A case study from
Reducing Poverty, Sustaining Growth—What Works, What Doesn’t, and Why
A Global Exchange for Scaling Up Success
Shanghai, May 25–27, 2004

Rural Roads and Poverty Alleviation in Morocco

Hernan Levy, Consultant
Social and Economic Development Department
Middle East and North Africa Region
The World Bank
1818 H Street, N.W.
Washington, DC 20433
E-mail: Hlevy@worldbank.org

The findings, interpretations, and conclusions expressed here are those of the author(s) and do not necessarily reflect the views of the Board of Executive Directors of the World Bank or the governments they represent. The World Bank cannot guarantee the accuracy of the data included in this work.

Copyright © 2004. The International Bank for Reconstruction and Development / THE WORLD BANK
All rights reserved. The material in this work is copyrighted. No part of this work may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or inclusion in any information storage and retrieval system, without the prior written permission of the World Bank. The World Bank encourages dissemination of its work and will normally grant permission promptly.
Executive Summary

About half of Morocco’s 30 million people, and more than 70 percent of the poor, live in rural areas. Through investments in rural roads and other infrastructure and social programs, the government is making efforts to improve the lot of the rural population.

Until the mid-1990s, the focus of highway planning and investment was on the main roads that connect large cities and carry the heaviest traffic. This approach responded to clear economic priorities and represented a sound allocation of resources. However, the increase in rural poverty in the 1990s and the limited progress in improving rural accessibility indicated the need for a strategy to address these two issues simultaneously.

Dimensions of rural poverty in Morocco

The rural poor in Morocco have an illiteracy rate of 67 percent, compared with 34 percent in urban areas. They live disproportionately in isolated areas; more than half the villages lack access to all-weather roads. Rural households derive their income from multiple sources within the rural economy, and women are disproportionately affected by poverty, as reflected by the fact that 9 out of 10 rural women are illiterate.

Rural Morocco is underserved with respect to infrastructure. Access to water and sanitation and to electric power is limited to about 40 percent of the rural population. Year-round and relatively easy access to rural roads is confined to only about 43 percent of all villages; the remainder have either difficult access and are subject to seasonal isolation (35 percent) or are completely inaccessible to motorized vehicles at all times (22 percent). Rural road accessibility in Morocco can take different forms; it is made especially difficult by frequent floods that cut roads to traffic for hours or days at a time, and by severe mountainous topography.

Scaling up access to rural roads—the National Rural Roads Program

The first National Rural Roads Program (NRRP-1) was launched in 1995. The program was intended to upgrade a selected group of roads to all-weather condition. Due to be completed in 2005, the NPRR-1 has brought construction or improvement of more than 11,000 kilometers of roads—about 20 percent of the country’s roads.

The criteria for defining priorities for the country’s rural road strategy were economic efficiency, degree of accessibility of the areas served by the road, the importance of the road in serving social and administrative centers, and the agricultural potential of the road’s area of influence. Contribution to financing by the local communities has also influenced selection of priorities in a few areas.

A second phase of the program, NRRP-2, will scale up these efforts in three major ways. First, the objectives will be defined in terms of the population served rather than the kilometers of roads built, with the aim of increasing the percentage of rural population given access to all-
weather roads. Second, the process will be altered to substantially increase and formalize the level of participation by the local government. Finally, the pace of construction and improvement will be accelerated, so that the works will be completed in five rather than ten years.

The poverty impact of rural road investments

The key effects of investment in rural roads are found in four main areas. In transport, improved roads mean less time to reach markets and services, reduced costs, and increased quality and frequency of services. In agriculture, they mean increased overall levels of agricultural activity and a land-use shift by farmers from low-value cereals toward higher-value fruits and orchards. In health and education, improved roads have resulted in doubled enrollment in primary education over ten years and a significant increase in visits to primary health care facilities and clinics. The quality of education and health services also improved, as greater accessibility made it easier to recruit teachers and medical staff. Improved roads also have an effect on gender inequality: enrollment of girls in primary education increased significantly more than that for boys; women gained the most in the increased number of visits to health services; and the welfare of women has improved from the introduction of butane gas for cooking made possible by better roads (which allowed them to stop the daily two-hour chore of collecting firewood) and from increased employment opportunities.

Beneficiaries of the improved roads are the users of services, especially villagers accessing clinics and other health services, students attending schools, and people accessing community services. Providers of services benefit because they can introduce new services, save in operating costs, and increase frequency of services. Producers, especially farmers, benefit both from better access to fertilizers, pesticides, and extension services, and from better conditions for the marketing of their produce. Providers of social services, notably health and education, benefit because better accessibility makes it easier to recruit and retain personnel (nurses, doctors, and teachers) and to get supplies of medicines and school materials. Nonusers also benefit: the transformation of the agricultural economy, together with improved supply of domestic inputs such as butane, allow the rural population, especially women, to make better use of time, including obtaining on-farm and off-farm employment.

A survey carried out in 2002 among key stakeholders of a sample of improved rural roads found responses consistent with the impacts described above. Survey responses regarding the positive effects of the rural road construction and of rural road improvements (the negative responses were negligible), gave the highest ratings to improvement of transport services, better access to schools, better access to health services, and improved supply of foodstuffs and other basic necessities.

Government commitment to rural roads programs

Until the launching of the NRRP, government funding to develop rural infrastructure was very limited. Annual road construction during the 1988–94 period was on average 280 kilometers per year. To launch the NRRP, the government increased the resources of the Road Fund (itself
replenished from gasoline and other user charges) allocated to rural roads. It also modified the text of the Road Fund to allow it to reimburse loans contracted by entities such as the Agence du Nord, which is developing rural roads in the North. At the same time, the government has increased the resources available for transfer to the local governments, making it possible to increase local contribution to the financing of rural roads in their jurisdictions.

