Kingdom of Morocco

Expressway Construction Project and Casablanca South Ring Road Construction Project

External Evaluator: Yuriko Sakairi, Yasuhiro Kawabata,
Sanshu Engineering Consultant Co., Ltd.
Field Survey: October 2007 to January 2008

1.Project Profile and Japan's ODA Loan

Map of Project Area

Starting point of the Casablanca-Settat Expressway

1.1 Background

The Moroccan government has taken steps to develop the expressway network by establishing the Société Nationale des Autoroutes du Maroc (ADM) (Morocco expressway public corporation), to which it transferred authority for expressway construction and expressway operation and maintenance in 1989. In 1991, the Moroccan government announced its Expressway Development Master Plan to build approximately 1,500 km of road network, with the centerpieces being the North-South Route to connect Morocco and Europe and the East-West Route which is part of the expressway that runs from Morocco to Libya. As segments with particularly high priority in the Master Plan, emphasis was placed on developing a total of approximately 1,000 km of expressway consisting of the part of the North-South Route from the port city of Tangier to Agadir, the main city on the southern coast, and the part of the East-West Route from Fez, the main city in the central area, to Jorf-Lasfar where industrial development has been remarkable in recent years. The goal for completion of these segments was 2004.

Along the Casablanca-Settat Expressway in the Expressway Construction Project is

situated the largest airport in the country, and moreover, the expressway is adjacent to an export processing zone. The traffic volume on existing ordinary roads as of 1995 was approximately 27,000 vehicles/day, and this was forecast to increase to 43,300 vehicles/day in 2000 and 57,000 vehicles/day in 2010. Given these conditions, it was necessary to quickly build a road to high specifications in order to boost transport capacity and improve traffic safety.

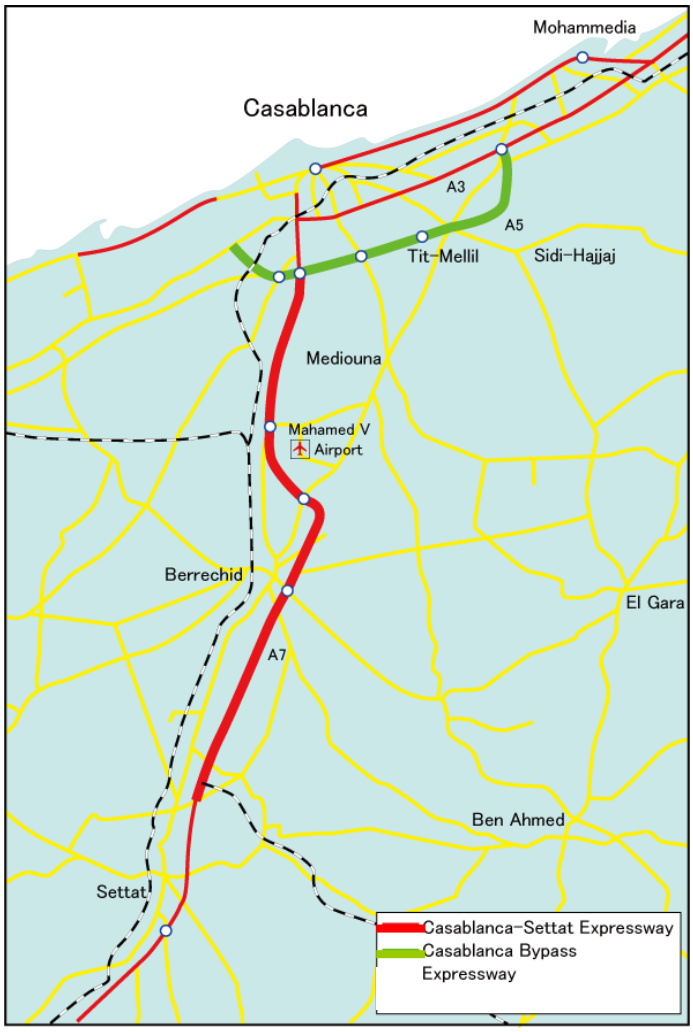
Meanwhile, traffic volume has been increasing by more than 10% per year on average since the beginning of the 1990s on the Casablanca-Rabat segment, which is part of the Casablanca South Ring Road Construction Project and is central to the country's economic and political life. Average daily traffic greatly exceeded the 12,000 vehicles/day, which was Morocco's high-specification expressway construction standards for 4 lanes. Because traffic congestion during the daytime was particularly marked and because there was concern that the noise and exhaust gas problem accompanying the congestion would worsen, immediate measures were required.

1.2 Objective

The objective is to improve road safety and to accelerate the distribution of goods by repairing and widening existing roadway and constructing new expressway (approximately 56.4 km) on the Casablanca-Settat segment and by constructing new expressway (approximately 35 km) south of Casablanca in preparation for future growth of traffic volume in the southern part of Casablanca, and thereby to prepare the environment for private investment and to further promote economic development in the region.

A map of the project area is shown in Figure 1. The South Ring Road is located around the outside of Casablanca. The Casablanca-Settat Expressway extends from the outskirts of Casablanca to Settat Province.

