II). However, the cost of acquiring land was 1,024 million yen at the time of the ex-post evaluation.

[13] Approximately 2,278 million MAD. IMF Average exchange rate between 2001 and 2012: 1MAD=11.70 yen.

[14] Based on the interview with the executing agency.

EIRR: 4.98% (4.70% at the time of appraisal on (I))[15]
Cost: Project cost, operation and maintenance expense (without tax)
Benefit: Shortening of travel cost and time for car users
Project Life: 20 years

For reference, when re-computed with the same premises at the time of the ex-post evaluation, the EIRR was 7.6%. The EIRR increased from the time of appraisal largely because the annual average traffic (actual values) was higher than planned, and also the operation and maintenance expense (actual values) was about half of the estimation at the time of appraisal. Because the executing agency did not calculate shortened travel cost and time, the estimation at the time of appraisal was used as the base and others including the price growth rate after the appraisal were removed in re-computation.

The outputs were made mostly as planned, but the project cost and project period exceeded the plan substantially (163% and 260% respectively, compared with the plan of (I)). Therefore, efficiency of the project is low.

### 3.3 Effectiveness[16] (Rating: ③)

#### 3.3.1 Quantitative Effects (Operation and Effect Indicators)

At the time of appraisal, for the section targeted by the project, the target value for annual average daily traffic (total in the section) was 7,800 vehicles/day (2015) in Tetouan Oued-Lau section (Figure 1), but 9,638 vehicles/day was achieved; the target was achieved. The executing agency did not collect the indicators on the shortened travel cost and time that were estimated at the time of appraisal. Therefore, before-after analysis cannot be conducted. Nonetheless, the opening of the road led to the average shortened travel time of 66.2 minutes[17] in the Tetouan Oued-Jebha section.

Table 2. Annual Average Daily Traffic (vehicles/day): **Tetouan Oued-Lau** Section

| Baseline Value (2007) | Target Value (2015) | Actual Values (2013) | (2014) | (2015) |
|---|---|---|---|---|
| 4,739 | 7,800 | 8,819 | 9,273 | 9,638 |

Note: The target value was set at the time of appraisal on (II). The value was the one targeted four years after the project completion.

#### 3.3.2 Qualitative Effects (Other Effects)

[15] The EIRR of the entire Mediterranean Road Construction Plan was about 14% (documents for the appraisal on (I), p.14). When examined during the field study, in most of the cases on Moroccan national road, the discount rate used for the road sector is over 10% in adopting a project plan. If the rate is under 5%, the discount rate can be considered substantially low. This section was a difficult section with a risk of landslide, which increased the cost. According to the interview with the executing agency, this project was adopted because the EIRR of the entire Mediterranean Road Construction Plan was 14%.
[16] Rating is based on the evaluation of the project effectiveness as well as its impact.
[17] The average based on the values in the beneficiary survey (Valid response number: 110 households). This is the average travel time that local residents spend to commute.

At the time of appraisal, the outcome was expected to be "improvement on the accessibility to the economic/social infrastructure of the local residents," and the impact was expected to be "redress of regional disparities." This project was expected to contribute to (Impact) redress of regional disparities between urban and rural areas by (Outcome) improving the level of the transportation infrastructure service. At the time of the ex-post evaluation, a certain qualitative effect was confirmed.[18] For the transportation infrastructure service, after the road was opened, the traffic, including regular bus services and taxies, has increased. Also, social services, including the use of ambulances, have improved.

As explained above, the target value of the traffic indicator was achieved, and the qualitative effect was confirmed. Therefore, effectiveness of the project is high.

## 3.4 Impacts

### 3.4.1 Intended Impacts

#### 3.4.1.1 Quantitative Effects

Target values for the quantitative impacts were not set at the time of appraisal, and they were not confirmed at the time of the ex-post evaluation.

#### 3.4.1.2 Qualitative Effects

At the time of appraisal, ① "improvement on the accessibility to the economic/social infrastructure of the local residents," ② "redress of regional disparities," and ③ "poverty reduction by economic revitalization in the roadside communities" were expected to be qualitative effects. Because there was no quantitative data available on these impacts to have a before-after analysis, these impacts were evaluated by a beneficiary survey.[19] Summary of the results are shown as follows.

① Survey on improvement on the accessibility of economic/social infrastructure for local residents

For commuting time, comparing before and after the project, the average time was shortened by 66.2 minutes, and the average commute time to school was shortened by 88.3

[18] Based on the evaluation of the beneficiary survey interviewers and the interviews with the executing agency.

[19] The sample size was 110, which was statistically significant. (statistical population: inhabitants within 2 km of the roadside of the project (the total length of 120 km) in Tetouan province and Chafchaouen province (The number of total households were unclear)). Questionnaires were designed to have items on effectiveness and the impact of the project from the perspective of the beneficiaries. It aimed to collect data supplementing indicators in effectiveness and impact. The target areas were decided by avoiding a selection bias on a certain area, and selecting multiple areas with distinct characteristics (It was planned that 6 places were going to be selected every 20 km between the starting point and the end). Households of beneficiaries were sampled, conducting judgment sampling in each area (Visit based on population registry was not possible. The interview was conducted with the households that were willing to help the study. Technically, it was not random sampling, which caused a restriction. There were a number of households who could neither respond to nor help the study.)

minutes, based on the survey responses. The rate of school enrollment and visiting health facilities rate cannot be calculated, but the time to visit health facilities and the commute time to school were shortened by 157.7 minutes and 88.3 minutes respectively. The related questions asked if the road increased the frequency of visiting maternal and child health facilities and whether they benefited from it. Approximately 76% of the respondents answered that it was beneficial. These results suggest that this project improved the accessibility to economic/social infrastructure.

**Table 3. The Average Time Shortened to Travel (Unit: Minute)**

| Purpose | Time | Number of Respondent | Purpose | Time | Number of Respondent |
|---|---|---|---|---|---|
| Commute to Work | 66.2 | 89 persons | Commute to School | 88.3 | 3 persons |
| Shopping | 105.0 | 4 persons | Visit Health Facility | 157.5 | 3 persons |
| Business | 80.0 | 6 persons | Visit Family | 105.0 | 17 persons |

Source: Beneficiary Survey
Note: Multiple answers allowed

**Table 4. Benefits, Maternal and Child Health Facilities**

| Very Significant | Significant | Somewhat | No | Unclear |
|---|---|---|---|---|
| 58 | 26 | 19 | 6 | 1 |

Source: Beneficiary Survey

② Survey on redress of regional disparities

Moreover, when asked if the road made a contribution in preventing the regional economy from isolation (i.e., whether they recognized the increased contact with other areas because of the road development), approximately 76% of the respondents answered that it made a contribution. Approximately 76% of the inhabitants of roadside communities also answered that it made a contribution, to the question on improvement on the living conditions in the area (because of the increased contact with other areas through the road development).

**Table 5. Awareness Survey on the Improvement of the Regional Isolation**

| Very Significant | Significant | Somewhat | No | Unclear |
|---|---|---|---|---|
| 57 | 27 | 14 | 12 | 0 |

Source: Beneficiary Survey

**Table 6. Awareness Survey on the Improvement of the Living Conditions in the Area**

| Very Significant | Significant | Somewhat | No | Unclear |
|---|---|---|---|---|
| 25 | 27 | 25 | 30 | 3 |

Source: Beneficiary Survey

When the poverty rate was compared by region before and after the opening of the road, it was 7.8% in the Tamger-Tetouan-Al Hoceima provinces near where the roads in the sections targeted by the project are located, in 2007 before the opening of the road. In 2014, when two

years had passed since the opening, the rate was 2.2%, which is among the lowest in Morocco.

Table 7. Poverty Rate Transition by Province

| | 2001 | 2007 | 2014 |
|---|---|---|---|
| Draa-Tafilalet | 40.3% | n/a | 14.6% |
| Marrakesh-Safi | 20.2% | 11.2% | 5.4% |
| Oriental | 18.2% | 10.1% | 5.3% |
| Sous-Massa | 16.7% | 12.7% | 5.1% |
| Fes-Meknes | 16.6% | 9.5% | 5.2% |
| Rabat-Sale-Kenitra | 15.5% | 5.1% | 3.8% |
| Beni Mellal-Khenifra | 14.4% | n/a | 9.3% |
| Tanger-Tetouan-Al Hoceima* | 11.5% | 7.8% | 2.2% |
| Settat-Casablanca | 6.9% | 3.2% | 2.0% |
| Three Southern Provinces in total (El Dakha-Ouet Ed Dahab, Laayoun-Saguia Al Hamra, Guelmin-Oued Noun)** | 6.0% | n/a | 3.3% |

Source: Poverty Profile (2007) and Family Income and Expenditure Survey (2014), conducted by the Moroccan Government.
Note: *Region in the section targeted by the project
***The Under-populated areas (desert areas) were aggregated in three Southern Provinces.

③ Economic revitalization in the roadside communities (its poverty reduction)

The beneficiary survey asked about economic revitalization in the roadside communities. From the subjective perspective of inhabitants in the areas, approximately 73% of the local residents answered that the road development made a contribution to tourism. On the other hand, about 16% and 32 % of the residents answered that it contributed to the development of the agriculture and the fishery industries, respectively. The results show that the contribution to economic revitalization varied depending on the sector.

**Table 8. Do you think that the road helped tourism in the area to be developed?**

| Very Significant | Significant | Somewhat | No | Unclear |
|---|---|---|---|---|
| 51 | 29 | 13 | 17 | 0 |

Source: Beneficiary Survey

**Table 9. Do you think that the road helped the agriculture industry in the area to be developed?**

| Very Significant | Significant | Somewhat | No | Unclear |
|---|---|---|---|---|
| 8 | 10 | 11 | 70 | 11 |

Source: Beneficiary Survey

**Table 10. Do you think that the road helped the fishery industry in the area to be developed?**

| Very Significant | Yes Significant | Somewhat | No | Unclear |
|---|---|---|---|---|
| 17 | 18 | 30 | 31 | 13 |

Source: Beneficiary Survey

### 3.4.2 Other Positive and Negative Impacts

3.4.2.1 Impacts on the Natural Environment

At the time of appraisal, it was confirmed that an Environmental Impact Assessment was prepared in April 2000. When examined at the time of the ex-post evaluation, the Assessment was approved before the commencement of the construction work (in September 2001). Moreover, based on the Assessment, management of noise, drainage, dust, and garbage was exercised during the construction work, following the initial plan. The executing agency and consultants also conducted regular inspections. During the construction work and after the loan provision, environmental monitoring was conducted as planned.

Moreover, at the time of appraisal, because most of the areas where the road was located were in the national forest in a mountainous region, there were no areas on which the project would have had an adverse impact, such as an overcrowded roadside. The impact of air pollution, noise, and vibration was assumed to be minimal. The project area was not in or near areas that were sensitive to impact such as national parks, and so an undesirable impact on the natural environment was assumed to be minimal. These estimations can be examined in the beneficiary survey.

Approximately 82% of the total respondents claimed that there was environmental deterioration during the construction work. For the environmental deterioration types, the respondents who chose dust and/or noise belonged to the largest group. On the other hand, approximately 56% and 72% of the respondents answered that the road development and pavement reduced noise and dust, respectively. From the subjective perspective of the respondents, environmental deterioration caused by the construction was temporary, and eventually the road improved living conditions.

**Table 11. Awareness on Environmental Deterioration during the Road Construction**

| Yes | No | Unclear |
|---|---|---|
| 88 | 13 | 9 |

Source: Beneficiary Survey

**Table 12. Environmental Deterioration Types (Multiple answers allowed)**

| Dust | Noise | Closed to Traffic | Others | Unclear |
|---|---|---|---|---|
| 84 | 65 | 72 | 5 | 1 |

Source: Beneficiary Survey
Note: Many of the respondents chose Closed to Traffic for the inconveniences of living. However, this type is not included in environmental deterioration in the analysis because technically it is not environmental disruption during the construction.

**Table 13. Awareness on Reduced Traffic Noise by the Road Development**

| Very Significant | Significant | Somewhat | No | Unclear |
|---|---|---|---|---|
| 31 | 31 | 19 | 26 | 3 |

Source: Beneficiary Survey

**Table 14. Awareness on Reduced Dust by the Road Development**

| Very Significant | Significant | Somewhat | No | Unclear |
|---|---|---|---|---|
| 45 | 34 | 13 | 18 | 0 |

Source: Beneficiary Survey

### 3.4.2.2 Land Acquisition and Resident Relocation

At the time of appraisal, the project was assumed to require a land acquisition of 1,776,707 ㎡, and the relocation of 305 households. The table below shows the confirmation at the time of the ex-post evaluation.