Surveys and studies by the highway agency of the impact of rural roads, and the dissemination of their findings, have likely been influential in expanding the public understanding of the benefits of improving rural roads. For example, a socioeconomic impact study carried out in 1998 of two roads improved under the NRRP showed an interesting result: one of the roads produced mainly economic benefits, while the other generated mainly social benefits. Some of the more striking impacts, achieved in at least one of the two roads, include doubling the frequency of service of public transport, doubling the number of visitors to the local market, and reducing the transport cost to the main social services by more than 33 percent.

**Institutional innovation**

The government’s emphasis on improving accessibility to rural infrastructure has also encouraged the highway agency to make innovations in the way it sets the objectives of its rural roads programs. While the NRRP-1 program aimed to achieve physical targets, the follow-on program, NRRP-2, will set targets based on the number of people that will benefit from improved accessibility to reliable roads. This represents a profound change in the thinking of the highway agency that will certainly influence how highway staff plan future developments of the sector.

On the institutional side, in addition to adopting accessibility as a target, the NRRP-2 is expected to (i) strengthen participation by the provinces and communes in the planning of rural roads, which will elicit a stronger commitment to maintenance; (ii) strengthen management capacity by the local communities of their roads, supported by a new system of agreements between the ministry responsible for roads and the provinces for the financing and maintenance of local roads; and (iii) monitor and disseminate at the provincial level rural roads programs that will make planning and executing these programs more transparent and will allow better integration of rural road programs with other sectors and activities planned at the local level.

**The role of local governments and rural communities**

Planning and constructing rural roads until 1994 involved very little participation by local governments. Participation improved radically during the preparation of the NRRP. Since the 1990s, local governments at various levels have contributed financially to the rural roads programs; the participatory process will be further strengthened under the NRRP-2 program, which foresees a stronger and more formalized contribution at the local level in the financing of the improvement and maintenance of the rural roads. It is expected that agreements will be signed between the highway agencies and the provincial governments (with all municipalities represented) as well as between the highway agency and the central government agency responsible for local governments.
External catalysts

The need to develop Morocco’s rural road network and to better understand the benefits of rural roads has been recognized by external financiers. For example, a World Bank highway project with a component of rural roads has recently been completed, and a follow-up project to support the NRRP-2 program is in preparation.

The Bank is also providing technical analysis and assistance through such means as the 1996 study of the impact of the rural roads and a follow-up workshop on the study. These have been instrumental in understanding the impact of rural roads and in helping gain support for better-targeted road sector interventions. Morocco’s highway agency has incorporated the use of surveys to assess the impact of their works and extended the conventional ex-post analysis to cover the social and economic effects of such investments.

Two other international agencies, the European Investment Bank and the French agency for international cooperation, are helping to develop Morocco’s rural roads. These two agencies are working with Morocco’s Northern Development Agency.

Main lessons learned

The first lesson is that the impact of rural roads is broad and touches a variety of sectors and services. Although many impacts can be predicted, others are more difficult to anticipate and are very dependent on local conditions. This was the case in Morocco, with two unsuspected but positive effects: a sharp increase in school enrollment, especially for girls; and a dramatic effect of freeing women from the daily chore of collecting firewood for cooking, a result of the introduction of butane, itself made possible by a sharp drop in transport costs and improved accessibility.

The next lesson is that changing objectives from road construction to improved accessibility for the rural population allows the program to better target the rural poor. The strategic shift toward accessibility rather than physical outputs makes it more likely that road services will be made available for the less-accessible populations, which normally include a higher proportion of the poor.

A third lesson is that local governments can participate effectively in the planning process for rural roads programs even if responsibility for developing and implementing the program is vested with the national highway agency.
OVER the last ten years, the Moroccan government has dramatically increased its attention to addressing rural poverty, and has made a big effort to allocate adequate resources to this endeavor. A key element in this effort has been improving the rural population’s access to essential infrastructure, including water supply, electric power and roads. The needs of the rural population were evident: more than 50 percent of them, and in some areas close to 80 percent, did not have access to that infrastructure.

Until the early 1990s, the “highway strategy” of the government was to improve, through some new construction but mostly through maintenance or rehabilitation, roads connecting the main cities and carrying the highest traffic volumes. This highway investment policy was irreprouachable from an economic point of view – it produced the highest returns for the resources invested. In a few of these roads, the improvements reduced transport costs for long-distance traffic and provided the rural population along the road with reliable year round access.

A first major leap in the importance given to developing rural roads happened in the mid-1990s. Increasingly concerned with the bad living conditions in rural areas, where most of Morocco’s poor are to be found, the government initiated several infrastructure programs targeting the rural population. In the road sector, the result was the launching in 1995 of the (first) National Program of Rural Roads (NPRR-1).

However, rural roads offered a special challenge, and preparing the NPRR-1 was a complex task. Roads are a means for people to reach social services and markets. They may be of many different technical standards, each standard possessing a distinct quality regarding ease of use, cost, safety and, of especial importance for the rural world, reliability. A rural area may be seen on a map as being served by a road, but in Morocco most such roads are just dirt tracks impassable most of the time by motor vehicles. While providing a village with a water well is often the ‘end of story’, providing a village with a nice road is often just the ‘start of the story’: the road will be of little use if it does not connect to other roads that are also in good condition. Road connectivity is essential to bring food, materials and agricultural inputs, or spares for the water well motor, at affordable prices, and to provide access to more social and administrative services. This was exactly the situation in Morocco.