Figure 1: Map of Project Site



1.3 Borrower/Executing Agency

Société Nationale des Autoroutes du Maroc (ADM) (Public corporation guaranteed by the government of Morocco)/ Société Nationale des Autoroutes du Maroc (ADM)

1.4 Outline of Loan Agreement

Loan Amount/Loan Disbursed Amount	(MR-P11) 9,568 million yen/7,514 million yen (MR-P12) 7,046 million yen/ 4,793 million yen	
Exchange of Notes/Loan Agreement	(MR-P11) May 1997/December 1997 (MR-P12) April 1998/June 1998	
Terms and Conditions -Interest Rate -Repayment Period (Grace Period) -Procurement -Interest Rate -Repayment Period (Grace Period) -Procurement	(MR-P11) Main Loan: 2.70 % 30 years (10 years) General untied Consultant Loan: 2.30% 30 years (10 years) General untied	(MR-P12) Main Loan: 2.2 % 30 years (10 years) General untied Consultant Loan: 0.75% 40 years (10 years) Partial untied
Final Disbursement Date	(MR-P11) May 2003, (MR-P12) September 2005	
Main Contractors (only contracts over 1 billion yen)	(MR-P11) AGROMAN EMPRESA CONSTRUCTORA S.A. (Spain)/ FERROVIAL & AGROMAN INTERNATIONAL (Spain) / FERROVIAL S.A. (Spain) (JV), SOCIETE SEPROB S.A (Morocco)/EL HAJJI ABDELLAH (Morocco) (JV) (MR-P12)GRANDS TRAVAUX ROUTIERS (Morocco) / LA ROUTE MAROCAINE (Morocco)/ SOCIETE GENERALE DES TRAVAUX DU MAROC (Morocco) (JV)	
Consulting Services (only contracts over 100 million yen)	(MR-P11) None over 100 million yen (MR-P12) CID (Morocco)/SCETAUROUTE INTERNATIONAL (France) (JV)	
Feasibility Study (F/S), etc.	Funded by Morocco's Ministry of Public Works (1995)	

2. Evaluation Results (rating: B)

2.1 Relevance (rating: a)

2.1.1 Relevance of plan at time of appraisal

In the Expressway Development Master Plan (1991), the plan was to develop a road network of approximately 1,500 km, with the centerpieces being the North-South Route which connects Morocco and Europe and the East-West Route which is part of the Trans-Maghreb Expressway which runs from Morocco to Libya. In particular, it was decided in the above-mentioned plan to implement construction during the 10 years up to 2004 on the Casablanca-Settat Expressway (ACS) in the project and the Casablanca-Marrakech segment which includes the South Ring Road (RPSC) in the project since they are particularly high-priority segments. Construction of both expressways will complete an expressway network totaling 610 km consisting of approximately 430 km on the Tangiers-Settat segment of the North-South Route and 180 km on the Rabat-Fez segment of the East-West Route and will link directly to Europe's expressway network across the Straits of Gibraltar.

2.1.2 Relevance of plan at time of evaluation

Currently, the two major development goals[1)] of the Moroccan government are i) increase and promotion of employment opportunities and sustainable economic growth and ii) decrease of low-income earners. In order to achieve these goals, four strategic objects are mandated: 1) introduction of the principle of competition and improvement of the investment environment, 2) improvement of access by low-income earners to basic services, 3) increase in the efficiency of the educational system, 4) improvement of water resources management and access to water supply and sewerage systems. This expressway project is a project that contributes particularly to improvement of the investment environment.

As of mid-2007, approximately 531.5 km was completed on the North-South Route (the route that connects Morocco and Europe) which includes the Casablanca-Settat segment (a segment targeted in this project). Meanwhile, approximately 252.5 km was completed on the East-West Route (part of the Trans-Maghreb Expressway which runs from Morocco to Libya) which includes the segment targeted by the South Ring Road Construction Project. The said roads are located in the area of Casablanca, the largest city in Morocco, and are part of the highest priority segments on the North-South Route and the East-West Route in the expressway development plan.

[1)] Prime Minister's speech before the Parliament, November 2002.

Implementation of these projects was consistent with the national plan, etc., at both the time of the appraisal and the time of the evaluation, and so the relevance of the project implementation is rated extremely high.

2.2 Efficiency (rating: b)

2.2.1 Output

The project outline and project output are shown on Table 1. The output was as planned or basically as planned, except for the shortening by 3 km of a newly constructed segment in the Expressway Construction Project and shortening by 1.5 km of road in the Casablanca South Ring Road Construction Project. However, there was additional construction such as construction of crossing facilities (box culvert underpasses and overpasses), relocation of interchanges, construction of service roads (side roads), and alteration of the sewer pipe route, etc.