**Table 15. The Status of the Land Acquisition**

| | Tetouan-Oued Lau | Oued Lau-El Jebha | Total |
|---|---|---|---|
| Acquired Land (㎡) | 624,270 | 1,484,843 | 2,109,113 |
| Number of Households | 443 | 1,584 | 2,027 |
| Amount of Compensation (Million MAD) | 46 | 41.5 (*) | 87.5 (*) |
| Japanese Yen (Million Yen) | About 538 | About 486 | About 1,024 |

Source: Documents provided by the executing agency
Note: * The amount of compensation in this area is a provisional value because matters in dispute are included.
Exchange Rate: 1MAD=About 11.7 Yen (IMF Average exchange rate between 2001 and 2012) for Calculation.

When a resident is not satisfied with the amount of compensation, he or she can take the case to the administrative court. Three households filed a suit in Tetouan-Oued Lau section and received a damage award. The value above includes the amount of damage awards. On the other hand, in Oued Lau-El Jebha section, there are some sections with matters in dispute, and the amount of compensation cannot be determined until the trial ends.

The excess in terms of the number of households and the amount of compensation against the estimation at the time of appraisal had the context that the direct impact of the "Arab Spring" in Morocco was low compared with neighboring countries but there was the impact of the "Arab Spring" which started around 2011 and the residents' awareness of their rights were thought to become higher than the ones at the time of appraisal. They neither complained nor took action (including sit-in protest). However, the situation where those who were not satisfied with the payment went to the administrative court against the state government increased.[20] 74 out of all the households targeted by the beneficiary survey (67% of the total respondents) answered that they received compensation after the land and houses were acquired. Procedure on the acquisition was taken following the Moroccan administrative procedure act and administrative litigation act, and major issues on the procedure have not been reported.

### 3.4.2.3 Unintended Positive/Negative Impact

For the question of whether there were other positive/negative impacts, according to the beneficiary survey, approximately 41% of the respondents answered that the road development

[20] Based on the results of the interview with the executing agency

increased the number of cars driving at excessive speed and increased the risk of traffic accidents. Approximately 27% of the respondents answered that the risk of floods and falling rocks increased due to the lack of works including reinforcement work. Although it was fewer than half of the total respondents, approximately 30% of the respondents recognized these negative impacts.

Especially, car accidents have been increasing nationwide every year. The number of car accident reached 78,864 incidents (including 3,565 fatal accidents) in 2015. The strengthening of traffic rules (stationing traffic officers and strengthening radar surveillance) had been decreasing the number of fatal accident until 2014 but the number increased in 2015. Road signs were not thoroughly set up in many places. Even where the signs were set, they were not followed in many cases. As well as the strengthening of traffic rules, increased driver awareness of traffic safety is necessary.

**Table 16. Awareness on the Risk of Excessive Speed**

| Very Significant | Significant | Somewhat | No | Unclear |
|---|---|---|---|---|
| 13 | 32 | 38 | 27 | 0 |

Source: Beneficiary Survey

**Table 17. Awareness on the Risk of Floods and Falling Rocks**

| Very Significant | Significant | Somewhat | No | Unclear |
|---|---|---|---|---|
| 13 | 17 | 21 | 58 | 1 |

Source: Beneficiary Survey

**Table 18. Transition on the Number of Traffic Accident**

| | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|
| Number of Traffic Accident | 67,082 | 67,151 | 67,926 | 68,645 | 78,864 |
| Number of Fatal Accident | 4,222 | 4,167 | 3,832 | 3,381 | 3,565 |
| Number of Serious Injury Accident | 12,482 | 12,251 | 11,641 | 9,365 | 9,957 |

Source: Documents provided by the executing agency

As described above, the project effects (effectiveness) estimated at the time of appraisal achieved the target by increasing the traffic volume. The beneficiary survey suggested that the impact mostly achieved the estimation at the time of appraisal, which was supported by the objective data including the reduction of the poverty rate. While some suits over the amount of compensation for land acquisition were filed at the administrative court, the resident relocation did not cause major problems because Morocco's administrative procedure was followed. On the other hand, because of the road development, many residents have safety concerns such as traffic accidents, and the number of accidents is increasing. On the whole, this project has largely achieved its objectives. Therefore, effectiveness and impact of the project are high.

## ３.５ Sustainability (Rating: ③)

### ３.５.１ Institutional Aspects of Operation and Maintenance

At the time of appraisal, the Provincial Departments of Equipment, Transportation and

Logistics (la Direction Provinciale de l'Equipement, du Transport et de la Logistique; hereafter referred to as "DPETL") in Tetouan province and Chafchaouen province of two departments of road of Ministry of Equipment, Transportation, Logistics and Water (Direction des Routes, Ministère de l'Equipement, du Transport, de la Logistique et de l'Eau, hereafter referred to as "DR") were assumed to be in charge of the operation and maintenance of the project, managing the target sections. They were expected to be the executing agency for the operation and maintenance of the project. The total number of staff at the DR was 3,849 (as of April 2009). Moreover, the daily work (such as cleaning of road surface and drainage, road safety management, and snow-removal in winter) was conducted by the DPETL to which regional offices leased equipment, and the regular work (inspection and repair) was being discussed to be conducted by the private sector selected through contract bidding.

At the time of the ex-post evaluation, it was confirmed that the institutional aspects of operation and maintenance remained as planned and expected at the time of appraisal. The total number of staff at the ministry was 6,569[21] (as of January 2016) (The staff at the ministry proper accounted for 32%, and the other staff, including the staff at DPETL in rural areas, accounted for 68%). The number of high-ranking officials was 1,369, the number of staff at the middle management level was 2,888, and the staff at the field offices was 2,312. The staff size was larger than the one at the time of appraisal. Therefore, the staff size was sufficient. The director at the DPTEL was expected to make decisions on the road operation and maintenance.[22] Therefore, it was clear where the responsibility lay. Decentralization has developed since 2011, and the authority on the institutional aspects of operation and maintenance was expected to be transferred to regional governments. However, the institutional aspect remained the same at the time of the ex-post evaluation. While the current staff size was sufficient, the executing agency believed that decentralization could reduce the current staff size at the central government for management. Excess or deficiency on the equipment at the DPETL has not been reported.

As described above, the institutional aspects reached the sufficient level, but the excess or deficiency must be tracked considering decentralization in the future.

### 3.5.2 Technical Aspects of Operation and Maintenance

At the time of appraisal, there were the office of infrastructure (in charge of roads) and the office of facilities at the DPETL in charge of the areas targeted by this loan project in the

[21] Website of Ministry of Equipment, Transportation, Logistics and Water (Ministère de l'Equipement, du Transport, de la Logistique et de l'Eau)
http://www.equipement.gov.ma/Formation/Chiffres-cles/Pages/Chiffre-Cle-RH.aspx (Accessed on August 17, 2017)

[22] The work type standard, separating daily work from regular work, is below. Regular work is the work of repairing roads every few years. Daily work is all the work, excluding regular work, for maintenance and repair based on a contract.

above-mentioned two provinces. Civil engineers, technicians, and clerks were assigned to each department. In order to train the technical personnel, Japan established "Training Institution of Equipments and Road Maintenance" (l'Institut de Formation aux Engins et à l'Entretien Routier; hereafter referred to as IFEER)[23] by Japan's grand projects and technical cooperation projects[24], and approximately 250 persons were expected to participate in the training session each year. The IFEER is in charge of the education of engineers and technicians at the DR, at the same time accepting third-country training mainly from African countries. The IFEER has achieved the record of training the accumulated total of 11,842 people between 1993, which is the year of foundation, and 2012. The annual average was 1,184 people. The training covered skills on road maintenance and repair (attended by 48% of the accumulated total trainees), skills on heavy machinery operation (30%), training for technicians (14%), and business administration (8%).

At the time of the ex-post evaluation, based on the visit to the project sites and the interview with the executing agency, at each DPETL, 3 to 10 engineers (university graduates; national qualification), 7 to 19 technicians, and 21 to 66 clerks were assigned. The manual, including operation procedure for heavy machinery, was developed and used.

At the sections of the project, regular monitoring was conducted almost daily. Based on the need of maintenance, priorities are set on a scale of A to D. Using this scale, repair is prioritized for the one in greatest need. This is possible because their technical skills are high enough.

In light of the above, technical aspects of operation and maintenance reached the sufficient level.

### ３．５．３ Financial Aspects of Operation and Maintenance

At the time of appraisal, the DPETL had a budget financed by the general account budget and the Special Road Fund. The budget amount for the road operation and maintenance in 2008 was 1,136 million MAD (approximately 13.9 billion yen), including 2 million MAD (approximately 2.5 billion yen) from the general account budget and 9.36 million MAD (approximately 11.5 billion yen) from the Special Road Fund. The Special Road Fund was a Moroccan special-purpose budget financed by taxes such as gasoline tax, car registration tax,

[23] See the following website for the contents of the training: http://www.equipement.gov.ma/routier/Infrastructures-Routieres/IFEER/Pages/Missions.aspx (Accessed on August 16, 2017)

[24] ODA Grant Projects "The Project for the improvement of equipment of IFEER in Morocco" (E/N signed on February, 2005, 0.328 billion yen). Technical Cooperation Projects (Former Project-Type Technical Cooperation) "Training Institution of Equipment and Road Maintenance (Institut de Formation aux Engins et a l'Entretien Routier Skhirat; IFEER) Program (1992 – 1997)", Group Training Course in the Third Country for "Capacity Enhancement for Road Maintenance Skills (1999 – 2003)", Group Training Course in the Third Country for "Road Maintenance and Construction Skills in IFEER, Phase2 (2005 – 2010)", Group Training Course in the Third Country for "Road Maintenance and Construction Management, Phase3 (2009 – 2011)".

and car weight tax, established in 1989.

At the time of appraisal for the budget of the executing agency in 1999, approximately 8.47 million MAD (approximately 8.5 billion yen) was financed by the general account budget and 12.70 million MAD (approximately 12.8 billion yen) was financed by the Special Road Fund. The cost for the operation and maintenance of the project was planned to be financed by the above-mentioned budget, and no major problems have been observed in the financial aspects of the operation and maintenance system.

At the time of the ex-post evaluation, it was confirmed that the budget for operation and maintenance of the regional and provincial roads was financed by the Special Road Fund and the general account budget of the DPETL as planned at the time of appraisal. Table 19 shows the Special Road Fund and the general account budget (except for labor cost) for the past four years. The Special Road Fund budget which accounted for 80% of the operation and maintenance cost has been increasing, and the budget was higher than the one estimated at the time of appraisal. The budget for operation and maintenance of the project was sufficient.

**Table 19. The Special Road Fund and the General Account Budget (for Operation and Maintenance) (Unit: million MAD)**

| | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|
| FSR | 2,200 | 2,200 | 2,500 | 2,700 |
| General Account | 155 | 223 | 237 | 508 |

Source: Website of Moroccan Ministry of Economy and Finance
Note: Financial year and calendar year are the same. The general account budget is the disbursement for the operation and maintenance except for labor cost. The FSR includes expenses such as contribution to the CFR, except for the operation and maintenance cost, but a detailed breakdown of expenses is not published.

For the maintenance cost of the Mediterranean road for the DPETL, the budget was disbursed as shown below. The disbursement in 2016 was high because 14,382 (thousand MAD) was allocated for landslide prevention. As needed budget, for example landslide prevention, could be allocated from the Special Road Fund as well as the general account budget. Therefore, the budget prepared was sufficient.

In light of the above, no major problems have been observed in financial aspects, and it can be said that future budgets are secured.

**Table 20. Actual Values of the disbursement for the maintenance cost (Unit: Thousand MAD)**

| 2014 | 2015 | 2016 |
|---|---|---|
| 286 | 3,622 | 25,096 |

Source: The DR

### 3.5.4 Current Status of Operation and Maintenance

At the time of appraisal, there was a past record of yen loan project, "Road Improvement Project (Approved in 1995, completed in 2003)," at DPETL, and there were no major problems observed. Therefore, operation and maintenance of the project was expected to be

managed properly.

When examined at the time of the ex-post evaluation, the maintenance team could be swiftly mobilized to come to the site when maintenance and repair was needed. Regular monitoring was conducted on the sections of the project almost daily. Based on the need of maintenance, priorities were set on a scale of A to D. Using this scale, repair was prioritized and conducted for the one in greatest need. Record and reports on the frequency were not sent to the central authority. When a problem occurred, however, the maintenance team at DR regional office was mobilized to conduct maintenance each time. Therefore, major problems were not observed.

In light of the above, it can be said that no major problems have been observed in the current status of operation and maintenance.

As described above, the sufficient level was secured in terms of the institutional, technical, and financial aspects of the operation and maintenance as estimated at the time of appraisal. Including the mobilization of the maintenance team when a problem occurred, the operation and maintenance of the project was conducted properly. Therefore, sustainability of the project is high.