Preparation of the NPRR-1 started with the carrying out of an inventory of all roads throughout the country. This was a huge task, involving visits to thousands of villages and kilometers of roads. The condition of some of the roads was so poor, that even all terrain vehicles could not visit 15 percent of the road listed in the inventory during the dry season.

The resulting NPRR-1 was an ambitious program. It envisaged the construction or improvement of about 11,000 kilometers of roads, or about 20 percent of the country’s road network managed by the national highway agency. Overall, about 55 percent of the program comprised improvement of existing roads, and 45 percent was new construction. The NPRR-1 program is expected to be completed by 2005, and plans for a second program, NPRR-2, which will scale up the efforts under the first program, are currently being prepared by the Moroccan government.
Dimensions of Rural Poverty in Morocco

Located on the extreme northwestern corner of Africa, Morocco’s area (about 450,000 square kilometers) is comparable to France’s or Sweden’s. The country’s population is about 30 million, of which close to 50 percent live in rural areas. Per capita income, about US$1,200, grew at a modest 1.3 per year during 1992-2002, although growth in the last 2 years was substantially higher. Rural inhabitants have received less benefit from the country’s economic growth over the past decade than urban dwellers. A result is that over 70 percent of the poor live in rural areas. The government, through investments in rural roads, combined with other infrastructure and social programs, is making efforts to improve the lot of the rural population.

According to the most recent counts (1998/1999), about 19 percent, equivalent to 5.3 million people, of Morocco’s population are estimated to live below the poverty line, and 44 percent, equivalent to 12 million, are considered “economically vulnerable” (at or below 150 percent of the poverty line). Poverty increased over the 1990s, since the corresponding numbers in 1990/1991 were 3.4 and 9 million. Poverty is mainly rural with almost two thirds of the poor living in rural areas and almost one quarter of the rural population being poor.

Rural poverty is concentrated in the Center and Northwest regions. The rural poor live in large households, with few working members, and have an illiteracy rate of 67 percent, compared to 34 percent in urban areas. They also live disproportionately in isolated areas, with more than half the villages without access to all weather roads. Rural households derive their income from multiple sources within the rural economy: agricultural own-production, production for the market, sale of labor in rural markets, rental of productive assets, and sale of crafts and other small-scale manufactures. While the rural poor often engage in one or more of these activities, they do so at a minimum level that generates little income.

Poverty also disproportionately affects women, especially in the rural areas. Their access to health and education services is limited with the result that their health and education status is highly deficient. In terms of education, 67 percent of women are illiterate compared to 41 percent of men. In the rural areas, 9 out of 10 women are illiterate and 58 percent of children that are either non-schooled or school dropouts are girls. In reproductive health, the rate of contraceptive prevalence is 58 percent. The fertility rate is 3.1, and the average number of children per woman is 6.7 for women without any education, 4.9 for those with a basic education, and 2.5 for those with higher education. The rate of prenatal consultations is 42 percent, of which only 20 percent in the rural areas. Maternal mortality is high at 228 deaths for 100,000 live births. The participation of women in economy is low, with women making up 24 percent of the active population. They are mainly relegated to tasks revolving around the family, housework, domestic services or the informal sector. The rate of female unemployment has increased in the 1990s and is at 19 percent. Women’s access to different monetary, education, cultural and basic infrastructure and resources remains weak.

There are large differences among provinces in the level of per capita income. The government is aiming to help the poorest regions by improving the access of their rural population to basic infrastructure and social services. To this end, the government has launched several programs in infrastructure and social areas to: (a) promote sustained growth, and (b) improve the efficiency and quality of public expenditures in social services that benefit the poor directly. Acceleration of rural infrastructure programs (electricity, potable water, roads) and increased participatory rural development programs are among the key elements in the policies for poverty reduction. The government strategy is consistent with the conclusions of a World Bank review\(^3\) in 2002 of rural development that found the causes of the worsening rural poverty to be:

- Lack of agricultural growth, most likely caused by poor policies, drought and low producers’ prices
- Slow progress of programs to improve rural access to potable water, roads, education and health
- Absence of pro-poor public investment
- Lack of an adequate rural social safety net

### Accessibility and the Rural Road Network

Access to rural infrastructure and services is a serious problem in Morocco. Access to water and sanitation (W&S) and to electric power is limited to about 40 percent of the rural population. Year round and relatively easy access to rural roads is confined to only about 43 percent of all villages, with the remainder having either difficult access and subject to seasonal isolation (35 percent) or being completely inaccessible to motorized vehicles at all times (22 percent).\(^4\)

There are large differentials among provinces in the population’s access to rural road, ranging from about 75 percent for the better provinces to about 20 percent for the more isolated provinces. Rural road accessibility in Morocco is made especially difficult by two factors: frequent floods that cut roads to traffic for hours or days at a time, and severe mountainous topography.

The road accessibility problem can take different forms. Isolated rural households normally do not have a decent road connection to even the closest village, impeding their access to markets, jobs and services. Conversely, a rural household may be well linked to the closest village, but the village may itself be isolated and poorly linked to main roads connecting to cities or other urban centers. A rural road may be passable some days, but not others, depending on weather conditions, type of road surface and quality of maintenance. Or, a road may be passable

---


\(^4\) Villages also include other smaller or larger population centers.
by one type of vehicle, for example, a four-wheel drive and a motorcycle, but not by a car or a truck. When a road is not passable, it does not provide access. In all cases, it is important to go beyond distance from roads alone as a measure of access since topography, water crossings, climate and other factors may be equally important factors. Still, the problem of rural road accessibility in Morocco essentially stems from the low density of its road network (see Table 1).