Near junction of South Ring Road and Casablanca-Settat Expressway

South Ring Road Tit Mellil Toll Station

Table 1: Project Outline and Project Output

Expressway Construction Project

Item	Plan	Actual
Existing road (4 lanes, 12.3 km)	Improvement in expressway standards	As planned
Existing road (2 lanes, 8.3 km)	Widening to 4 lanes and improvement in expressway standards	As planned
New construction of roads meeting expressway standards	35.8km	32.8km
Construction of incidental facilities	5 interchanges, 3 junctions, 4 toll stations, 1 service area in each direction, 1 operation and maintenance facility	Additions: Construction of 7 crossing facilities (box culvert underpasses, overpasses) (additional construction); Construction of service

		roads (side roads) in 13 locations
Consulting service	150 million	105.62 million

Casablanca South Ring Road Construction Project

Item	Plan	Actual
New construction of roads meeting expressway standards	35km	33.5 km
Construction of incidental facilities	4 interchanges, 1 toll station	Additions: Construction of 5 crossing facilities (box culvert underpasses, overpasses) (additional construction)
Consulting service	144 million	98.08 million

2.2.2 Project period

Whereas the project period of the Expressway Construction Project as planned at the time of appraisal was December 1997 to October 2000 (35 months), the actual project period was December 1997 to May 2003 (66 months), which represents a delay of 2 years 8 months. Furthermore, the construction period was May 1998 to June 2001 (the month the roads opened), which represents a delay of 8 months.

Meanwhile, whereas the project period of the Casablanca South Ring Road Construction Project was originally planned for June 1998 to February 2001 (2 years 9 months), the actual project period was June 1998 to September 2005 (7 years 4 months), resulting in a delay of 4 years 7 months). Furthermore, the construction period was February 1999 to February 2004 (the month all road segments opened), which was a delay of 3 years.

Reasons for the delay common to both projects are (1) the time required from the loan signing until the loans went into effect (5 months and 8 months, respectively), (2) the fairly large number of design changes (crossing facilities, increase in side roads, alteration of sewer pipe route, etc.) in response to on-site conditions which could not be adequately understood at the time of the initial design and the occurrence of changes in construction as well, (3) the unexpectedly long time required for land acquisition (a need rose to add crossing structures because local areas were split by the expressway, and time was required to negotiate their location and re-plan the roads where they would be located).

Both construction projects were planned for implementation during December 1997 to February 2001 (3 years 3 months), but the actual project period was December 1997 to September 2005 (7 years 10 months), or 241% of the plan, thereby significantly exceeding the plan. Furthermore, in the preparation of the project implementation plan at the time of

appraisal, the time required for land acquisition and procurement of construction contractors was not adequately taken into account. It was assumed that the overall plan would require approximately three years, but in expressway construction projects of this scale, the construction itself requires more than two to two and a half years. In the case of this project, since at least more than one year should be considered necessary for land acquisition and procurement of construction contractors, it appears that the three years allotted in the original plan was insufficient.

Moreover, because there was inadequate consultation at the project preparation stage with local residents concerning land acquisition and relocation, it was discovered during construction that the expressway would split local areas in two. For this reason, it became necessary to additionally construct crossing structures (box culvert underpasses, overpasses) and side roads. It also became necessary to build up earth to raise the road height to accommodate the box culvert underpasses. This led to extension of the construction period.

2.2.3 Project cost

The total project cost for the Expressway Construction Project as planned at the time of the appraisal was 12,758 million yen (ODA loan portion: 9,568 million yen). The actual project cost was 10,021 million yen (ODA loan portion: 7,514 million yen). Meanwhile, the total project cost of the Casablanca South Ring Road Construction Project as planned at the time of the appraisal was 9,928 million yen (ODA loan portion: 7,046 million yen), and the actual project cost was 9,111 million yen (ODA loan portion: 4,793 million yen). The total project cost of both projects was lower than the planned cost by 16%, with the Expressway Construction Project 21% below the planned amount and the Casablanca South Ring Road Construction Project 8% below the planned amount. The main reason for the cost reduction was the shortening of the road extensions (the expressway was shortened from 36 km to 33 km (9% reduction) and the ring road was shortened from 35 km to 33.5 km (5% reduction).

The project cost of these projects was within the planned amount, but because the project period significantly exceeded the planned project period, the efficiency is evaluated as moderate.

2.3 Effectiveness (rating: b)

2.3.1 Traffic volume on the projects' roads

Table 2 shows the annual average daily traffic (AADT) on the Casablanca-Settat Expressway. The AADT of the segment from the junction with the Casablanca South Ring

Road to (3) Berrchide Nord, which includes the interchanges (3) Berrchide Nord and (2) Aero port Med V which connects to the Casablanca International Airport, is basically as planned or exceeds the forecast. Meanwhile, the traffic volume shown for the segments south from (3) Berrchide Nord to (6) Settat Sud is extremely small. This is a predictable circumstance because, as of 2005/2006, the segment to Marrakech, a major city in the south, was not yet opened. It is expected that completion of the Marrakech-Agadir segment, which is currently under construction and is to be completed in 2010, will cause an increase in traffic volume.

Table 2: Annual Average Daily Traffic (AADT)
of the Casablanca-Settat Expressway

(unit : vehicles/day)

Segment	2003	2004	2005	2006
(1) Casablanca ― (2) Aero port Med V	21,661	24,076	26,184 (26,900)	29,026
(2) Aero port Med V ― (3) Berrchide Nord	13,769	15,210	16,318 (11,500)	18,088
(3) Berrchide Nord ― (4) Settat nord	5,653	6,542	7,284 (9,400)	8,591
(4) Settat Nord ―(5) Settat Centre	-	-	4,772 (n/a)	6,005
(5) Settat Centre ―(6) Settat Sud	-	-	4,191 (n/a)	5,301

Figures in parenthses are the estimated traffic volumes at the time of the feasability study (1995).

source: Internal materials of ADM.