## ４．Conclusion, Lessons Learned and Recommendations

### ４.１ Conclusion

The objective of this project was to improve accessibility to economic/social infrastructure for local residents by developing a new road and widening/strengthening the 120 km stretch of existing road between Tetouan and El Jabha within “the Mediterranean Road Construction Plan” (550 km), thereby contributing to redressing regional disparities. The implementation of the project has been highly relevant to Morocco’s development policy and development needs as well as Japan’s ODA policy. Therefore, its relevance is high. The outputs were made mostly as planned, but the project cost and project period exceeded the plan substantially, and the efficiency is low. The project effects (effectiveness) estimated at the time of appraisal achieved the target by increasing traffic volume. The impacts estimated at the time of appraisal mostly achieved the target, which was supported by objective evidence, including a reduction of the poverty rate. While some suits over the amount of compensation for land acquisition were filed at the administrative court, resident relocation did not cause major problems because Morocco’s administrative procedure was followed. On the other hand, after the road development, quite a few residents had safety concerns such as traffic accidents, and the number of accidents is increasing. Therefore, this project has largely achieved the onset of effect as planned, and the effectiveness and impact are high. As above, a sufficient level was secured in terms of the institutional, technical, and financial aspects of

the operation and maintenance as estimated at the time of appraisal. Including the mobilization of the maintenance team when a problem occurred, the operation and maintenance was conducted properly. Therefore, sustainability of the project effects is high.

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

## 4.2 Recommendations

### 4.2.1 Recommendations to the Executing Agency

Road signs are not thoroughly set up, and excessive speed and the lack of traffic rules/ethics are increasing the number of traffic accidents. For accident-prevention measures, it is recommended that the DR promptly prepare an action plan on enforcement of traffic rules/ethics (enlightenment activities). The DR should cooperate with the national police agency and the military police and with schools in rural areas and communes, in some cases. Those measures should be included in major policies in the program and budgeting is required.

### 4.2.2 Recommendations to JICA

N/A

## 4.3 Lessons Learned

① Conducting a Detailed Preliminary Study

With the excess of the total project cost, procedures including re-estimation on the construction cost had to be taken, which became a cause of extending the project period. Considering this situation, from now on, by scrutinizing the plan of the other party with a preparatory study before the appraisal, a more realistic estimation had to be made, including escalation of materials and equipment cost, and fluctuations in exchange. A lesson that a detailed study for rigid scrutiny had to be conducted was learned.

**Comparison of the Original and Actual Scope of the Project**

| Item | Plan | Actual |
|---|---|---|
| ①Project Outputs | ① Public engineering works<br>(a) Improvement of national roads and Development of new roads: Tetouan-Oued Lau section (46 km) and Oued Lau-Jebha section (74 km) Width 12 m: two-lane road (3.5m ×2＝7.0m, asphaltic pavement), Road shoulders (2.5 m ×2 ＝ 5.0 m). Development of new roads (20 km), Improvement of the existing roads (100 km)<br>(b) Bridge: About 62 Places<br>(c) Slope protection<br>(d) Structural Objects (Drainage, Transverse drainage pipe, etc.)<br>② Consulting service: Detailed design review, etc. | ① Public engineering works<br>(a) Improvement of national roads and Development of new roads: As planned.<br>(b) Bridge: 13 Places<br>(c) Slope protection: Cement revetment was reduced, and slope was lessened.<br>(d) Structural Objects: Simplified by using culvert for bridge<br>② Consulting service: As planned |
| ②Project Period | September 2001 – October 2005<br>(50 months) | September 2001 – June 2012<br>(130 months) |
| ③Project Cost<br>Amount Paid in Foreign Currency<br>Amount Paid in Local Currency<br>Total<br>ODA Loan Portion<br>Exchange Rate<br><br>(Reference)<br>Amount Paid in Foreign Currency<br>Amount Paid in Local Currency<br>Total<br>ODA Loan Portion<br>Exchange Rate | 9,337 million yen<br>7,682 million yen<br>(761 million MAD)<br><br>17,019 million yen<br>12,764 million yen<br>1MAD = 10.09 yen<br>(As of December 2000)<br><br>(Reference) Updated portion for Phase II (additional financing)<br>1,838 million yen<br>34,717 million yen<br><br>36,555 million yen<br>8,455 million yen<br>1 MAD=12.3 yen | 1,138 million yen<br>26,647 million yen<br>(2,278 million MAD)<br><br>27,785 million yen<br>20,325 million yen*<br>1MAD = 11.70 yen<br>(IMF Average exchange rate between 2001 and 2012) |
| ④Final Disbursement | November 2015 | |

Note: Total of 12,587 million yen in Project (I) and 7,738 million yen in Project (II)

<End>

Kingdom of Morocco

FY 2016 Ex-Post Evaluation of Japanese ODA Loan Project

"Rural Road Improvement Project"

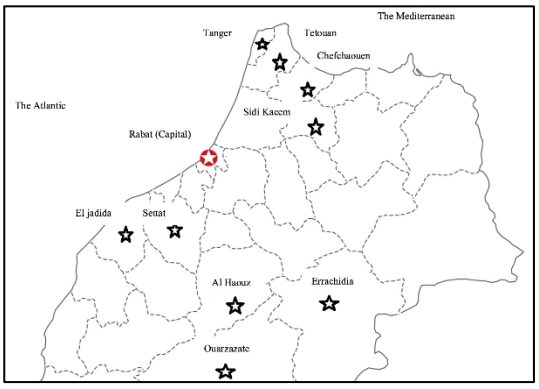
External Evaluator: Takeshi Daimon, Waseda University

## 0. Summary

This project aimed to develop a portion of 15,500 km of rural roads, based on "The Second National Program of Rural Roads (Deuxième Programme National des Routes Rurales: PNRR2)" (2005–2015) laid down by the Moroccan Government. It aimed to improve traffic access for the inhabitants of roadside communities, improve the living conditions, and redress regional disparities by developing and improving rural roads. This project has been highly relevant to Morocco's development policy and needs as well as Japan's ODA policy. Therefore, its relevance is high. Although the project cost was consistent with increased outputs (within the plan), the project period exceeded the plan. Therefore, the efficiency of the project is fair. Among the effectiveness indicators, the annual average daily traffic mostly reached the target value, and the road cut-off dates and access rates also mostly achieved the target set for the evaluation. Moreover, the poverty rate in rural areas and school enrollment rate (particularly the enrollment rate for girls) improved subsequent to this project. The frequency of visits to health facilities marginally improved, and the operating distance and sales of transportation companies improved. However, traffic accidents increased after the project. Taking into account all these findings by the executing agency of PNRR2, the effectiveness and impact of the project are high. While institutional, technical, and financial aspects of the operations and maintenance (OM) are high in regional and provincial roads, non-classified roads administered by communes continue to have issues to address. Taken all together, that sustainability of the project in regional and provincial roads are high and some problems have been observed in non-classified roads, the sustainability of the project effects is fair.

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

## 1. Project Description




Project location

Non-classified roads (El Jadida)

(prefectures targeted by the project)

## 1.1 Background

Economic activities through Morocco's transport sector play a major role in the economic and social activities of the country, accounting for approximately 6% of the gross domestic product (GDP) at the time of appraisal, while giving rise to 10% of employment in urban areas and 15% of the national budget. With regard to land transportation in particular, 90% of the intercity passenger transport and 75% of freight is conveyed by road. The market of land transport was restricted until 2003, when the Transportation Act came into effect, and thereafter the road transport sector was liberalized. This liberalization of road transport was expected to accelerate land transport between urban and rural areas, and broaden the transport sector.

At the time of appraisal, there were 57,622 km[1] of public roads in Morocco, and 80% of the highways, national roads, and regional roads were paved. On the other hand, provincial roads as well as rural roads (total length of 23,200 km at the time of appraisal) which are positioned under the highways, national roads, and regional roads above mostly consisted of unclassified roads (Routes Non-Classifiées: hereinafter referred to as "NC" roads), which are not under the management of the Directorate of Roads[2] (hereinafter referred to as "DR") in the Ministry of Equipment, Transportation, Logistics and Water (Ministère de l'Equipement, du Transport, de la Logistique et de l'Eau) but are administered by each commune. With the rate of paving for provincial roads at 45.9% (2005) and the rate of road access[3] for rural populations at 54% (same yaer), the disparity between urban and rural regions was significant. Moreover, while the national poverty rate was 14.2% (2004), the poverty rates for urban and rural areas were 7.9% (same year) and 22% (same year), respectively. Therefore, the poverty rate in rural areas remained high and there was a strong need for infrastructure development in rural areas.

Japan has been assisting the development and improvement of rural roads in Morocco since it extended a Yen loan for "Road Improvement Project" in 1995. Major donors, such as the World Bank, have also supported the development and improvement of rural roads. In 2004, the Moroccan government established the Fund for Road Finance (Caisse pour le Financement Routier, hereinafter referred to as "CFR") to develop and maintain rural roads. Furthermore, for the purpose of development and expansion of rural roads, the Moroccan government secured government budget, Special Road Funds (Fonds Spécial Routier, hereinafter referred to as "FSR"), local government budget, domestic funds, such as Hassan II

[1] As of December 2005.
[2] Direction des Routes in French
[3] The rate of road access is defined by "the number of people living in the villages consisting of 50 or more households and located within 1 km of the project's roads divided by the total number of rural population."

Fund, and funds from aid donors.

### 1.2 Project Outline

The object of this project is to improve traffic access for the inhabitants of roadside communities in Morocco by developing and improving rural roads, thereby contributing to the improvement of living conditions and alleviation of regional disparities.

| | | |
|---|---|---|
| Loan Approved Amount/ Disbursed Amount | 8,439 million yen / 8,439 million yen | |
| Exchange of Notes Date/ Loan Agreement Signing Date | March, 2008 / March, 2008 | |
| Terms and Conditions | Interest Rate<br>Repayment<br>(Grace Period<br>Conditions for Procurement | 1.4%<br>25 years<br>7 years)<br>General Untied |
| Borrower/Executing Agency | Cash for Road Financing / the Ministry of Equipment, Transportation, Logistics and Water | |
| Project Completion | March, 2017 | |
| Main Contractor (s) | - | |
| Main Consultant (s) | - | |
| Related Studies (Feasibility Studies, etc.) | Special Assistance for Project Formation (SAPROF) (October, 2007–February, 2008) | |
| Related Projects | ODA Loan Projects<br>"Road Improvement Project (March, 1995)"<br>"Rural Road Improvement Project II (July, 2011)"<br><br>Technical Cooperation Projects<br>"Skhirat Road and Equipment Training Institute(IFEER) Program (1992–1997)"<br>Group Training in the Third Country for "Capacity Enhancement for Road Maintenance Skills (1999–2003)"<br>Group Training Course in the Third Country for "Road Maintenance and Technique, Phase 2 (2005–2010)"<br>Group Training Course in the Third Country for "Road Maintenance and Management, Phase 3 (2009–2012)"<br><br>ODA Grant Projects<br>"The Project for the improvement of equipment of road maintenance and construction machine training center" (February, 2005)<br>World Bank<br>Second Rural Roads Project (December 2006, with supplemental financing in June 2014) | |

## 2. Outline of the Evaluation Study

### 2.1 External Evaluator

Takeshi Daimon, Waseda University

### 2.2 Duration of the Evaluation Study

This ex-post evaluation study was conducted based on the following schedule:

Duration of the study: December, 2016–December, 2017

Duration of the field study: March 20–April 1, 2017; July 3–July 8, 2017

### 2.3 Constraints during the Evaluation Study

At the time of the ex-post evaluation, a part of the NC roads, which were set for sub-projects, remained incomplete. These incomplete road sections are excluded from the evaluation as these sections account for less than 10% of the total target sections and are the sections added to the original plan. In terms of the overall outputs, more sections than the ones originally scheduled were developed. This exclusion does not affect the results of the evaluation.

## 3. Results of the Evaluation (Overall Rating: B[4])

### 3.1 Relevance (Rating: ③[5])

#### 3.1.1 Consistency with the Development Plan of Morocco

In its "Economic and Social Development Plan (2000–2004)," the Moroccan government stated that the alleviation of regional disparities, economic development of rural areas through rural road development, and improvement of traffic access for inhabitants in rural areas and remote places, were important issues, and the Moroccan government continued to maintain this policy at the time of the ex-post evaluation. Moreover, Morocco prepared the Second National Program of Rural Roads (PNRR2) (2005) under which it aimed to develop 15,500 km of rural roads by 2012. This project financed a portion of the PNRR2, which was also supported by the World Bank as it was relevant to Morocco's development plan.

At the time of ex-post evaluation, the Moroccan government prepared the "Spatial and Social Disparities in Rural Areas Countermeasure Program"[6] (2017–2022), a succeeding program of the PNRR2, under which it aimed to develop 33,000 km of rural roads up to the target year. The development of rural roads in Morocco was given high priority as a development policy and this project has been relevant to Morocco's development plan.