Table 1: International Comparison of Road Density

<table>
<thead>
<tr>
<th>Country</th>
<th>Road density (area) (km/1,000 sq km)</th>
<th>Road density (population) (km/1,000 people)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tunisia</td>
<td>150</td>
<td>2.57</td>
</tr>
<tr>
<td>France</td>
<td>1,620</td>
<td>15.13</td>
</tr>
<tr>
<td>Peru</td>
<td>70</td>
<td>2.91</td>
</tr>
<tr>
<td>Morocco</td>
<td>90</td>
<td>2.17</td>
</tr>
</tbody>
</table>

The National Rural Roads Program

As mentioned in the introductory section, until the mid-1990s, the focus of highway planning and investments was on the main roads, those connecting the large cities and carrying the heaviest traffic. This approach responded to clear economic priorities and represented a sound allocation of resources. However, the increase in rural poverty in the 1990s, and the limited progress in improving rural accessibility, indicated the need for a well-designed strategy and a plan to improve the rural population access to roads.

Designing a rural road strategy is a complex task that involves a multiplicity of variables. At the same time, tradeoffs dictated by scarce investment resources required the establishment of criteria for identifying priorities and defining the location, type and standards of the rural roads. Many questions needed to be considered. What population should be targeted first, and based on what criteria? How to treat populations living in highly geographically dispersed households, requiring a very high cost per unit population served? What definition should be used to measure rural road accessibility? What type of road facility to provide, and would this depend on road construction and maintenance conditions, such as topography, climate, rainfall, exposure to floods (common in Morocco). How to involve the local governments and population in the preparation of the strategy and plans, to ensure fairness, equity and ownership of the plans? Who would be responsible for the management and maintenance of the newly improved or built rural roads? Would such investments be sustainable, that is, would the road assets be properly maintained to ensure that the benefits they provide endure? What should be the relative priority between roads that provide access to isolated communities, but that are not connected to the rest of highway system, and those that strengthen the connectivity of the national road system?

While some of the above questions could be answered with relative ease, most were not easily resolved, or led to mutually exclusive courses of action, therefore requiring the adoption of

---

5 M. Rmili et Mme Benaziz (2002). La Performance d’un Réseau Routier a travers l’Accessibilité et la Mobilité, 6ème Congres National de la Route, Agadir, Maroc.
compromises. Some criteria could be established a priori based on clear evidence of economic efficiency or equity. Investments oriented to improve accessibility of the rural population to markets and services, when not justifiable on purely economic terms, must at least respond to cost-effectiveness criteria. Roads that connect to the rest of the road system, in addition to providing rural road accessibility, should be preferred to roads that do not connect to the road system. In fact, an important benefit of improving accessibility at the local level is the potential offered the rural population to reach transport services that connect with regional or national services and markets. Roads whose maintenance is in doubt risk being a waste of resources, and therefore should not be undertaken unless satisfactory assurances exist about their maintenance. For equity reasons, reducing the accessibility differential between the most accessible and the less accessible provinces is clearly a factor for assigning priority in rural road investments.

At the outset, a key government decision was to entrust the national highway agency, working in close consultation with the local authorities, with the responsibility for designing and implementing the rural roads strategy and plans. In view of the worldwide trend and of Morocco’s own policies towards decentralization, external observers may question the institutional location of the task. However, conditions in Morocco, and specifically as related to rural roads, indicated that a decentralized approach, that would have been spatially-focused at the provincial level, was not appropriate. There are two main reasons for this. First, little practical progress has been achieved in the decentralization process. In particular as regards roads, local agencies have little autonomy and are endowed with very minimal financial and technical resources to plan and construct roads. In fact, they barely assign any resources to the maintenance of the existing local roads. Second, such agencies are even less equipped for the planning of networked utilities such as roads; rural roads priorities decided purely at the local level would not take into account essential connectivity requirements of Morocco’s road system.

The outcome of the above analysis was the launching in 1995 of the first National Rural Roads Program (NRRP-1). The intention of this Program was to upgrade to all-weather condition, including pavement in some cases, a selected group of roads in poor condition. An inventory showed that about 50 percent (29,000 kilometers out of 57,000 kilometers) of the classified road system were unpaved, often were just tracks, and that there were an additional 9,000 kilometers of similar roads that were not part of the classified road system. Altogether, there were some 38,000 kilometers of roads as potential candidates for improvement. Of this ‘universe’ of roads to consider for improvement, 80 percent were basic unengineered tracks, and the remaining 20 percent had some basic road platform. Thirty percent of these roads and tracks were impassable by a motorized vehicle more than 30 days per year. Overall, the NRRP-1, based on resources available and priorities as explained below, identified some 11,000 for improvement. Of these, about 6,000 kilometers were to be improved to all weather condition but not paved, and 5,000 kilometers were to be paved.

The criteria for defining priorities included economic efficiency (return on the investments), degree of accessibility of the areas served by the road, the importance of the road in serving social and administrative centers, and the agricultural potential of the road’s area of
influence. Contribution to financing by the local communities also influenced selection of priorities in a few areas.

**Scaling-Up Access to Rural Roads**

The design of the NPRR-1 featured the construction and/or improvement of over 11,000 kilometers of roads, or about the 20 percent of the country’s road network. Table 2 shows the distribution of roads by region.