Table 3 displays the AADT on the existing National Highway 9 (ordinary two-lane road) which parallels the Casablanca-Settat Expressway. Because the traffic capacity of ordinary two-lane roads is considered to be 14,000 vehicles/day, this national highway has already reached capacity and congestion at peak time has become a regular event. Henceforth, as the Casablanca-Settat Expressway (ACS) is extended further south to Marrakech/Agadir, it is predicted that long-distance traffic will increase and that an increased amount of traffic will use the expressway rather than the ordinary road.

Table 3: Annual Average Daily Traffic (AADT) of the Casablanca-Settat Expressway and National Highway 9 (Casablanca-Berrechid)

(unit : vehciles/day)

	Section	2004	2005	2006
Casablanca-Settat Expressway (ACS)	(1) Casablanca – (2) Aeroport Med V	26,508	26,184	29,026
	(2) Aeroport Med V- (3) Berrchide Nord	15,210	16,318	18,088

National Highway 9 (RN9)	Mediouna - Aeroport	19,096	19,185	19,908
	Aeroport - Berrechid	13,719	13,731	13,585

source: Internal materials of ADM.

Table 4 shows the AADT on the South Ring Road. The actual traffic volume is only 45% to 70% of the forecasted level. One reason for this is that there is currently no congestion on the Casablanca-Rabat Expressway which parallels the South Ring Road, and so in terms of traffic capacity, there is leeway. Another factor that may be mentioned is the fact that the road opened in February 2004, but there is still inadequate developed/induced traffic in the area around the outer edge of Casablanca. The traffic capacity of four-lane expressways is considered to be 48,000 vehicles/day, and the traffic volume of the Casablanca-Rabat Expressway (ADM) is already 38,325 vehicles/day (AADT, 2005) at the junction (Mohammadia). It is predicted that in the future, medium- and long-distance traffic which does not originate or end in Casablanca will begin to use the South Ring Road.

Table 4: Annual Average Daily Traffic (AADT) of the South Ring Road

(unit : vehicles/day)

Segment	2003	2004	2005	2006
(1) Mohammédia – (2) Echg Tit Méllil	5,528	5,726	6,627 (14,820)	8,066
(2) Echg Tit Méllil – (3) Echg Casa Port	6,480	6,848	8,018 (11,470)	9,743
(3) Echg Casa Port – (4) Echg Médiouna	7,011	7,514	8,920 (14,200)	11,051
(4) Echg Médiouna – (5) Rs 114	8,362	9,210	10,657 (18,520)	13,016

source: Internal materials of ADM.

2.3.2 Traffic accidents and deaths

Table 5 shows the rate of traffic accidents and deaths on both expressways (ACS and RPSC) and on National Highway 9. Following the opening of the Casablanca-Settat Expressway in June 2001, the traffic accident rate fell both in terms of percentage of accidents and the percentage of deaths, thereby confirming the expressways' high level of safety. According to ADM, the main causes of accidents were tire blowouts (28%) and speeding (46%), and so it is necessary to further strengthen driver education and regulation.

The accident rate on the South Ring Road is high compared to the figures for the Casablanca-Settat Expressway. The decline in both the accident rate and the fatal accident

rate in 2006 compared to 2005 result from the extension of the fences which were installed to prevent entry onto the expressway together with the addition of three overpasses in 2005..

Table 5: Traffic Accidents on Both Expressways and National Highway 9

	2002	2003	2004	2005	2006
Casablanca-Settat Expressway (ACS)	27.0 (5.8)	27.1 (3.3)	21.2 (2.6)	21.6 (2.7)	24.3 (4.6)
National Highway 9 (RN9)	72.3 (12.0)	64.4 (9.7)	56.4 (13.6)	49.6 (9.8)	73.3 (19.4)
South Ring Road (RPSC)			38.5 (5.5)	39.5 (9.9)	28.2 (6.1)

ACS: Casablanca-Settat Expressway, 57 km.
RN9: Ordinary road parallel to ACS.
RPSC: Casablanca South Ring Road, 27 km.
The upper row is the number of accidents per 100 million vehicle kilometers.
The lower row in parentheses is the number of fatal accidents per 100 million vehicle kilometers.
source: Internal materials of ADM and the chronological table of accident statistics produced by DRCR (Direction Des Routes de La Circulation Routiere).

2.3.3 Time saving

made to measure the change in the length of time to transport goods, which is an objective of both projects. On the Casablanca-Settat Expressway, the travel time was reduced by more than half, from 70 minutes to 32 minutes because the distance is 5 km shorter than the ordinary road and because the traveling speed is faster.. Meanwhile, the South Ring Road is 2 km longer than the ordinary road, but because the travelling speed is faster, the travel time for the entire section was reduced by more than half there as well, from 48 minutes to 20 minutes.