#### 3.1.2 Consistency with the Development Needs of Morocco

At the time of appraisal, more than 80% of Morocco's major roads (highways, national roads, and regional roads) were paved. However, there was a conspicuous disparity between urban and rural areas, with a paving rate of 45.9% (2005) for provincial roads. It was

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

[5] ③: High, ②: Fair, ①: Low

[6] The original title is "PROGRAMME DE LUTTE CONTRE LES DISPARITÉS SPATIALES ET SOCIALES EN MILIEU RURAL. In fact, unlike previous PNRR, this program covers the development of other sectors, so does not focus on the road sector. However, the detail of this program was not published at the time of field work (March, 2017 and July, 2017).

recognized that the implementation of this project could aim to improve traffic access for the inhabitants of roadside communities, and there were needs to improve the living conditions and redress regional disparities. This project was co-financed with the World Bank. Coordinating with the CFR, areas with high needs were selected in terms of rates of return, access rate, and poverty rate, saving adjustment costs among donors. Moreover, the CFR's management of procurement provided accurate database on contract fulfillment of each road section and the investment timing was appropriate. PNRR2, which initially aimed to complete the project by 2015, reached 79% of its achievement rate by 2015. As regional disparities still remain, it was recognized that improved traffic access for the inhabitants of roadside communities was intended to be realized by developing and improving rural roads, and there were constant needs to improve the living conditions and redress regional disparities.

At the time of the ex-post evaluation, under the framework of PNRR2, the rate of road access improved in all the provinces[7] in comparison to the rate of 2005. However, at the time of the ex-post evaluation, there was a gap among provinces in the rate of road access. Oued Eddhab province ranked the lowest at 38% and Cassablanca province ranked the highest at 95%. The needs to redress regional disparities continue to remain in the areas targeted by PNRR2.

#### ３．１．３ Consistency with Japan's ODA Policy

This project was consistent with "An Infrastructure Improvement for Sustained Growth," "Poverty Reduction," and "Reducing regional disparities" in Morocco, stated in the Overseas Economic Cooperation Operations (April 2005).

#### ３．１．４ Appropriateness of the Project Plan and Approach

At the time of planning, this project was scheduled to develop a total road length of 630.11 km (39 road sections). However, at the time of ex-post evaluation, 876.67 km (65 road sections) were developed. The volume of outputs increased. Confirming the inputs, outputs, and outcomes[8], the project plan/approach was generally appropriate.

In light of the above, this project has been relevant to Morocco's development policy, development needs, and Japan's ODA policy. Therefore, its relevance is high.

### ３．２ Efficiency (Rating: ②)

#### ３．２．１ Project Outputs

[7] Based on the documents provided by the DR.
[8] Evaluated in terms of effectiveness and efficiency.

At the time of appraisal, this project aimed to develop and expand a total rural road length of 630.11 km (regional, provincial, and NC roads) in 9 provinces. However, at the time of ex-post evaluation, 876.67 km were developed and expanded in the 9 provinces, including Tanger where additional construction was ongoing. At the time of ex-post evaluation, among 65 road sections (which were complete at the time of the evaluation), 17 road sections were classified roads (regional and provincial roads) under the management of the DR and 52 sections were NC roads under the management of communes. The details of these 65 sections are mentioned below.

Table 1. Sub-project, Output Overview

| Target Provinces | Plan (km) | Actual (km) | Difference |
|---|---|---|---|
| Tetouan | 2 sections | 9 sections * | +7 sections |
| | 49.00 | 48.00 | |
| | | 91.54 (7 sections added) | |
| Subtotal | 49.00 | 139.54 | +90.54 km |
| Tanger | 1 section | 1 section | Achieved original plan |
| | 5.00 | 4.72 (completed but additional construction was ongoing; scheduled to be completed by the end of 2017) | -0.28 km |
| Chefchaouen | 2 sections | 2 sections | Achieved original plan |
| | 35.00 | 35.88 | +0.88 km |
| Sidi Kacem | 3 sections | 3 sections | Achieved original plan |
| | 65.76 | 64.75 | +0.01 km |
| | | 0.0 (4 sections (30.0 km) *added but construction did not begin.) (The date of commencement of the work was not determined.) | |
| Settat | 3 sections | 3 sections | Achieved original plan |
| | 87.9 | 89.19 | +1.29 km |
| El Jadida | 14 sections | 31 sections | +17 sections |
| | 67.5 | 59.90<br>1 section cancelled, 1 section is scheduled to be completed in 2017. | |
| | | 123.92<br>20 sections added**<br>1 section under construction (scheduled to be completed in 2017) | |
| Subtotal | 67.5 | 183.82 | +116.32 km |
| Errachidia | 11 sections | 10 sections | -1 section |
| | 214.95 | 173.50 | |
| | | 20.58<br>2 sections cancelled, 1 section added. *** | |
| Subtotal | 214.95 | 194.08 | -20.87 km |
| Ouarzazate | 2 sections | 4 sections | +2 sections |
| | 81.41 | 81.41 | |
| | | 44.69<br>2 sections added ** | |
| Subtotal | 81.41 | 126.10 | +44.69 km |
| Al Haouz | 1 section | 2 sections | +1 sections |
| | 23.59 | 23.59 | |

| | | | |
|---|---|---|---|
| | | 15.00<br>1 section added** | |
| Subtotal | 23.59 | 38.59 | +15.00 km |
| Total | 630.11<br>39 sections | 876.67<br>65 sections complete | +246. 56 km<br>+26 sections |

Source: Documents provided by the CFR
Note: * JICA approval on June, 2011; ** JICA approval on July, 2010; *** JICA approval on July, 2008.

These changes met the criteria that were agreed with the implementing agency (①Conducting studies, such as D/D study, ②New roads' priority over existing roads, ③Providing information on land acquisition and resettlement) and JICA approved the change each time. Therefore, these changes did not cause issues for procedures. However, regarding incomplete road sections except for two sections already cancelled in Errachidia after the loan was provided, one section was cancelled in El Jadida, two sections were still under construction at the time of the ex-post evaluation, and additional four sections[9] in Sidi Kacem did not begin. The DR is considered to have understood that a revision or abolition of road section plans do not have to necessarily be approved by JICA after the provision of loan.

The public engineering works consisted of simple pavement and gravel road maintenance. The differences between the time of appraisal and time of ex-post evaluation are as follows.

At the time of appraisal, the plan was ①Simple pavement: 22 sections, the total length of 400.48 km, a two-lane road (two lanes in total), width 6.0 m (road shoulders 1.0 m×2 included) and ②Gravel road maintenance: 18 sections, the total length of 229.64 km, a two-lane road (two lanes in total), width 6.0 m (road shoulders 1.0 m×2 included). At the time of ex-post evaluation, ①in simple pavement, the same sections, total length, and specifications were the same as those at the time of appraisal. However, ②in gravel road maintenance, the number of sections was 43 and the total length was 647.03 km (specifications were the same as those at the time of ex-ante evaluation). This project did not use consulting services.

### ３．２．２ Project Inputs

#### ３．２．２．１ Project Cost

At the time of appraisal, the total project cost was expected to be 11,086 million yen (yen loan amount: 8,439 million yen (public engineering works); Moroccan Government: 2,647

[9] JICA approved that these four sections should be added on June 2011. However, the construction did not begin at the time of the project completion. A loan for these sections is not yet decided. The CFR sought a loan within a project succeeding this project (Rural Road Improvement Project II, a loan signed on July 2011) (based on the interview).

million yen[10] (indirect cost and other costs).

At the time of the ex-post evaluation, the total project cost was 9,976 million yen (yen loan amount: 8,439 million yen (public engineering works); Moroccan Government: 1,537 million yen[11] (indirect cost and other costs). As of July 2017, most of the road sections were completed, so these are the total costs.

The final total project cost was 9,976 million yen (90%) which was below the total project cost (11,086 million yen) estimated at the time of appraisal. As mentioned above, the total road length as output was 138% of the length set at the time of appraisal, but the value of the construction contracts was below the initial plan.

Therefore, the project cost was within the plan.

#### 3.2.2.2 Project Period

At the time of appraisal, the project period was 4 years and 4 months (52 months) from the time of signing the loan agreement (March 2008) up to the time of completing the project including one-year guarantee period (June 2012, including 1 year guarantee period). However, at the time of the ex-post evaluation, as the construction in seven sections (one section in Tanger, two sections in El Jadida, and four sections in Sidi Kacem) did not begin or remains incomplete, this project has not yet ended. Therefore, the accurate project period is unclear.

However, (as of July 2017) when the second field study was conducted for the ex-post evaluation, 9 years and 5 months (114 months) (219% of the value at the time of appraisal) have passed since the time of signing the loan agreement. Therefore, the project period was significantly longer than the planned period.

### 3.2.3 Results of Calculations for Internal Rates of Return (references only)

Due to the nature of the project of not making financial revenues, such as toll receipts, the financial internal rate of return (FIRR) was not calculated at the time of the appraisal. On the other hand, at the time of the appraisal, the economic internal rate of return (EIRR) was 15.8% based on the following premises:

Cost: Public engineering works cost (excluding taxes), operation and maintenance expense (for the purpose of convenience, operation, and maintenance was computed as "0."[12] This expense was small in comparison to public engineering works cost.)
Benefit: Total benefits from the total shortening of travel time for car users
Project Life: 10 years

While re-computing the EIRR at the time of the ex-post evaluation, as a matter of

[10] 189 million MAD. Exchange rate at the time of the evaluation: 1MAD=14.0 yen.
[11] 135 million MAD. Based on the calculation of 1 MAD=11.35 yen (average exchange rate during the project period; truncating numbers of decimals).
[12] Estimation that operation and maintenance expense can be 0 for 10–20 years after the commencement of the project as a small expense is not appropriate. However, it was supposed as 0 to ensure consistency with the estimation at the time of appraisal.

convenience, a reduced average travel cost (between before and after PNRR2) calculated by Team Maroc (a consulting firm) in a study on PNRR2 in 2012 was used as the benefit of each road. Due to the fact that the actual value to the car users based on the type of car transport and on the section was not available, it was multiplied by the ratio 3:1, which is the ratio of passenger cars to commercial cars in vehicle registrations.

Table 2. Average Transportation Costs (MAD/km)

| | 2005 | 2012 | Reduce |
|---|---|---|---|
| Per passenger | 0.80 | 0.59 | 0.21 |
| Per ton of cargo | 2.61 | 2.14 | 0.47 |
| Per carrier | 1.70 | 1.54 | 0.16 |

Source: Study conducted by Team Maroc (2012).

However, when the actual measured value of traffic volume (Table 3) was used, the EIRR was negative 1.8%. Supposing that the project life is 15 or 20 years in the same estimate, the EIRR was, at best, 3.9% and 6.1%, respectively. In order to gain a similar EIRR computed at the time of appraisal, the simulation results showed that the project life should be set at 20 years and the traffic volume should be doubled.

However, in this calculation (following the calculation at the time of appraisal), operation and maintenance expense was assumed as "0." If the operation and maintenance expense is included, the EIRR is revised downward.[13] However, the EIRR with operation and maintenance expense was not re-computed for the purpose of comparison on the same level of operation and maintenance expense at the time of appraisal.

In light of the above, although the project cost was consistent with the increased outputs (within the plan), the project period exceeded the plan. Therefore, the efficiency of the project is fair.

### 3.3 Effectiveness[14] (Rating: ③)

#### 3.3.1 Quantitative Effects (Operation and Effect Indicators)

① Annual Average Daily Traffic (hereinafter referred to as AADT)

The baseline value of all the 39 sections at the time of appraisal (2007) were 40–400 vehicles/day depending on the section, totaling to 3,680 vehicles/day. The target value (1 year after the project completion) in 2013 was 88–804 vehicles/day depending on the section, totaling to 7,739 vehicles/day (increase of 210% in the total value).[15]

[13] If operation and maintenance expense is 3% of the public engineering works cost, the EIRR can be -8.4% (project life: 10 years), -1.2% (15 years), and 1.8% (20 years).

[14] Rating is based on the evaluation of the project effectiveness as well as its impact.

[15] The documents provided by JICA states that AADT for NC roads "is just the estimate value and not accurate." The AADT effectiveness indicators (the baseline value) of NC roads are considered to be an estimated value as there was no record of renewing these indicators at the time of appraisal. At the time of

These values were set for the 39 road sections initially targeted at the time of appraisal. These 39 sections can be used to compare the actual measurement value (2017). However, among these sections, the actual value for only 25 sections was available, as shown below (Table 3), due to reasons such as cancellation, suspension, termination, and delay. Also, the sections whose target values are over 80% are with the mark of *.