**Table 2: The NPRR-1 - Regional Distribution and Type of Investment (kilometers)**

<table>
<thead>
<tr>
<th>Region</th>
<th>Construction</th>
<th>Improvement</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>South</td>
<td>1,647</td>
<td>1,126</td>
<td>2,773</td>
</tr>
<tr>
<td>Tensift</td>
<td>493</td>
<td>809</td>
<td>1,302</td>
</tr>
<tr>
<td>Center</td>
<td>764</td>
<td>1,205</td>
<td>1,969</td>
</tr>
<tr>
<td>Northwest</td>
<td>611</td>
<td>652</td>
<td>1,263</td>
</tr>
<tr>
<td>Center-North</td>
<td>800</td>
<td>893</td>
<td>1,693</td>
</tr>
<tr>
<td>Oriental</td>
<td>374</td>
<td>586</td>
<td>960</td>
</tr>
<tr>
<td>Center-South</td>
<td>460</td>
<td>816</td>
<td>1,276</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5,149</strong></td>
<td><strong>6,087</strong></td>
<td><strong>11,236</strong></td>
</tr>
</tbody>
</table>

The NPRR-1 is due to be completed in 2005. In the meantime, preparation of a second phase of the program, labeled NPRR-2, is underway. This new program will scale-up the efforts under the preceding program in three major ways, involving the objectives, the process, and the output:

- **The program objectives will be defined in terms of the population served, rather than the kilometers of roads built.** The target will aim to increase the percentage of rural population given access to an all-weather road from about 50 percent at the start of the program, to 75 percent when the program is completed. Under NPRR-1 objectives were defined in terms of physical outputs; that is, kilometers of roads improved or paved. Improvements in accessibility were monitored and considered a valuable consequence of the program. In contrast, in the NPRR-2, improved accessibility overall of the rural population, and a reduction in accessibility differential between the more accessible and the less accessible regions, are explicit objectives.

- **The level of participation by the local government will be substantially increased and formalized.** The NPRR-2 will be divided into individual Provincial Master Plans, which will only be finalized after they are discussed and approved by the respective provincial authorities. At the same time, these authorities, and all the communes in the province, will sign an agreement with the central government agency in charge of the road program formalizing the commune’s financial contribution to the program, and their commitment to properly maintain the local roads that will be improved under the program.
The pace of construction and improvement will be accelerated. While the number of kilometers to be improved will be about the same in each program, the second program intends to complete the works in 5 rather than 10 years it will have taken the first program.

The Poverty Impact of Rural Road Investments

No large scale systematic study exists of the impact or rural roads investments on poverty in Morocco. However, some indicative data and analysis are available and may be used to make an initial assessment of government efforts in this area. For example, though not directly related to the NPRR, a study conducted by the World Bank found that improved roads generated substantial positive impacts on transport, agriculture, health, education and gender. ⁶ The key impacts, described in more detail below, can be summarized as follows:

**On transport**
- lower time and better mode of transport to reach markets and services
- reduced transportation costs (up to 50 percent in some cases)
- increase in quality and frequency of commercial (passengers and freight) transport services

**On agriculture**
- overall levels of agricultural activity increased in volume of production, productivity of the land, and monetary values of the output.
- farmers shifted land use from low-value cereals towards higher value fruits and orchards, thanks to the reduced perishability risks resulting from the year-round operability of the roads

**On health and education**
- enrollment in primary education doubled over a 10-year period, substantially more than in the control areas; similarly, there was a significant increase in visits to primary health care facilities and clinics
- the quality of education and health services improved, as improved accessibility made it possible to recruit teachers and medical staff

**On gender**
- enrollment of girls in primary education increased significantly more than that for boys
- women gained the most in the increased number of visits to health services

---

women welfare improved from the introduction of butane gas for cooking made possible by better roads, which allowed them to stop the daily two-hour chore collecting fuelwood, and from increased employment opportunities.

The study used “before and after” and “with and without” (unimproved roads nearby used as control) analysis and comparisons, and the results obtained offer useful illustrations of the impacts of road improvements. Focus groups with key stakeholders helped to interpret the data. More details about the study methodology, and of its limitations, are provided in Annex 1. A survey of stakeholders carried out in 2002 regarding the effects of rural roads improved in the late 1990s, received responses consistent with the findings of the impact study.

**Transport infrastructure and services**

All four roads studied were improved from an originally deteriorated gravel or unengineered track condition to an asphalt surface (mostly 4-meter paved width). The most direct impact was the elimination of frequent road closures during rainy periods, as the improved roads became open to traffic year-round (Tables 3 and 4).

**Table 3: Road Conditions in 1982, Before Project**

<table>
<thead>
<tr>
<th>Region</th>
<th>Traffic (veh/day)</th>
<th>Surface</th>
<th>Periods of Road Closure</th>
</tr>
</thead>
<tbody>
<tr>
<td>North</td>
<td>40</td>
<td>gravel, poor condition</td>
<td>about 90 days</td>
</tr>
<tr>
<td>Center</td>
<td>150</td>
<td>unengineered track</td>
<td>about 60 days</td>
</tr>
<tr>
<td>South</td>
<td>54</td>
<td>gravel, poor condition</td>
<td>during rainy season</td>
</tr>
</tbody>
</table>