2.3.4 Internal rate of return

The financial internal rate of return (FIRR) at the time of the appraisal was calculated based on construction cost, operation and maintenance cost, debt servicing cost, and taxes, etc as expenses, and toll income as the quantitative benefit. The FIRR for the Casablanca-Settat Expressway Construction Project was 10.5% and for the Casablanca South Ring Road Construction Project was 10.3%. In this evaluation, the FIRR was recalculated using the actual construction cost and the actual cost from 2002 to 2005 of the operation and maintenance cost, debt servicing cost, taxes, and toll income, based on the forecast project life. According to the recalculation, the FIRR of the Casablanca-Settat Expressway Construction Project is 9.8% and the Casablanca South Ring Road Construction Project is -2.1%. The reasons are considered to be as follows. In the

Casablanca-Settat Expressway Construction Project, the traffic volume on the segment south from (3) Berrchide Nord to (6) Settat Sud is extremely low and is less than the volume planned at the time of the appraisal. In the Casablanca South Ring Road Construction Project as well, the traffic volume on the segment is 45% to 70% (2005) of the planned level, and even in 2006, there were no segments where the traffic volume reached 15,000 vehicles/day (i.e., the necessary traffic volume during the first fiscal year of operation to make a toll road project viable).

The economic internal rate of return (EIRR) at the time of appraisal was calculated based on the construction cost and the operation and maintenance cost as expenses and the fuel saved and the reduction in operation and maintenance cost as quantitative benefits. As a result, the EIRR of the Casablanca-Settat Expressway Construction Project was 12.6%. At the time of the appraisal, the EIRR was calculated with reference to the 1995 Feasibility Study report, and because the expressway network plan was subsequently reviewed and revised, it was considered inappropriate to recalculate the EIRR at the time of the ex-post evaluation using the 1995 Feasibility Study report as a basis. Thus, EIRR was not calculated at the time of the ex-post evaluation. Moreover, because the EIRR for the Casablanca South Ring Road Construction Project was not calculated at the time of the appraisal, it was not calculated at the time of the ex-post evaluation.

Table 6: Internal Rate of Return (%)

		Appraisal	Ex-Post Evaluation
Casablanca-Settat Expressway Construction Project	FIRR	10.5%	8.7%
	EIRR	12.6%	n/a
Casablanca South Ring Road Construction Project	FIRR	10.3%	-2.2%
	EIRR	n/a	n/a

2.4 Impact

2.4.1 Resident relocation and land acquisition

At the time of the appraisal, the project site was almost all grassland used for livestock or was unused land, and the number of households to be relocated for the Casablanca South Ring Road Project was approximately 10 households. It was forecast that no major problem would occur with regard to resident relocation and land acquisition, but in fact the land acquisition and resident relocation amounted to 22 household (approximately 110 residents) in the Expressway Construction Project and 27 households (approximately 135 residents) in the Casablanca South Ring Road Construction Project. Land acquisition and

resident relocation was carried out appropriately according to the regulations and customary practices of Morocco, such that the amount of time spent on negotiations to secure the cooperation and understanding of the residents became one factor in the delay of the construction period.

2.4.2 Social and environmental impact

In the plan based on the rough design at the stage of the Feasibility Study, it was forecasted that there would be resident relocation and land acquisition of approximately 10 households dotting the area. However after the detailed design was completed, it was found during the final surveying that some segments would pass through communities. For that reason, in response to the request of the residents, the following additional countermeasure construction was implemented in order to ease travel between divided communities.

-Casablanca-Settat Expressway Construction Project: Construction of additional crossing facilities in 7 locations (box culvert underpasses, overpass bridges), alteration of interchange locations, construction of service roads (side roads) in 13 locations.

-Casablanca South Ring Road Construction Project: Construction of additional crossing facilities in 5 locations (box culvert underpasses, overpass bridges) and alteration of sewer pipe routes, etc.

Following completion of the project as well, three overpasses were additionally constructed, but according to the beneficiary survey (see below), farm households where the road construction made it inconvenient to contact relatives and where access to public services worsened gave the project a negative evaluation overall. However, half of the survey respondents said that accidents have been reduced and safety has increased due to the construction of the limited-access expressway.

2.4.3 Development of the local economy

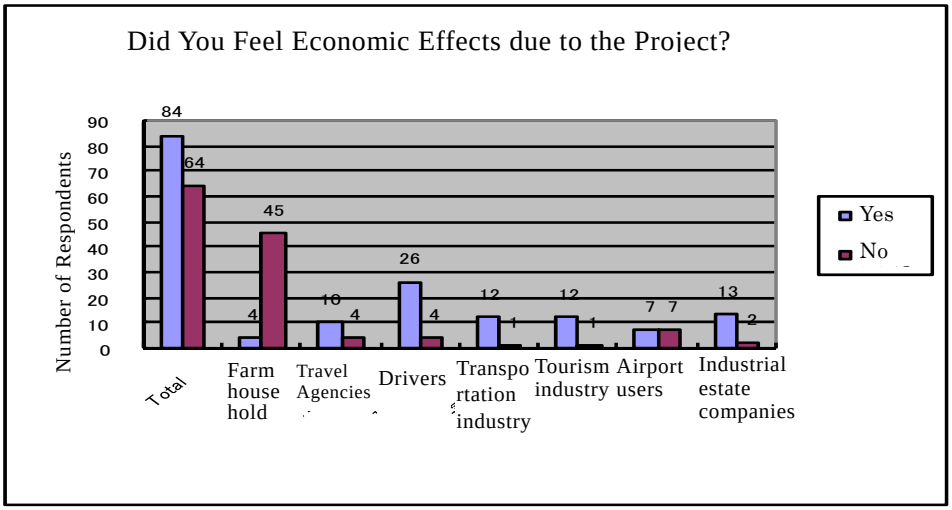
As of 2004, the population of the city of Casablanca was 2,949,805 persons, and the population of Settat was 956,904 persons. Approximately two-thirds of Settat’s population is farming population, but the percentage of urban population is increasing. In Settat, vegetables and grains such as wheat are cultivatedin addition to the production of lentils, which the city ranks second in Morocco for.. The export processing zone (Aeropole) with tax-exempt privileges located on 216 hectares adjacent to the Casablanca International Airport was completed in 1996, and currently 50 US and European companies (hi-tech industries such as airlines, communications, electronics, data, and biotech, etc.) have located there and workplaces for approximately 2000 persons were created. The fact that the travel time by expressway between the export processing zone