Table 3. Target Subprojects AADT (Vehicles/Day)

| Provinces | Road ID | Road Section | Baseline 2007 | Target 2013 | Actual 2017 |
|---|---|---|---|---|---|
| Al Haouz | P2117 | S-RAHAL / TOUAMA | 70 | 144 | 291* |
| Chefchaouen | NC3079 | Souk El had - Bab Hamma | 100 | 225 | 370* |
| Chefchaouen | NC6006 | Bab Taza-B.Fagloum | 400 | 745 | 750* |
| El jadida | NC | P2131-Dr Lahcinat Old Taleb | 50 | 96 | 90* |
| El jadida | NC | P3414-P3465 Par Dr Laababda | 50 | 96 | 85* |
| El jadida | NC10 | P3419-8012 Par Laamarna Lakramia | 50 | 96 | 120* |
| El jadida | NC7127 | P3459-Dior Chaab Old Rahmoun | 50 | 96 | 85* |
| El jadida | NC | R320 -Douar Louta | 50 | 96 | 100* |
| El jadida | NC | R320- Douar Lamkhatra | 50 | 96 | 100* |
| El jadida | NC | R316- P3429 par Lahnanta et Lamoualda | 50 | 171 | 85 |
| El jadida | NC2016 | Krabba-Laachichat | 50 | 105 | 90* |
| El jadida | NC | P3409 - Dr Jouabra | 50 | 105 | 70 |
| El jadida | NC | R301-Dr Old Youssef | 50 | 96 | 80* |
| El jadida | NC8010 | P3413- olad Azooz -idguaba-P2302 | 50 | 96 | 100* |
| El jadida | NC | Dr Old Said -Dr Lahmarsa | 50 | 96 | 80* |
| Ouarzazate | P1507 | Taznakhte-Tarmigt | 50 | 96 | 75* |
| Ouarzazate | P1506 | Telouat-Tabouraht | 70 | 144 | 200* |
| Settat | P3612 | Berrechid à RP 3619 | 150 | 338 | 350* |
| Settat | P3612 | Travaux d'achèvment de la liaion Berrechid-RP3619 | 120 | 187 | 362* |
| Settat | P3630 | Aïn Blal à Beni Khloug | 400 | 804 | 350 |
| Settat | P3624 | Settat à Mrizigue | 150 | 309 | 262* |
| Sidi Kacem | P4518 | Had Kourt - Jorf El Melha | 150 | 309 | 126 |
| Tanger | NC8107 | Assilah-Dar seid | 150 | 198 | 50-150 |
| Tetouan | NC14211 | Bghaghza - Spirada (Construction) | 150 | 206 | 500* |
| Tetouan | NC15004 | Beni Idder - Beni Imrane | 50 | 173 | 150* |
| Total of the 25 Sections | | | 2,630 | 5,123 | 4,871 |

Source: Documents provided by the DR.
Note: * Section having a value over 80% of the target value. When the actual value in a section was confirmed, the value was included in this table.

20 out of the 25 road sections reached over 80% of the target value and the status of the AADT achievement was relatively high in terms of the number of sections, which exceeded the target value. Even sections which were under the target value exceeded the AADT of the baseline year, except for a section in Settat. Therefore, it can be assumed that road development contributed to induced traffic volume.[16]

appraisal, it was totaled due to restrictions on data. Following this computation, the total value is used for comparison.

[16] However, the induced traffic volume cannot at all times be the only factor for increased traffic. In addition to induced traffic volume, development traffic volume and conversion traffic volume would have an influence.

② The number of inhabitants of roadside communities (population)

The baseline value at the time of appraisal (2007) was 276–19,486 depending on the section, totaling to a population of 109,905. The target value was 292–19,515, depending on the section, 1 year after the project completion, totaling to a population of 113,513 (approximately 3% increase in 6 years).

At the time of appraisal, the population of the roadside inhabitants in 39 road sections was reported[17]. However, while checking at the time of the ex-post evaluation, the baseline value at the time of appraisal was confirmed to be an estimate value. Considering this reason, the target value set at the time of appraisal became meaningless. For example, the baseline value (estimate value) of NC3079, a road in Chefchaouen, was 898 at the time of appraisal, but the real value was 1,240. Considering this situation, without mentioning the initial target population value of 983, a comparison with the baseline value is shown in this report

Table 4. Target Sub-projects, The Number of Inhabitants of Roadside Communities (population)

| Provinces | Sections | Baseline 2007 | Actual 2017 |
|---|---|---|---|
| Al Haouz | 1 | 2,496 | 2,600 |
| Chefchaouen | 3 | 6,684 | 8,022 |
| El jadida | 12 | 21,180 | 26,471 |
| Errachidia | 9 | 33,777 | 33,777 |
| Ouarzazate | 4 | 36,000 | 42,000 |
| Settat | 4 | 49,805 | 58,000 |
| Sidi Kacem | 3 | 11,720 | 12,545 |
| Tanger | 1 | 878 | 878 |
| Tetouan | 2 | 16,000 | 23,000 |
| Total | 39 | 177,662 | 206,415 |

Source: Documents provided by the DR.

The statistical figures in Errachidia are the same and their accuracy cannot be confirmed. Excluding Errachidia, the figure of population increased to 120%[18] from the time of appraisal and the population of 143,885 increased to 172,638. Therefore, as initially planned, traffic access for roadside inhabitants achieved proximately 6% increase. However, the number of inhabitants cannot be used as an effectiveness indicator as other factors, such as the natural population growth, not attributable to the impact of road development alone, could have been influential.

[17] Table 4 is based on 39 sections which was provided with information among all the sections targeted by this project..

[18] For reference, the ratio of the estimated baseline value at the time of appraisal and the target value is 182%.

③ Annual traffic cut-off days caused by natural disasters (day/year)

At the time of appraisal, 4–60 days/year, depending on the section, was set for the baseline value (2007). 0 days/year was set for all sections for 1 year after the project completion.

Table 5. Target Subprojects, Annual Traffic Cut-off Days Caused by Natural Disasters (Day/Year)

| Provinces | Sections | Baseline 2007 | Target 2013 | Actual 2017 |
|---|---|---|---|---|
| Al Haouz | 2 | 7 | 0 | 0 |
| Chefchaouen | 3 | 90 | 0 | 0 |
| Ouarzazate | 6 | 215 | 0 | 4 |
| Settat | 5 | 24 | 0 | 0 |
| Sidi Kacem | 3 | 11 | 0 | 1 |
| Tanger | 1 | 60 | 0 | 3 |
| Tetouan | 12 | 990 | 0 | 0 |

Source: Documents provided by the DR.

When the target value was set at 0 day/year for all the sections including additional sections, 24 sections (89% of the total sections) achieved the target (except for 3 sections) in the 27 sections whose data was available (see annex 2).

### 3.3.2 Qualitative Effects (Other Effects)

The qualitative effects expected at the time of appraisal were an increase of maintained road access after project completion.[19] The project also aimed to achieve 80% of the nationwide access rate at the time of the PNRR2 completion.[20]

A part of the road sections continued to be incomplete at the time of the ex-post evaluation. Although all the sections were not complete, this project completed over 80% of the sections by the end of 2013. Considering this reason, the actual value in 2016 can be used for the evaluation analysis. As of 2016, the national average of the access rate was 79.3%. At the time of PNRR2 completion, this project largely achieved its objective.

This project has largely achieved its objective in each target province. Even when the value was lower than the target value, there were no provinces with a value of 5 or lower than the target value, except for Sidi Kacem.

Table 6. Rate of Road Access

| Provinces | Baseline 2005 | Target 2015 | Actual 2016 |
|---|---|---|---|
| Al Houz | 40% | 69% | 66% |
| Chefchauen | 24% | 60% | 60% |
| El Jadida | 54% | 80% | 77% |
| Errachidia | 52% | 90% | 89% |

[19] See footnote 2 for the definition of road access rate.
[20] Documents provided by JICA.

| | | | |
|---|---|---|---|
| Ouarzazate | 55% | 80% | 79% |
| Settat | 40% | 74% | 70% |
| Sidi Kacem | 59% | 76% | 71% |
| Tanger | 52% | 70% | 70% |
| Tetouan | 30% | 73% | 69% |
| Nationwide | 54% | 80% | 79.3% |

Source: Documents provided by the DR.

In light of the above, among the effectiveness indicators, ①in terms of the AADT, which is a quantitative effect, the target value was mostly achieved. ②In terms of the roadside population, an increase was observed but the achievement was not confirmed as the baseline value was an estimated value. Roadside population cannot be used as an effectiveness indicator as it does not necessarily reflect the direct impact attributable to the project alone. ③In terms of the annual traffic cut-off days, the target value was mostly achieved. Moreover, in terms of the rate of road access, which is a qualitative effect, the target value at the time of appraisal was mostly achieved. Therefore, the effectiveness of the project is high.

## ３.４ Impacts

### ３.４.１ Intended Impacts

#### ３.４.１.１ Quantitative Effects

At the time of appraisal, the improvement of poverty rate in the nine provinces targeted by this project was set as an impact (a quantitative effect). Based on a study targeting the period between 2005 and 2006, the poverty rate (weighted average) in the 9 provinces was 25.6%, which was higher than the national average (14.2%). The poverty rate in each province was Tetouan (37.7%)[21], Tanger (33.4%), Chefchaouen (39.1%), Sidi Kacem (22.6%), Settat (15.8%), El Jadida (20.6%), Errachidia (30.3%), Ouarzazate (23.9%), and Al Haouz (25.6%).

The latest published poverty profile by province and commune was implemented in 2007 after the project implementation.[22] Aside from the poverty survey, a family income and expenditure survey was conducted in 2014. A part of this survey was published[23] and its summary results are shown below.

Table 7. Transition of Poverty Rate by Region[24] (Urban and Rural Areas)

[21] Documents provided by JICA.
[22] http://www.hcp.ma/Indicateurs-communaux-de-la-pauvrete-de-la-vulnerabilite-et-de-l-inegalite_a670.html (accessed on April 19, 2017).
[23] Présentation des résultats de l'Enquête Nationale sur la Consommation et les Dépenses des ménages 2013/2014 (2016.10). The detailed information was not published.
[24] The poverty line in 2014 (poverty line based on income level, 4667MAD (urban) (≒2.6USD, Conversion of Purchasing Power Parity) 4312MAD (rural) (≒2.4USD, Conversion of Purchasing Power Parity)) is used. The poverty rate in 2001 and 2007 uses the same income level (the detailed information for the poverty line in each year was not included in the above-mentioned

| | 2001 | 2007 | 2014 |
|---|---|---|---|
| Urban Areas | 7.4% | 4.9% | 1.6% |
| Rural Areas | 25.1% | 14.4% | 9.5% |
| National Average | 15.3% | 8.9% | 4.8% |

Source: Poverty Profile (2007) and Family Income and Expenditure Survey (2014) conducted by the Moroccan Government.

The results show that the poverty rate decreased from 14.4% in 2007 to 9.5% in 2014 in the rural areas targeted by the PNRR2. The poverty rate also decreased in all the regions, including the regions targeted by this project (the official statistics started to use "region" as a unit since 2011 when decentralization began).

Table 8. Poverty Rate Transition by Region Targeted by this Project

| | 2001 | 2007 | 2014 |
|---|---|---|---|
| Draa-Tafilalet | 40.3% | n/a | 14.6% |
| Marrakesh-Safi | 20.2% | 11.2% | 5.4% |
| Oriental | 18.2% | 10.1% | 5.3% |
| Sous-Massa | 16.7% | 12.7% | 5.1% |
| Fes-Meknes | 16.6% | 9.5% | 5.2% |
| Rabat-Sale-Kenitra | 15.5% | 5.1% | 3.8% |
| Beni Mellal-Khenifra | 14.4% | n/a | 9.3% |
| Tanger-Tetouan-Al Hoceima | 11.5% | 7.8% | 2.2% |
| Settat-Casablanca | 6.9% | 3.2% | 2.0% |
| Three Southern Regions (El Dakha-Ouet Ed Dahab, Laayoun-Saguia Al Hamra, Guelmin-Oued Noun) * | 6.0% | n/a | 3.3% |

Source: Poverty Profile (2007) and Family Income and Expenditure Survey (2014) conducted by the Moroccan Government.
Note: Under-populated areas (desert areas) were aggregated in three Southern Regions.

The provinces targeted by the yen loan project were not the only targets as shown above, but the poverty rate decreased by half from 2007 (at the time of the project commencement) in all the regions (rural areas) covered by the PNRR2.

In light of the above, the poverty rate continued to decrease at the time of the ex-post evaluation. The poverty rate decreased by half in 3 out of the 10 regions, using the baseline value at the time of appraisal (2007) and the value in 2014. In comparison to the data in 2001, the poverty rate generally deceased by half in all the regions. Taking this into account, the project is likely to have the intended impacts (onset of effect). However, it is not possible to determine that the poverty reduction is attributable to the pure impact of this project as other possible factors, such as wage increases with economic recovery may exist.

#### ３．４．１．２ Qualitative Effects

At the time of appraisal, the contribution to ①poverty reduction (the non-income-based

source).

poor not captured by the above quantitative effects), ②development and facilitation of the rural economy by securing effective road transport, ③improvement of rural resident's standard of living, and ④remedy of the disparity between regions were considered to be qualitative impacts.

For the improvement of rural resident's standard of living (③), improvement of the unemployment rate (i.e. employment opportunities and income growth) can be effective. The data for each province (targeted by the project) for 2014 was available, but the time-series data (before and after the project) for each province for comparison was not published. Considering this reason, unemployment rates are compared by gender, and by urban and rural areas (Table 9). The poverty rate temporarily decreased from the baseline year to 2010, but increased up to 2014.