**Table 4: Road Conditions in 1995, After Project**

<table>
<thead>
<tr>
<th>Region</th>
<th>Traffic (veh/day)</th>
<th>Traffic growth (percent/year, since 1982)</th>
<th>Surface</th>
<th>Periods of Road Closure</th>
</tr>
</thead>
<tbody>
<tr>
<td>North</td>
<td>640</td>
<td>23.8</td>
<td>bitumen, 4-5.5m</td>
<td>nil</td>
</tr>
<tr>
<td>Center</td>
<td>275</td>
<td>4.8</td>
<td>bitumen, 4 m</td>
<td>nil</td>
</tr>
<tr>
<td>South</td>
<td>192</td>
<td>10.3</td>
<td>bitumen, 4 m</td>
<td>nil</td>
</tr>
</tbody>
</table>

The road users benefited in several other ways: (a) the cost of operating vehicles dropped, leading to lower prices for freight and passenger services than in the roads not improved; (b) traffic on the project roads increased at higher rates than before the improvement, and included larger and higher-efficiency trucks; (c) the supply of interurban passenger services increased substantially, especially share-ride taxis offering frequent service, whereas in the past the only service was a rural bus offering as little as one run a day; and (d) ownership of motorized vehicles increased.

The transport time between the rural population and markets and social services fell drastically. In some cases, the time to reach county and village administrative offices, agricultural extension personnel and rural markets, was cut by at least 50 percent (see Figure 1). This
improvement was the result of better roads and, in some cases, of new facilities, whose construction was made possible in part by the improved roads.

The improvement in the roads resulted in a significant reduction in the cost of operating vehicles, often leading to lower transport rates offered by commercial trucking services. For example, data from a focus group for the two Southern routes showed that the rate for a truckload of merchandise between two population centers some 10 km apart went down from 300 Dh\(^7\) before the project to less than 150 Dh once the road was improved. In some cases, the reduction in the price of transport services paid by the local population was purely due to the better surface condition, which resulted in lower operating costs for the vehicles. In other cases, transport prices decreased for many road users because the improved road completed a long-distance link that was substantially shorter than the existing road.

Another benefit was an increase in the quality and frequency of commercial transport services. For example, focus groups in the Southern region noted that before the road improvement the only passenger service was a daily run of a rural bus. After the improvement, a fleet of some 40 share-ride taxis served these roads, with a frequency of several taxis per hour.

Survey data also revealed that annual transport costs of farming inputs (fertilizers, herbicides, seeds) per unit of cultivated area decreased drastically in the project area in the Northern road compared to the control areas. The annual transport cost of agricultural products to markets decreased in both the project and the control areas between 1985 and 1995, but the gains were substantially greater in the project than in the control areas (Figure 2).

\(^7\) Dh=Dirham, local currency. In 1997, US$1=9.5 Dh.
Figure 1: Reaching Markets and Services: Modes of Transportation and Time Traveled (hours), Aggregated for the three provinces in project zones only\textsuperscript{8}

<table>
<thead>
<tr>
<th>Mode of Transport</th>
<th>1985</th>
<th>1995</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horse Taxi</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Horse Walk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Horse Walk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Horse Horse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Horse Horse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walk Walk</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 2: Transport Costs of Agriculture Inputs and Outputs per Unit of Cultivated Land in Northern Region

\textsuperscript{8} Souk is the local name for market. In rural areas, souks rotate about once a week per location.
Household transport expenditures over the 10-year period to 1995 increased (in current Dh) in both project and control zones, but substantially more in control zones (188 percent), despite a larger increase in annual household expenditures in project zones (148 percent) than in control zones (87 percent). At the same time, improvements in the agricultural economy and in social indicators were also better in the project zones. Generally, higher household expenditures and better overall social welfare lead to higher transport expenditures, but this did not happen. A likely reason is that improvement of the roads caused transport prices, in current terms, to increase less in the project zones than in the control zones, even as the quality and frequency of road transport services improved more in the project zones.

Overall, motorization in the project zones increased. Ownership of cars increased about 3 times, reaching in 1995 one car per every 10 farms, compared to one car per every 30 farms in the control zone. Ownership of trucks followed a similar pattern, increasing in the project areas about threefold, to reach in 1995 one truck for every 11 farms, compared to no change in the control zones, where truck ownership remained close to zero.

**Agriculture**

The study found that in the road project areas overall levels of agricultural activity increased in volume of production, productivity of the land, and monetary values of the output. The agricultural production mix was transformed as farmers were able to shift land from low-value cereals to high-value fruit and orchards, which yield higher profits, thanks to the reduction in perishability risks brought about by the better quality and year-round operability of the roads. In two of the three study regions, land used for vegetables and fruits increased by more than 40 percent over the study period.

**Figure 3: Changes in Agricultural Productivity (Output per Unit of Cultivated Land) in Project Areas Between 1985 and 1995 (percentage change)**

The transformation of the agricultural economy followed the well-known Von Thunen model according to which the "economic" distance to market decreases as roads are improved, encouraging farmers to replace grains with vegetables, which yield higher profits but whose perishability requires reliable and speedy transport.
Other agricultural effects included livestock production shifting towards pure-breed cows; increased use of modern agricultural inputs, especially fertilizers, as improved transport made distribution channels better; and increased use of agricultural extension services by small farms (by more than four times over the project period). The shift to higher-value products, combined with improved yields for traditional crops, raised the value added per unit of cultivated land.

**Figure 4: Changes in Agricultural Value-Added (Dh per Unit of Cultivated Land) in Project Areas Between 1985 and 1995 (percentage change)**

Improvements in the agricultural economy led to related changes in workloads, employment on farm and establishment of new shops. These changes followed different patterns depending on the regions. Off-farm employment grew overall by more than six times in the project zones (compared to about three times in the control zones) and across all three regions. The study found that agricultural practices in the control zones, which did not benefit from improvements, remained essentially the same during the decade covered by the study.