and Casablanca is 20 minutes adds to the attractiveness of the site.

In the ex-post evaluation, a beneficiary survey[2)] was conducted in interview form with residents along both expressways constructed by this project, and valid responses[3)] were received from a total of 165 persons. According to the survey, 51% of the respondents (84 persons) highly evaluate the economic effects of the projects.[4)] This is due to the fact that it became easier to develop new markets, distribution became more active, employment opportunities were created, economic exchanges became possible, and industrial estates were built. Of these respondents, 92% stated that the scale of the economy expanded by 10% to 30%. This is supported by statistics which show that, following the completion of the expressways in Settat Province from 2001 to 2004, economic development occurred with a 9% increase in the number of companies, a 10% increase in the amount of exports, and a 15% increase in output.

Starting point of South Ring Road

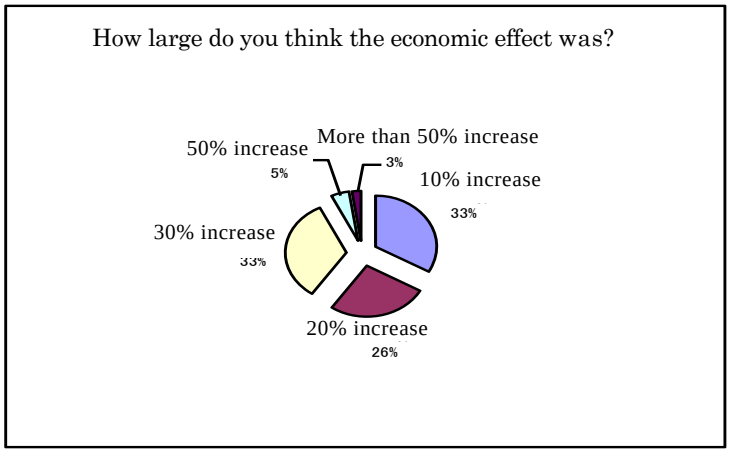
Moreover, it was also clear that 88% of respondents felt their household income had increased due to the new roads.

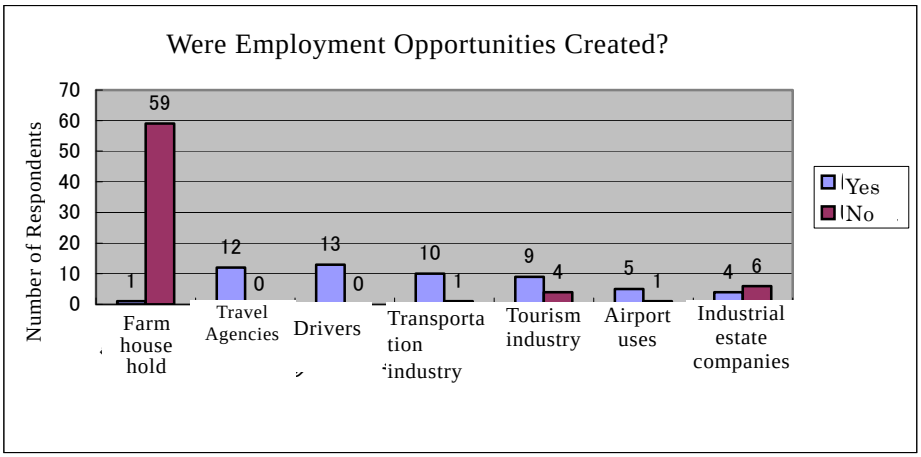


[2)] The survey was implemented during December 3-20, 2007. Of the respondents, 27 (16%) were women.

[3)] The composition ratio of the respondents was 36% farm households, 18% road users, and 9% each from the tourism industry, transportation industry, travel agencies, industrial estate companies, and airport users.

[4)] Refer to "Total" on the left of the bar graph. The totals of "yes" and "no" do not equal 100% because there were respondents who expressed no opinion concerning the economic effects of the project.





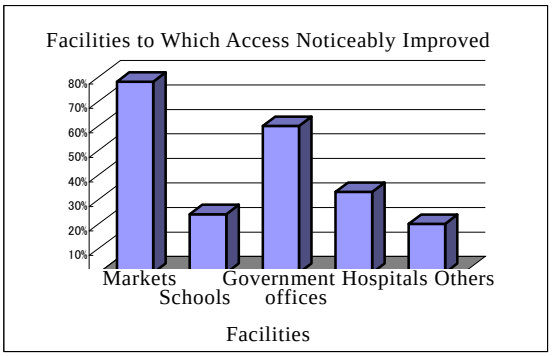
It is clear from the beneficiary survey that some sort of employment opportunities were created by the projects for workers, other than those in farming who did not benefit much from the projects.