In comparison to the national average of unemployment rate, the unemployment rate (not considering sex) improved in all the provinces. However, the female unemployment rates in Sidi Kacem, Settat, Al Houz, and Errachidia were higher in comparison to the national average (Table 10). This situation did not improve at the time of the ex-post evaluation. Therefore, the impact of road development on the unemployment rate improvement was not confirmed.

Table 9. Unemployment Rate (By Gender, and Urban and Rural Areas) (%)

| | Baseline Year 2008 | 2010 | 2014 |
|---|---|---|---|
| Nationwide (Male) | 9.5 | 8.9 | 9.7 |
| (Female) | 9.8 | 9.6 | 10.4 |
| Urban Areas (Male) | 13.0 | 12.1 | 12.8 |
| (Female) | 20.3 | 19.8 | 21.9 |
| Rural Areas (Male) | 5.1 | 4.8 | 5.4 |
| (Female) | 1.8 | 2.0 | 1.8 |

Source: Documents provided by the DR.

Table 10. Unemployment Rate (By Gender and Province) (%) (2014)

| | Male | Female | Average |
|---|---|---|---|
| Ouarzazate | 10.0 | 20.2 | 12.3 |
| Sidi Kacem | 10.8 | 42.5 | 14.8 |
| Settat | 9.4 | 34.8 | 13.1 |
| Al Haouz | 6.5 | 31.1 | 9.2 |
| El Jadida | 8.5 | 24.2 | 11.6 |
| Errachidia | 11.2 | 41.1 | 15.8 |
| Chefchauen | 6.1 | 15.4 | 7.9 |

| | | | |
|---|---|---|---|
| Tanger | 12.8 | 21.2 | 15.1 |
| Tetouan | n/a | n/a | n/a |
| National Average | 12.4 | 29.6 | 16.2 |

Source: Website of the Moroccan's Government[25].

Considering the remedy of the disparity between regions (④), the inequality index (change over time) on the target provinces were not published. Instead, the Gini coefficient[26] at the national level is used here. As Table 12 shows, the Gini coefficient marginally decreased at the national level, also suggesting that not a little disparity between urban and rural areas continued to remain. The improvement was not considered to be undertaken at the time of the ex-post evaluation. Therefore, the impact of road development on the disparity between regions was not confirmed.

Table 12. Gini Coefficient (Inequality Index) (%)

| | 2001 | 2007 | 2014 |
|---|---|---|---|
| Nationwide | 40.6% | 40.7% | 39.5% |
| Urban Areas | 39% | n/a | n/a |
| Rural Areas | 32% | n/a | n/a |

Source: Documents provided by the DR.

Poverty reduction based on non-income aspects (①), and development and facilitation on the rural economy by securing effective road transport (②) were not specific to the road sections targeted by this project and were considered as reference only. The school enrollment rate of students in ages appropriate for elementary and junior high school (6–14 years old) increased from 58.8% to 66.0% or increased at 7.2% after the PNRR2. It was found that the rate of female students in particular increased from 62.1% to 66.8% or increased at 4.7% and the frequency of visit to health facilities increased from 6.9 times to 8.7 times or increased at 4.7%. These results are consistent with the reduced time required to access schools and health facilities, also suggesting that road improvement improved non-income-based poverty.

Table 13. Qualitative Effect Indicators

| Indicators | 2005 | 2012 |
|---|---|---|
| Non-Agricultural Workers (Person/douar) | 19.8 | 24.5 |
| Product Commercialization Rate (%)* | 35.6 | 37.4 |
| School Enrollment Rate (6–14 years old) (%) | 58.8 | 66.0 |
| Female Students | 62.1 | 66.8 |
| Time required to access to schools (minutes): Winter | 42 | 35 |

[25] http://rgphentableaux.hcp.ma/Default1/ (accessed on April 19, 2017)
[26] The Gini coefficient is the index of inequality. Closer the index is to 0, the more equitable it is.

| | | |
|---|---|---|
| Same as Above: Summer: Summer | 39 | 31 |
| Time required to access to neighboring health facilities (minutes): Winter | 69 | 45 |
| Same as Above: Summer | 55 | 39 |
| Frequency of visit to health facilities (times) | 6.9 | 8.7 |
| Transportation Business: Average Travel Distance (km)** | 26,305 | 29,454 |
| Same as Above: Average of Working Days (day) | 249 | 268 |
| Same as Above: Average of Annual Sales (MAD) | 73,642 | 83,887 |
| The number of traffic accidents (Person) | 0.1 | 1.4 |

Source: Study conducted by Team Maroc (2012).

Note: * Rate of households running business for agricultural products and other products by the unit of household and selling on the distribution channel. Agricultural products account for 61.5% and other products account for 43.6%.

**Annual Average Travel Distance per Carrier

### ３．４．２ Other Impacts

#### ３．４．２．１ Impacts on the Natural Environment

At the time of appraisal, among road sector stipulated regulations of "Japan Bank for International Cooperation Guidelines for Confirmation of Environmental and Social Considerations" (2002), this project was confirmed to not make any major violation. It was then confirmed that this project was not likely to have significant adverse impact on the environment. The preparation of an Environmental Impact Assessment (EIA) for this project was not obligatory under Moroccan domestic law, and the project area was not in or near areas that were sensitive to impacts, such as national parks; thus, undesirable impact on the natural environment was assumed to be minimal. Nonetheless, the DR was expected to determine whether an EIA is implemented based on the results of the Preliminary Environmental Assessment. In the event that an EIA was determined to be unnecessary, the Regional and Provincial Department of Equipment, Transportation and Logistics (la Direction Régioniale de l'Equipement, du Transport et de la Logistique, hereinafter referred to as DRETL) and la Direction Provinciale de l'Equipement, du Transport et de la Logistique (hereinafter referred to as DPETL) were expected to prepare a simplified environmental management plan and specify the content of environmental measures construction contractors should implement during construction of the project. At the same time, the DRETL/DPETL were expected to monitor the air quality, water quality, and noise during construction.

Based on the visit to the project sites and interview with the DRETL/DPETL at the time of the ex-post evaluation, an EIA was not obligatory and the impact on the natural environment was not reported in most of the cases as assumed at the time of appraisal. Moreover, it was confirmed that contractors effectively implemented preventive measures such as anti-environmental-pollution measures stipulated in a simplified environmental plan during construction, and that it was effectively monitored by the DRETL/DPETL. According to the monitoring, it was also confirmed that there was

no impact on the environment.

#### ３．４．２．２ Land Acquisition and Resident Relocation

No land acquisition or resident relocation was planned as this was a project to pave and develop existing unpaved and underdeveloped roads. If land acquisition or resident relocation occurred in the basic design or detailed design for any of the roads, steps for acquisition and relocation were expected to be taken in accordance with Morocco's domestic procedures at the time of appraisal.

Based on the visit to the project sites and interview with the DR and DRETL/DPETL at the time of the ex-post evaluation, resident relocation did not occur as this was a project to expand and rehabilitate existing roads. If an existing road had to be expanded, residents were expected to provide their land to the land owner, namely the government. Most of the residents provided a part of the land, following the procedures of domestic law. However, in some of the sections developed[27], the width remained shorter than 6.0 m, which was set in the design as some of the land owners refused to provide land to avoid land violation as a result of road expansion. The sections using gravel road maintenance and the total length increased, but this increase had no negative impact on the environment and society.

#### ３．４．２．３ Unintended Positive/Negative Impact

A detailed study, including quantitative and qualitative analyses, was conducted to evaluate the existence of the impact and its extent of this project on gender empowerment, while it was not planned at the time of appraisal.

Column　A detailed study on gender empowerment

Targeting the road areas developed by PNRR2,[28] a quantitative analysis[29] was conducted, using the dataset based on the household survey (2012) covering school enrollment rate and prenatal checkups. This analysis aimed to test the following hypotheses:

(Hypothesis 1) Means of public transportation, such as bus services, would be created by road development, and these means would provide students with opportunities to economically commute to farther schools. As a result, the more advanced the school grades are, it results in a higher female students' school enrollment rate in the project target areas.

(Hypothesis 2) Road development would increase access to means of public transportation, and the prenatal checkup frequency of pregnant women would increase by economically better access to health facilities.

[27] Based on the visit to the NC roads in El Jadida. However, the DPETL (El Jadida) does not have detailed data on the length of these sections.
[28] While one road section targeted by this project was included, the other sections were not the target areas of this yen loan project. Therefore, this quantitative analysis is only an additional analysis.
[29] Ordinary least squares (OLS), logit, and mediation analysis were employed.

The results of the analysis did not show a statistical significance for Hypothesis 1. However, the status of road development and frequency of visit to neighboring communal health centers or provincial health centers were statistically significant in Hypothesis 2 (frequency of visit to these health facilities increased in the areas where the roads were developed), when considering travel cost to access health centers by distance and also by time as mediator variables. On the other hand, access to hospitals and clinics outside the areas was not statistically significant (in the areas where the roads were developed, the correlation with frequency of visit to these health facilities were not confirmed).

Conversations with the inhabitants, mainly women, of roadside communities were also arranged in El Jadida and Settat. The participatory approach considered discussions on beneficial effects of the roads. Furthermore, an interview survey on the beneficial effects was conducted by visiting roadside rural health facilities, and elementary and junior high schools. The following statements show some of the information collected during the interviews:

"Now good teachers can come to the elementary school because of the improved access to the central major roads." (A representative in a commune of El Jadida)

"It is difficult for girls to commute to the junior high school because the school is 3 km away." (A woman in El Jadida)

"At the elementary school, students are replaced by 25 male and female students in the morning and afternoon. There are no lights, water, and toilets." (A principal of an elementary school in Settat)

"An ambulance can come because of the road improvement, but it is not easy to use after all, because tips (1MAD for 1 km) have to be paid to the driver." (A woman in Settat)

"A prenatal checkup is available but giving birth is only possible at a hospital 16 km away." (A nurse at a communal health center in El Jadida)

"After the road was developed, my transportation and work became easier." (A woman in Settat)

"Even when a road is developed, students cannot go to the school if it rains. The high school enrollment rate of female students is low because of the accessibility to the high school only by taxi." (A principal of a junior high school in El Jadida)

As shown above, road improvement contributed to improving daily living. However, the results of the analysis did not support road improvement directly, leading to a significant improvement on the school enrollment rate of female students and on the hospital visit frequency of pregnant woman.

Interview near the road

Market (souq) near the road

Health center near the road

An inhabitant on the road

As shown above, rural road improvement by this project made a certain contribution to the social development and poverty reduction, while not particularly having a positive impact on gender empowerment. The positive impact on women in particular was not confirmed.

Moreover, considering road transportation, the time required to access schools and health facilities decreased as Table 13 shows. A significant improvement was observed in carrier's average travel distance, average working days, and average annual sales. The carrier's annual average

travel distance increased by approximately 25% and the annual average working days increased by approximately 19 days. Accordingly, the average annual sales per business operator increased by 10,245 MAD (approximately 14%). Road development decreased the average transportation costs per ton of cargo as Table 2 shows. This improvement was possible owing to the beneficial effects of road development.

At the time of the ex-post evaluation, the number of workers in the fields, except agriculture business (monoculture farming), increased after the road development, and occupational diversification was promoted as a positive impact, while these results were not planned at the time of appraisal. However, there was also a negative impact.[30] Owing to reasons, such as excessive speed, the number of traffic accidents was 14 times higher, increasing from 0.1 person/year for sectional average to 1.4. Among 68,458 annual accidents (2013),[31] 3,705 people died and 10,993 people were seriously injured. As a result of the improvement of the road access rate, based on the field work, ambulances were able to pass through the roads, which was not possible previously, and more patients gained access to immediate care. While the improvement was observed, the escalation of accidents from the perspectives of quantity and quality is becoming an issue. The lack of traffic education, road signs, and traffic mirrors, for the prevention of traffic accidents, is considered to be a cause of this situation.

As described above, the decrease in poverty rate after the implementation of this project in the target provinces is predicted as an impact. The qualitative impacts assumed at the time of appraisal were not confirmed. The positive impacts, such as occupational diversification, were confirmed, while they were not expected at the time of appraisal. Therefore, the impact of the project is high.

In light of the above, this project has largely achieved its objectives. Therefore, the effectiveness and impact of the project are high.

### ３.５ Sustainability (Rating: ②)

#### ３.５.１ Institutional Aspects of Operation and Maintenance

For operation and maintenance of this project, the DRETL/DPETL were expected to manage regional roads and provincial roads, and communes were expected to manage NC roads. The total number of staff at the Ministry of Equipment, Transportation, Logistics and Water was 3,686 (as of January, 2008), and the staff size was considered to be sufficient for operation and maintenance of roads targeted by this project at the time of appraisal. However, the staff size at the communes in charge of NC roads was unclear at the time of appraisal.