**Overall Social Impacts**

The surveys showed that while enrollment in primary education increased throughout all areas covered by the study, the gains in the areas served by the project roads, where enrollment more than doubled between 1985 and 1995, was substantially higher than in the control roads. In parallel, the quality of education improved, as it became possible to recruit teachers to staff the schools, and absenteeism of both teachers and students dropped.
Table 5: School Attendance (ages 7 to 15), in Project Zone, Before and After Project (percentages)

<table>
<thead>
<tr>
<th>Region</th>
<th>1985</th>
<th>1995</th>
<th>Percentage Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Regions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>39</td>
<td>81</td>
<td>108</td>
</tr>
<tr>
<td>Girls</td>
<td>17</td>
<td>54</td>
<td>220</td>
</tr>
<tr>
<td>Northern</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>49</td>
<td>81</td>
<td>65</td>
</tr>
<tr>
<td>Girls</td>
<td>10</td>
<td>38</td>
<td>287</td>
</tr>
<tr>
<td>Central</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>44</td>
<td>85</td>
<td>93</td>
</tr>
<tr>
<td>Girls</td>
<td>26</td>
<td>67</td>
<td>162</td>
</tr>
<tr>
<td>Southern</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>34</td>
<td>80</td>
<td>134</td>
</tr>
<tr>
<td>Girls</td>
<td>15</td>
<td>52</td>
<td>250</td>
</tr>
</tbody>
</table>

The findings on education corroborated those of a 1994 study\(^9\) of standard of living throughout Morocco, notably that: “The presence of a paved road increases school participation for both boys and girls. When there is no paved road in a community, the school attendance is 21 percent for rural girls and 58 percent for rural boys. In contrast, the rate increases to 48 percent for rural girls and 76 percent for rural boys if there is a paved road in the community.”

The rural population also nearly doubled its use of health care facilities (hospital and primary care) and, like education, the quality of health services was enhanced as the supply of medicines improved, health officials launched a campaign to staff rural health care centers with doctors, and immunization and other health prevention programs became easier to implement (see Table 6).

---

Table 6: Changes in Frequency and Distances to Health Services in Project and Control Zones, Before and After Project, for all Three Regions Aggregated\textsuperscript{10}

<table>
<thead>
<tr>
<th></th>
<th>Infirmary</th>
<th></th>
<th>Health Centers</th>
<th></th>
<th>Hospitals</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Distance</td>
<td>Frequency of visits</td>
<td>Distance</td>
<td>Frequency of visits</td>
<td>Distance</td>
<td>Frequency of visits</td>
</tr>
<tr>
<td></td>
<td>(km)</td>
<td>(days/year)</td>
<td>(km)</td>
<td>(days/year)</td>
<td>(km)</td>
<td>(days/year)</td>
</tr>
<tr>
<td>Project Zone</td>
<td>Before</td>
<td>2.3</td>
<td>20.7</td>
<td>2.8</td>
<td>60</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>After</td>
<td>2.5</td>
<td>8.7</td>
<td>5.6</td>
<td>60</td>
<td>2.4</td>
</tr>
<tr>
<td>Control Zone</td>
<td>Before</td>
<td>5</td>
<td>9.6</td>
<td>3.7</td>
<td>40</td>
<td>0.8</td>
</tr>
<tr>
<td></td>
<td>After</td>
<td>1.7</td>
<td>9.8</td>
<td>5</td>
<td>40</td>
<td>1.6</td>
</tr>
</tbody>
</table>

Rural-urban interaction increased several times over in the two directions: urban dwellers visiting their rural relatives, and farm household members visiting cities.

**Gender**

*Education.* There was a dramatic improvement in the project zones in the enrollment of girls in primary school: it went up from 17 percent in 1985 to 54 percent in 1995. This happened consistently across the three zones studied, and all three zones registered enrollment levels higher than the national average for rural areas, especially in the Central region, where girls' enrollment reached 67 percent. One reason cited for the substantial improvement in girls' enrollment is that several new primary schools and satellite classrooms opened during the period. By comparison, enrollment of girls in primary education in rural areas throughout Morocco remained practically constant during the study period.

Despite the large gains in the enrollment of girls in primary education in 1995, in the three zones combined, girls' enrollment levels were still substantially below boys', 54 percent versus 81 percent. It appears that the traditional reluctance of parents to send girls to school—because they contribute more than boys to household chores such as getting water and caring for siblings, and because of perceived dangers of rape when there are long distances and difficult trails to school—was still the primary cause for their lagging behind boys.

*Health.* In the project zones, there was a clear gain in the frequency of visits by women to health services: their visits to a hospital more than doubled (2.4 per year in 1995, compared to 1.1 in 1985) and their visits to the primary care centers also increased (3.1 in 1995 compared to 2.3 in 1985). Men made similar percentage gains, but the frequency of their visits to hospitals was much lower than women (0.8 per year in 1995); however, it was about the same for visits to primary care centers.

\textsuperscript{10} In the 1980s, health centers were conceived as primary care facilities serviced by a full-time doctor, while infirmaries were supposed to be staffed by nurses only. In practice, the intended level of staffing was often not reached.
Focus groups reported that women gained substantially from health programs in maternal and infant care and family planning, but no statistics specific to the project zones were available.

Another health impact was the diversification of the diet. Focus groups in the Northern region reported that while in the past they rarely ate fish, after the road was improved they do so at least once a month; they credited this change to the fact that the newly paved road enabled refrigerated trucks carrying fish to have access to the souks (rural markets) serving their areas. Similarly, it was reported that consumption of fresh vegetables and fruits increased.