A positive response to the effects of the project overall was expressed by drivers, transportation industry personnel, tourism industry personnel, airport users, and industrial estate companies. This is probably because these types of workers can use the maintained expressway for transport of industrial and agricultural products and as a tourism route, to reduce the operation and maintenance expenses and increase the mileage for their transport vehicles, and to enjoy improved access to various public facilities. For example, of the products transported by the survey respondents, 38% are industrial products, 27% are agricultural products, and 15% are food products. Access to public services was improved, with 78% of respondents stating that access to markets improved and 60% stating that access to government services improved.

However, although the projects created some employment opportunities for construction workers during construction and for operation and maintenance staff after completion, the negative aspects of having farmland and the local community divided by the road are

large for the subsistence farmers or small-scale farmers who do not have vehicles, or have only enough surplus produce for the local market.

2.4.3 Impact on natural environment



Mitigation measures for the environmental impact during construction (restriction of construction hours, sprinkling water to reduce blowing sand, setting up of safety equipment, etc.) are stated clearly on the bidding documents, and the construction companies implemented these measures according to the specifications. Moreover, because there was less traffic congestion following the completion of the expressway, 55% of the respondents in the beneficiary survey stated that air pollution had decreased. Regarding noise, 44% stated that it had decreased for the same reason. Approximately 41% stated that the water quality in the surrounding area had improved due to reduced risk of water and soil contamination given the reduction in traffic accidents (which produce oil leakage and chemical spills from overturned vehicles).

Casablanca-Settat Expressway
Berrchide Service Area

Casablanca-Settat Expressway
End-point (Settat)

Thus, there were definite visible effects as a result of the project implementation, and the effectiveness is rated as moderate.

2.5 Sustainability (rating: a)

2.5.1 Executing agency Société Nationale des Autoroutes du Maroc (ADM) (Morocco expressway public corporation)

ADM was in charge of project implementation and is in charge of operation and maintenance of the expressways following project completion.

2.5.1.1 Operation and maintenance system

The headquarters of ADM is in the capital city of Rabat, and the headquarters is composed of an operation bureau, general affairs/finance bureau, development bureau, and a chief engineer department. Under the headquarters, there are six operation centers located across the country, and the Work Division is in charge of construction. The number of staff as of 2006 was 594 persons, with 109 employed at the headquarters, 326 in the operation centers, and 159 in the Work Division. By job level, there are 134 management staff, 408 supervisors, and 52 dispatched staff.

The operation center in Bouskoura supervises both expressways and manages the extension of approximately 250 km near Casablanca (including 18 interchanges). The Bouskoura Operation Center is staffed by 1 manager, 2 engineers, 2 clerical workers, and 18 technicians. Toll collection operations are carried out by approximately 275 non-regular staff. It was confirmed through inspection of the workplace that ADM is conducting road repair, operation, and maintenance appropriately. Moreover, ADM has set operation and maintenance standards and is carrying out regular inspections and repairs according to these standards. Thus, there appear to be no particular problems in the technical capacity of the operation and maintenance units.

2.5.1.2 Technical capacity for operation and maintenance

Although all sessions did not necessarily deal with operation and maintenance, training sessions were held 41 times for 1,360 persons/day (excluding long-term training) in FY2006, at a cost of 997,000 dirhams (DH). Staff hired as toll collectors receive orientation training concerning collection operations and service before initiating their work.

2.5.1.3 Financial status for operation and maintenance

The current condition of both expressways (traffic volume, toll income, income and expenditures) is shown on the following tables.

Table 7: Annual Average Daily Traffic (AADT)

(unit: vehicles/ day)

	2005	2006
Casablanca-Rabat Expressway	30,000	33,000
Casablanca-Settat Expressway (ACS)	15,000	17,000
Casablanca South Ring Road (RPSC)	6,000	9,000

source : ADM's Annual Report.

Table 8: Toll Income by Road

(unit: million DH)

	2004	2005	2006
Casablanca-Rabat Expressway 62 km	195 (37%)	219 (36%)	252 (33%)
Casablanca-Settat Expressway (ACS) 57 km	110 (21%)	122 (20%)	145 (19%)
Casablanca South Ring Road (RPSC) 27 km			
Total Distance 639 km	534	616	754

*Figures in parentheses represent the income from each road as a percentage of ADM's total toll income.

source : ADM's Annual Report.

Table 9: ADM's Income and Expenditures

(unit: million DH)

	2004	2005	2006
Operational income (toll income + other income)	640	681	810
Operational expenses	559	489	612
(expenses for maintenance work and operation)	157(28%)	128(26%)	119(19%)
Operational profit	81	192	198
Profit	-187	-214	-162
Net Profit	-101	-20	35

*Figures in parentheses represent the necessary amount for operation and maintenance expenses as a percentage of operation expenditure.

source : ADM's Annual Report.

Together with the addition to the road extension (639 km as of 2006), income is increasing but operational expenses are also increasing. ADM's account balance moved from a deficit in 2005 to a surplus in 2006. Among the expressway segements that are currently open to traffic, three expressways, namely the Casablanca-Rabat, Casablanca-Settat (ACS), and the South Ring Road (RPSC) (which comprise 23% of the total expressway length) earn fiftysome percent of the toll income. When the segments currently under construction are completed in 2010, it is possible that ADM's balance of accounts will be in tight circumstances.