[30] Documents provided by the DR.
[31] Based on “Le METL en chiffres (2014),” the latest publication, including the project sites.

At the time of the ex-post evaluation, it was confirmed that the institutional aspects of operation and maintenance remained almost same as planned and expected at the time of appraisal. The total number of staff at the ministry was 6,569[32] (as of January, 2016) (of which the staff at the Ministry accounted for 32% and the other staff including the staff at the DRTEL/DPTEL accounted for 68%). The number of high-ranking officials was 1,369, the number of staff in the middle management level was 2,888, and the staff in the field offices was 2,312. The staff size for operation and maintenance of regional and provincial roads (non-NC roads) developed by this project was larger than the one at the time of appraisal. Therefore, the staff size was sufficient. The director at the DRTEL/DPTEL was expected to make decisions on road operation and maintenance. Therefore, it was clear where the responsibility lay.

On the other hand, the project left NC roads, which the communes were expected to manage, entirely to the communes. It all depends, but based on the visit to the project sites and the interview with the DPTEL, the staff size and its institution in charge of operation and maintenance were not sufficient in most of the cases. Also, each commune had different decision making and locus of responsibility, and generalization was not possible. Moreover, no prospect of future improvement for this situation was planned. According to the report on examination published (in April, 2017) by the Board of Audit in Morocco,[33] NC roads face the crisis that "national property of roads would be disgraced or lost,because the state and the local autonomy failed to maintain them after the road development."

In light of the above, the reality is that NC roads cannot benefit from the institutional aspects of operation and maintenance such as the DRTEL/DPTEL, unless they are classified or upgraded to regional or provincial roads. Therefore, no major problems have been observed in terms of the institutional aspect for regional and provincial roads, but major problems have been observed in the institutional aspect for NC roads whose operation and maintenance was supposed to be managed by communes.

### 3.5.2 Technical Aspects of Operation and Maintenance

At the time of appraisal, the section of infrastructure (in charge of roads) and section of facilities in the DRTEL/DPTEL were in charge of regional and provincial roads. At each DRTEL/DPTEL, 3 to 10 engineers (university graduates; national qualification), 7 to 19 technicians, and 21 to 66 clerks were assigned. At the time of the ex-post evaluation, based on the visit to the project sites and the interview with the implementing agency, it is confirmed

[32] Website of the Ministry of Equipment, Transport, Logistics and Water http://www.equipement.gov.ma/Formation/Chiffres-cles/Pages/Chiffre-Cle-RH.aspx (accessed on August 17, 2017).

[33] Audit Report in 2015 byCourt of Audit (published on April, 2017) http://www.courdescomptes.ma/fr/Page-27/publications/rapport-annuel/rapport-de-la-cour-des-comptes-pour-l-annee-2015/1-189/ (accessed on August 17, 2017).

that the engineers, technicians, and clerks were assigned as planned. The manual, including operation procedure of heavy machinery, was developed and used.

On the other hand, at each commune in charge of NC roads, the plan at the time of appraisal expected that there would be a specialized section (engineering division) to operate and maintain roads and public facilities. In the section, three to four officials and one vehicle for monitoring were expected to be assigned for road operation and maintenance. However, based on the interview with the DRTEL/DPTEL and communes, under the existing conditions, there were not many communes with this section and staff. In reality, only ad hoc operation and maintenance was possible in case where repair was required. Moreover, there were not many communes possessing heavy machinery, and the manual for operation and maintenance could not be found at the communes.

At the time of appraisal, Japan established the IFEER (l'Institut de Formation aux Engins et à l'Entretien Routier)[34] by Japan's grand projects and technical cooperation projects[35] to train engineers and technicians, and approximately 250 persons were expected to participate in the training session annually. The IFEER is in charge of the education for engineers and technicians at the DR, accepting third country training mainly from African countries. The IFEER has had a record (accumulated total) of training 11,842 people between 1993, which is the year of foundation, and 2012. The annual average number of people trained was 1,184. The training covered skills on road maintenance and repair (attended by 48% of the accumulated total trainees), skills on heavy machinery operation (30%), training for technicians (14%), and business administration (8%).

However, in reality, only the engineers and technicians at the DRTEL/DPTEL participated in these training courses in most of the cases. There were almost no participants from the communes.[36]

In light of the above, no major problems have been observed in the technical aspect for regional and provincial roads, but major problems have been observed in terms of the technical aspect for NC roads managed by communes.

### 3.5.3 Financial Aspects of Operation and Maintenance

At the time of appraisal, the general account budget and Special Road Funds (FSR) were

[34] See the following website for the contents of the training: http://www.equipement.gov.ma/routier/Infrastructures-Routieres/IFEER/Pages/Missions.aspx (accessed on August 16, 2017)

[35] ODA Grant Projects "The Project for the improvement of equipment of IFEER in Morocco" (E/N signed on February, 2005, 0.328 billion yen). Technical Cooperation Projects (Former Project-Type Technical Cooperation) "Institut de Formation aux Engins et a l'Entretien Routier Skhirat (IFEER) Program (1992–1997)," Group Training in the Third Country for "Capacity Enhancement for Road Maintenance Skills (1999–2003)," Group Training Course in the Third Country for "Road Maintenance and Construction Equipment in IFEER, Phase 2 (2005–2010)," Group Training Course in the Third Country for "Road Maintenance and Construction Equipment, Phase 3 (2009–2011)."

[36] Based on the interview with the DR and DPTEL.

expected to finance the budget for the regional and provincial roads. The budget amount for road operation and maintenance in 2007 was 965 million MAD (approximately 13.51 billion yen), including 190 million MAD (approximately 2.66 billion yen) from the general account budget and 775 million MAD (approximately 10.85 billion yen) from the FSR. The budget from the FSR accounted for approximately 80% of the total budget. The FSR was a Moroccan special-purpose budget financed by taxes, such as gasoline tax, car registration tax, and car weight tax, being established in 1989.

On the other hand, it was planned that communes would finance the budget for NC roads. The budget was expected to be made from its own funds, such as resident tax, borrowing from funds in local governments and subsidies from the Ministry of Interior. Based on the estimation by the SAPROF, approximately 10% of the overall annual revenue totaling 6,100 million MAD (approximately 85.4 billion yen) in 1,298 communes in Morocco was disbursed to road maintenance. While local governments' funding for NC roads maintenance was not sufficient, it was expected to be supported by regular reports on the development of decentralization and transition of financial conditions.

In light of the above, at the time of appraisal, no major problems have been observed in the financial aspect of the operation and maintenance system.

At the time of the ex-post evaluation, it was confirmed that the budget for operation and maintenance of the regional and provincial roads was financed by the FSR and the general account budget as planned at the time of appraisal. Table 12 shows the FSR and the general account budget (except for labor cost) for the past 4 years. The FSR budget which accounted for 80% of the operation and maintenance cost increased, and the budget was higher than the one estimated at the time of appraisal. The budget for operation and maintenance of the regional and provincial roads was sufficient.

Table 12. FSR and the General Account Budget (For Operation and Maintenance) (Unit: million MAD)

| | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|
| FSR | 2,200 | 2,200 | 2,500 | 2,700 |
| General Account | 155 | 223 | 237 | 508 |

Source: Website of the Moroccan Ministry of Economy and Finance.
Note: Financial year and calendar year are the same. The general account budget is the disbursement for operation and maintenance except for labor cost. The FSR includes expenses except operation and maintenance cost, such as contribution to the CFR. A detailed breakdown of expenses is not published.

In light of the above, the financial aspects and budget for the regional and provincial roads were as planned at the time of appraisal, and no particular problems have been observed. On the other hand, some problems have been observed for NC roads. There were not sufficient budgets for NC roads, which were under the management of the communes and

there were no available data.

### 3.5.4 Current Status of Operation and Maintenance

At the time of appraisal, there was a past record of yen loan project, "Road Improvement Project (approved in 1995, completed in 2003)," at the DRTEL/DPTEL and communes, and there was no major problems observed. Therefore, operation and maintenance of the project were expected to be managed appropriately.

At the time of the ex-post evaluation, the status of operation and maintenance for regional and provincial roads was marked on a scale of A to D. If the mark of a road was lower than C the road was considered as a target for intensive repair and maintenance. On the other hand, in principle, communes were not obliged to submit a report on NC roads, which were under the management of communes, to the DRTEL/DPTEL. However, for important roads, the DRTEL/DPTEL voluntarily evaluated the status and ranked them on a scale of A to D. In the ex-post evaluation, in El Jadida, whose rating of the status of operation and maintenance was not reported, 28 road sections were rated on a scale of A to D with the help of technicians and engineers at the DRTEL/DPTEL (Table 13).

Among 50 sections except for 15 sections, mainly NC roads, with unclear status of operation and maintenance among 65 roads that were completed, 46 road sections (92% of the total) were rated either A or B. The roads rated as C or below C, which indicates a need of repair, accounts for only 8%, while the maintenance of the NC roads was inadequate or completely missing. There was no road with the worst status (rated as D).

Most of the NC roads were gravel road maintenance, based on the visit to NC roads in El Jadida. There was relatively limited traffic, and heavy vehicles, such as trucks did not pass often. As a result, while maintenance was not sufficient in the sections 5 years after the completion, there were no roads in need of immediate repair, supporting the observation.

Table 13. Rating on the Status of Operation and Maintenance

| | A | B | C | D | 不明 |
|---|---|---|---|---|---|
| Tetouan | 0 | 0 | 0 | 0 | 9 |
| Tanger | 1 | 0 | 0 | 0 | 0 |
| Chefchauen | 0 | 0 | 2 | 0 | 0 |
| Sidi Kacem | 2 | 0 | 1 | 0 | 0 |
| Settat | 3 | 0 | 0 | 0 | 0 |
| El Jadida | 5 | 21 | 1 | 0 | 4 |
| Errachidia | 9 | 0 | 0 | 0 | 1 |
| Ouarzazate | 4 | 0 | 0 | 0 | 0 |
| Al Haouz | 0 | 1 | 0 | 0 | 1 |
| Total | 24 | 22 | 4 | 0 | 15 |

Source: DR (except for El Jadida) and visit to the project sites (El Jadida).

Regional and provincial roads under the direct management of the DR were sufficiently maintained by regular inspection and repair, but NC roads under the management of the communes were not sufficiently maintained. However, even in the sections 5 years after the completion of NC roads, there were no roads in need of immediate repair, and it was satisfactory overall. However, when the roads are left without maintenance, it is not possible to address issues in the future when repair is demanded.[37] Therefore, the status of operation and maintenance is fair.

As described above, for regional and provincial roads, the status of operation and maintenance in the institutional, technical, and financial aspects was appropriate as planned at the time of appraisal. However, for NC roads under the management of the communes, there are some problems in terms of institutional, technical, and financial aspects. These issues were expected at the time of appraisal, but it can be said that appropriate measures were not taken by the executing agency. The possible appropriate measures for the future were not planned at the time of the ex-post evaluation. Therefore, sustainability of the project effects is low for the NC roads.

Taking these into account there are no particular problems about the institutional, technical, and financial aspects, and current status of the operation and maintenance system of the regional and provincial roads of this project. On the other hand, there are some problems in terms of the institutional, technical, and financial aspects of the NC roads. Therefore, sustainability of the project effects is fair.

## 4. Conclusion, Lessons Learned, and Recommendations

### 4.1 Conclusion

This project aimed to develop a portion of 15,500 km of rural roads, based on "The Second National Program of Rural Roads (PNRR2)" (2005–2015) laid down by the Moroccan Government. It aimed to improve traffic access for the inhabitants of roadside communities, improve the living conditions, and redress regional disparities by developing and improving rural roads. This project has been highly relevant to Morocco's development policy and needs as well as Japan's ODA policy. Therefore, its relevance is high. Although the project cost was consistent with increased outputs (within the plan), the project period exceeded the plan. Therefore, the efficiency of the project is fair. Among the effectiveness indicators, the annual average daily traffic mostly reached the target value, and the road cut-off dates and access rates also mostly achieved the target set for the evaluation. Moreover, the poverty rate in rural areas and school enrollment rate (particularly the enrollment rate for girls) improved

[37] Considering 10 years and 15 years post the completion, the road surface and bed could get worse by accumulating axial loads as well as increased traffic.

subsequent to this project. The frequency of visits to health facilities marginally improved, and the operating distance and sales of transportation companies improved. However, traffic accidents increased after the implementation of PNRR2. Taking into account these findings, the effectiveness and impact of the project are high. While operation and maintenance in terms of institutional, technical, and financial aspects are high in regional and provincial roads, non-classified roads administered by communes continue to have issues to address. Taken together,that sustainability of the project in regional and provincial roads are high and some problems have been observed in non-classified roads, the sustainability of the project effects 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

① Accident-prevention Measures

Road signs are not thoroughly set up on the regional and provincial roads under the management of the DR, let alone NC roads under the management of the communes. Excessive speed and lack of traffic rules/manners are also the causes of rapid increase in the number of traffic accidents, including fatal accidents. It is recommended that the DR prepare an action plan, as accident-prevention measures, on the enforcement of traffic rules/manners (heavier penalties and enlightenment activities), while cooperating with the national police agency and the military police, and also with schools in rural areas and communes in some cases. The action plan should be prepared by the end of 2017 when a succeeding program to the PNRR2 is expected to begin and this plan should be organized as major policies in the program and budgeted.

② Measures for the Operation and Maintenance of NC roads (Database Building and Upgrading)

The database for NC roads under the management of communes is not yet built by the DR, the status of these roads is sufficiently unclear, and the operation and maintenance is not sufficient. This recognition is shared with the DR. It is recommended that NC roads be upgraded to regional and provincial roads, the database be built in the DR, and the operation and maintenance of the road should be under the direct management By the end of 2017, at the latest, the arrangement of this upgrading should be undertaken in order to ensure budgeting in the following year. However, though decentralization started in 2011, the authority on road projects is being transferred to state governments.[38] A number

[38] Audit by Cour des Comptes (2017) raised the same issue and also suggested the same.

of NC roads are now under the management of state governments in terms of budget and personnel for the operation and maintenance. In the future, state governments should take responsibility to build the database on former NC roads (which are upgraded to regional and provincial roads) and to monitor them closely. Indicators used in monitoring could cover traffic volume, status of operation and maintenance, repair (contents and frequency), financial return and the status of road.

#### ４.２.２ Recommendations to JICA

This project was co-financed by multiple donors for the PNRR2, including the World Bank. It could be valuable, if a comprehensive evaluation is conducted on the support of PNRR2 provided by all the donors involved aside from the individual evaluation on the aid effectiveness of the yen loan project. The World Bank has been playing a central role in donor co-ordination. As the World Bank is expected to conduct an ex-post evaluation after its provision of loan to the PNRR2 is completed by the end of July 2017, it is necessary to continue sharing information with the World Bank.

### ４.３ Lessons Learned

① Appropriate Project Supervision in Sector Investment-type Yen Loan (Small-scale and fragmented)

In the vast numbers of small-scale and fragmented sector investment, it is necessary to undertake project management as a whole and also to undertake individual subproject management. The central authority cannot at all times manage vast numbers of subprojects. In this project, it was necessary to gain an approval from JICA before a subproject was added or cancelled. However, in reality, some road sections targeted by the loan were ignored without maintenance at the time of completion of the loan provision. Some sections were ended without maintenance after the provision of the loan. A procedure of gaining an approval from JICA was not taken because it was cancellation after provision of the loan. In order to avoid these problems of project management and also to undertake management considering regional characteristics and unique circumstances for subprojects, provincial governments should play a central role. Based on the status of the maintenance, the feedback system in procurement management should be built. On the other hand, the central authority should continue to implement reporting systems from regions for project management as a whole. For major indicators, the database on all roads should be built.

② Necessity for Component of Technical Cooperation (Employment of Consultants)

This project conducted the SAPROF and Japanese consultants has been involved in the project since the preparation stage. However, procurement management was delegated to Morocco, and tracking of progress and procurement management in this yen loan project became unclear, as mentioned above. These problems can be avoided if the consultants for execution management of a yen loan project reside in the field in sector investment-type yen loan.

Aside from financial assistance, the component of technical cooperation should have been implemented which could have contributed to capacity building on procurement management of rural roads which cannot be reached by the central government. Donors, such as the World Bank, have provided technical cooperation component,[39] aside from financial assistance. In case of this project, the technical cooperation from the World Bank covered sections, including the project sites, but it was not specialized in this project. As a result, this project received relatively low benefits from the World Bank's technical cooperation. For this reason, technical cooperation could have been included in the yen loan or employment of consultants was possible and desirable.

③ Perspective on Future Project

There may be no progress to promote the aid effectiveness of rural road improvement if donors count on a developing country's self-help to conduct their activities, including exiting agency's measures on accident-prevention, road classification, and database building. Therefore, it should be supplemented by donors' technical assistance in the measures related to these areas to be taken for rural road improvement, which contributes to the improvement of the aid effectiveness. In regard to this point, JICA will be able to provide technical cooperation projects through a scheme that combines dispatch of experts and training.

[39] Each donor provides different technical cooperation. In the case of the World Bank, a technical cooperation on standardization of road specifications and design was conducted by introducing highway design and development model (HDM).

**Comparison of the Original and Actual Scope of the Project**

| Item | Plan | Actual |
|---|---|---|
| ①Project outputs | Target provinces: 9 provinces<br>Total length: 630.11 km<br>Road sections: 39 sections<br><br>①Simple pavement: 22 sections, a two-lane road , width 6.0 m<br><br>②Gravel road maintenance: 18 sections, a two-lane road , width 6.0 m | Target provinces: As planned<br>Total length: 876.67 km<br>Road sections: 65 sections<br><br>①Simple pavement: As planned<br><br>②Gravel road maintenance: 43 sections, the specifications were as planned. |
| ②Project Period | March 2008–June 2012<br>(52 months) | March 2008–March 2017<br>(109 months) |
| ③Project Cost<br>Amount paid in foreign currency<br>Amount paid in local currency<br><br>Total<br>ODA loan portion<br>Exchange rate | <br>8,439 million yen<br>2,647 million yen<br>(189 million MAD)<br><br>11,086 million yen<br>8,439 million yen<br>1MAD = 14.0 yen<br>(as of December 2007) | <br>8,439 million yen<br>1,537 million yen<br>(135 million MAD)<br><br>9,9766 million yen<br>8,439 million yen<br>1MAD = 11.35 yen<br>(average between March 2008 and March 2017) |
| ④Final Disbursement | January 2015 | |

<End>

Annex1. Target subprojects, inhabitants of roadside communities (population)

| Provinces | Road ID | Road Section | Baseline 2007 | Actual 2017 |
|---|---|---|---|---|
| Al Haouz | P2117 | S-RAHAL / TOUAMA | 2,496 | 2,600 |
| Chefchaouen | NC3079 | Souk El had - Bab Hamma | 1,240 | 1,488 |
| Chefchaouen | NC6006 | Bab Taza-B.Fagloum(lot1) | 3,362 | 4,035 |
| Chefchaouen | NC6006 | Bab Taza-B.Fagloum(lot2) | 2,082 | 2,499 |
| El jadida | NC | P2131-Dr Lahcinat Old Taleb | 2,258 | 2,822 |
| El jadida | NC | P3414-P3465 Par Dr Laababda | 1,870 | 2,337 |
| El jadida | NC10 | P3419-8012 Par Laamarna Lakramia | 3,201 | 4,001 |
| El jadida | NC7127 | P3459-Dior Chaab Old Rahmoun | 1,554 | 1,942 |
| El jadida | NC | R320 -Douar Louta | 2,300 | 2,875 |
| El jadida | NC | R320- Douar Lamkhatra | 2,244 | 2,805 |
| El jadida | NC | R316- P3429 par Lahnanta et Lamoualda | 1,550 | 1,937 |
| El jadida | NC2016 | Krabba -Laachichat | 1,668 | 2,085 |
| El jadida | NC | P3409 - Dr Jouabra | 1,085 | 1,356 |
| El jadida | NC | R301-Dr Old Youssef | 975 | 1,218 |
| El jadida | NC8010 | P3413- olad Azooz -idguaba-P2302 | 1,155 | 1,443 |
| El jadida | NC | Dr Old Said -Dr Lahmarsa | 1,320 | 1,650 |
| Errachidia | R702 | Arfoud-Merzouga | 1,336 | 1,336 |
| Errachidia | NC | Aoufous-Zaouit Aoufous | 750 | 750 |
| Errachidia | P7110 | Macissi-Oum Jrane | 2,421 | 2,421 |
| Errachidia | A | ASRIR RN10 PK 557- Limite Province Dr | 9,526 | 9,526 |
| Errachidia | 2583 | RN10 – Tizouggarine | 4,359 | 4,359 |
| Errachidia | R703 | Bouzmou-Aït Hani | 11,737 | 11,737 |
| Errachidia | NC | RN13- Ksours Tillicht | 2,062 | 2,062 |
| Errachidia | 2605 | P7101 – Lhroun | 895 | 895 |
| Errachidia | NC | RN10 - Ksar tarda | 691 | 691 |
| Ouarzazate | P1507 | Taznakhte-Tarmigt (Lot 1) | 5,000 | 6,000 |
| Ouarzazate | P1507 | Taznakhte-Tarmigt (Lot 2) | 5,000 | 6,000 |
| Ouarzazate | P1506 | Telouat-Tabouraht (Lot 1) | 13,000 | 15,000 |
| Ouarzazate | P1506 | Telouat-Tabouraht (Lot 2) | 13,000 | 15,000 |
| Settat | P3612 | Berrechid à RP 3619 | 6,652 | 8,500 |
| Settat | P3630 | Aïn Blal à Beni Khloug | 15,425 | 17,000 |
| Settat | P3624 | Settat à Mrizigue (Lot1) | 8,724 | 10,000 |
| Settat | P3624 | Settat à Mrizigue (Lot2 ) | 12,352 | 14,000 |
| Sidi Kacem | P4518 | Had Kourt - Jorf El Melha | 4,150 | 4,358 |
| Sidi Kacem | P4540 | Azib Siltane - Sidi Abdelaziz | 5,278 | 5,542 |
| Sidi Kacem | P4527 | Chemin d'accès à M'zefroune | 2,292 | 2,645 |
| Tanger | NC8107 | Assilah-Dar seid | 878 | 878 |
| Tetouan | NC14211 | Bghaghza – Spirada | 10,000 | 16,000 |
| Tetouan | NC15004 | Beni Idder - Beni Imrane | 6,000 | 7,000 |
| | | Total | 177,662 | 206,415 |
| | | Total (Except for Errachdia) | 143,885 | 172,638 |

Source: Documents provided by the DR.

Annex 2. Target subprojects, annual traffic cut-off days caused by natural disasters (days/year)

| Provinces | Road ID | Road Section | Baseline 2007 | Target 2013 | Actual 2017 |
|---|---|---|---|---|---|
| Al Haouz | NC | Ouzgita-Ameghras* | 4 | 0 | 0 |
| Al Haouz | P2117 | S-RAHAL / TOUAMA | 3 | 0 | 0 |
| Chefchaouen | NC3079 | Souk El had - Bab Hamma | 30 | 0 | 0 |
| Chefchaouen | NC6006 | Bab Taza-B.Fagloum(lot1) | 30 | 0 | 0 |
| Chefchaouen | NC6006 | Bab Taza-B.Fagloum(lot2) | 30 | 0 | 0 |
| Ouarzazate | P1507 | Taznakhte-Tarmigt | 25 | 0 | 2 |
| Ouarzazate | P1501 | Asdif-Iznagen* | 30 | 0 | 0 |
| Ouarzazate | P1502 | Alamdoun-Ait Toumert* | 15 | 0 | 0 |
| Ouarzazate | P1506 | Telouat-Tabouraht | 60 | 0 | 0 |
| Settat | P3612 | Berrechid à RP 3619 | 4 | 0 | 0 |
| Settat | P3630 | Aïn Blal à Beni Khloug | 6 | 0 | 0 |
| Settat | P3624 | Settat à Mrizigue | 5 | 0 | 0 |
| Sidi Kacem | P4518 | Had Kourt - Jorf El Melha | 4 | 0 | 1 |
| Sidi Kacem | P4540 | Azib Siltane - Sidi Abdelaziz | 4 | 0 | 0 |
| Sidi Kacem | P4527 | Chemin d'accès à M'zefroune | 3 | 0 | 0 |
| Tanger | NC8107 | Assilah-Dar seid | 60 | 0 | 3 |
| Tetouan | NC14211 | Bghaghza - Spirada | 90 | 0 | 0 |
| Tetouan | NC | Azla - Mokdassen* | 60 | 0 | 0 |
| Tetouan | NC | RN 2 - RP4702 par Bni Wassim* | 90 | 0 | 0 |
| Tetouan | NC | RN2 - Fechkara (2eme Section)* | 90 | 0 | 0 |
| Tetouan | NC | RP4105 - Ihdounen par Drabna * | 90 | 0 | 0 |
| Tetouan | NC | Travaux d'achèvment de la liaion RN2 – Fechkara PAR AIN ALEK * | 90 | 0 | 0 |
| Tetouan | NC | Travaux d'achèvment de la liaion RP4105 - Ihdounen par Drabna* | 90 | 0 | 0 |
| Tetouan | NC | Saddena - Al Ounsar RP4702* | 60 | 0 | 0 |
| Tetouan | NC | Bni Idder - Kh Achiche* | 60 | 0 | 0 |
| Tetouan | NC | Jbel Lahbib - Kharoub / Zaitouna* | 90 | 0 | 0 |
| Tetouan | NC15004 | Beni Idder - Beni Imrane | 90 | 0 | 0 |

Source: Documents provided by the DR.

Note: ＊sections added (12 sections)