Of the toll income (per 100 DH) in 2006, 28% was allocated to operation and maintenance expenses, 47% to payment of interest and principal, and 25% to partial repayment of debt processing. Henceforth as unprofitable routes with low traffic volume increase, it is likely to become necessary to devise some sort of measures, such as strengthening of financial support including increased investment by the government in ADM, without relying on loans.

2.5.1.4 Operation and maintenance status

Visual inspection of both roads concerned revealed no particular problems in the condition of the road surface. Each type of periodic operation and maintenance work and daily maintenance work is consigned to privates companies according to the type of work (greenery planting, cleaning, road line painting, etc.). Furthermore, private contractors are selected through bidding, and ordinarily four to five companies participate in the bidding. At this time, only a few years have elapsed since the opening of the roads to traffic, and so simple daily operation and maintenance work is sufficient; however, when large-scale repair work including overlay becomes necessary in 5 to 10 years, doubts remain as to whether adequate financing can be secured. According to the above table of income and expenditures, funds allocated to operation and maintenance are decreasing each year, and it is necessary to take this point adequately into consideration.

3. Conclusion, Lessons Learned, and Recommendations

3.1 Conclusion

Given the above, the evaluation of this project may be said to be high. This is a significant project whose relevance should not be evaluated only according to the profitability of particular segments but rather it should be evaluated based on the fact that the project is consistent with the Moroccan government's plan to construct an expressway network which links major domestic cities and the fact that the project targeted the road segments given the highest priority for investment in the plan.

3.2 Lessons Learned

At the time of the appraisal, it was expected that no large problems were expected to occur in either project regarding land acquisition and resident relocation. However, at several locations along the roads, land acquisition and resident relocation occurred, and problems were caused by the division of local areas as a result of the construction of limited-access expressways through residential areas, necessitating the following measures.

- Casablanca-Settat Expressway Construction Project: Construction of 7 additional crossing facilities (box culvert underpasses and overpass bridges), relocation of interchanges, construction of service roads (side roads) in 13 locations.
- Casablanca South Ring Road Construction Project: Construction of 5 additional crossing facilities (box culvert underpasses and overpass bridges) and alteration of the route of sewer pipes. Furthermore, 3 overpass bridges were installed following the project completion.

Consequently, in addition to the issues of land acquisition and resident relocation/compensation studied in the environmental assessment prepared during the project preparation stage, it is necessary to prepare an action plan based on design plans which reflect the latest local information, disclose information to local residents, conduct adequate advance consultations, and incorporate planning and design of a sufficient number of crossing facilities.

3.3 Recommendations

N.A.

Comparison of Original and Actual Scope

MR-P11 Expressway Construction Project

Item	Plan	Actual
(1) Output		
Existing Roads (4 lanes,12.3 km)	Improvement to expressway standards	As planned
Existing Roads (2 lanes, 8.3 km)	Widening to 4 lanes and improvement to expressway standards	As planned
New Construction of Roads Meeting Expressway Standards	35.8km	32.8km
Construction of Incidental Facilities	5 interchanges, 3 junctions, 4 toll stations, 1 service area in each direction, 1 operation and maintenance facility	Additions: Construction of 7 crossing facilities (box culvert underpasses, overpasses) (additional construction); Construction of service roads (side roads) in 13 locations
Consulting Service	150 million	105.62 million
(2) Project Period	December 1997 – October 2000 (2 years 11 months)	December 1997 – May 2003 (5 years 6 months)
(3) Project Cost (Total Project Cost) Foreign Currency Local Currency Total ODA Loan Portion Exchange Rate	 9,568.00million yen 3,190.00 million yen (353.00 million DH) 12,758.00 million yen 9,568.00 million yen 1 DH = 12.6 yen (as of November 1996)	 7,514.00 million yen 2,507.00 million yen (251.00 million DH) 10,021.00 million yen 7,514.00 million yen 1 DH = 10.4 yen (as of June 2001) 1 DH = 12.2 yen (as of February 2004)

MR-P12 Casablanca South Ring Road Construction Project

Item	Plan	Actual
(1) Output		
New Construction Roads Meeting Expressway Standards	35 km	33.5 km
Construction of Incidental Facilities	4 interchanges, 1 toll station	Additions: Construction of 5 crossing facilities (box culvert underpasses, overpasses) (additional construction)
Consulting Service	144 M/M	98.08 M/M
(2) Project Period	June 1998 – February 2001 (2 years 9 months)	June 1998 – June 2005 (7 years 4 months)
(3) Project Cost (Total Project Cost)		

Foreign Currency Local Currency Total ODA Loan Portion Exchange Rate	7,046.00 million yen 2,882.00 million yen (385.00 million DH) 9,928.00 million yen 7,046.00 million yen 1DH = 12.6 yen (as of November 1996)	4,793.00 million yen 4,318.00 million yen (431.00 million DH) 9,111.00 million yen 4,793.00 million yen 1 DH = 10.4 yen (as of June 2001) 1 DH= 12.2 yen (as of February 2004)