Cooking and Heating. A major gain in women's welfare stemming from the better quality roads was the introduction of butane for cooking and heating. For example, focus groups in the Northern region reported that before the road improvements women spent an average of 2 hours daily collecting fuelwood. Butane gas, used extensively in urban areas, did not reach the rural areas due to the high transport and distribution costs. The price of butane dropped almost 50 percent following the improvement of the road and became affordable to the local population. A similar phenomenon was reported in the other regions.

Environment
Changes in transport conditions and in the agricultural economy had both negative and positive effects on the environment, although no environmentally sensitive areas were put at risk by the road projects (which did not involve new construction). Negative impacts were those resulting from the increased traffic and economic activity, especially air and noise pollution and road accidents, and the increased use of fertilizers and other chemicals, which probably contaminated the water table. Positive impacts resulted in part from the transformation of the agricultural economy, notably curtailment of extensive goat and sheep herding—that damages the soil cover—and increased tree plantations, and from the broader use of butane substituting for fuelwood, whose demand exceed the size of Morocco’s sustainable forests.

Beneficiaries
As suggested by the impacts described above, the beneficiaries of the improved roads can be summarized as follows:

Users of services: this includes users whose access to different services became easier as a result of improved transport services and also as a result of better road condition. In particular, this includes villagers accessing clinics and other health services, students attending schools and people accessing community services.

Producers and providers of services: Providers of transport services, benefited from the better roads since they could introduce new services, save in operating costs, and improve frequency of services. Producers, especially farmers, benefited both from facilitated access of fertilizers, pesticides, extension services and from facilitated conditions for the marketing of their produce. Providers of social services, notably health and education, benefited because the better
accessibility made it easier to recruit and retain personnel (nurses, doctors, and teachers) and to get supplies of medicines and school materials.

Non-users: the transformation of the agricultural economy, together with improved supply of domestic inputs such as butane, allowed the rural population, especially women, to make better use of time, including obtaining on-farm and off-farm employment.

Extension and Corroboration of Findings

A survey \(^{11}\) carried out in 2002 among key stakeholders (villagers, providers of social services and providers of transport services) of a sample of rural roads improved or built in several provinces under a recently completed Bank highway project found responses consistent with the impact study described above. The survey interviewed 391 persons (including 190 villagers, 73 percent of which were illiterate) in the sample of rural road construction and 655 persons (including 379 villagers, 61 percent of which were illiterate) in the sample of rural road improvement.

Survey responses regarding the positive effects of the rural road construction and of rural road improvements (the negative responses were negligible), gave the highest ratings to improvement of transport services, better access to schools, better access to health services and improved supply of foodstuffs and other basic necessities (see tables 6 and 7 below).

Table 7: Rural Road Construction

<table>
<thead>
<tr>
<th>Impact</th>
<th>Overall</th>
<th>Villager</th>
<th>Provider Social Services</th>
<th>Provider Transport Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Improvement of transport services (buses, taxis, jeeps)</td>
<td>25</td>
<td>36</td>
<td>-</td>
<td>43</td>
</tr>
<tr>
<td>2. Creation of new transport services</td>
<td>3</td>
<td>4</td>
<td>-</td>
<td>6</td>
</tr>
<tr>
<td>3. Better access to health services</td>
<td>23</td>
<td>25</td>
<td>24</td>
<td>17</td>
</tr>
<tr>
<td>4. Better access to schools</td>
<td>27</td>
<td>33</td>
<td>29</td>
<td>5</td>
</tr>
<tr>
<td>5. Increase in Primary School enrollment</td>
<td>10</td>
<td>3</td>
<td>25</td>
<td>-</td>
</tr>
<tr>
<td>6. Increase in Girls’ Primary School enrollment</td>
<td>2</td>
<td>1</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>7. Reduced absenteeism of teachers thanks to better roads</td>
<td>4</td>
<td>1</td>
<td>6</td>
<td>-</td>
</tr>
<tr>
<td>8. Improved health services (for example, longer work hours, more personnel...)</td>
<td>9</td>
<td>2</td>
<td>22</td>
<td>-</td>
</tr>
<tr>
<td>9. Improved access to community services</td>
<td>13</td>
<td>6</td>
<td>24</td>
<td>9</td>
</tr>
<tr>
<td>10. Improved supply of foodstuffs and other basic necessities</td>
<td>21</td>
<td>24</td>
<td>21</td>
<td>11</td>
</tr>
<tr>
<td>11. Improved access for visits with family and friends</td>
<td>7</td>
<td>12</td>
<td>-</td>
<td>11</td>
</tr>
<tr>
<td>12. Obtain better prices for my products</td>
<td>0</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>13. Operating and maintenance costs of vehicles are lower</td>
<td>11</td>
<td>3</td>
<td>3</td>
<td>49</td>
</tr>
<tr>
<td>14. Less dirt on the roads</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>15. Lower cost of basic products</td>
<td>12</td>
<td>16</td>
<td>9</td>
<td>8</td>
</tr>
</tbody>
</table>

Table 8: Rural Road Improvement

<table>
<thead>
<tr>
<th>Impact</th>
<th>Overall</th>
<th>Villager</th>
<th>Provider Social Services</th>
<th>Provider Transport Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Improvement of transport services (buses, taxis, jeeps)</td>
<td>27</td>
<td>40</td>
<td>-</td>
<td>34</td>
</tr>
<tr>
<td>2. Creation of new transport services</td>
<td>9</td>
<td>10</td>
<td>-</td>
<td>24</td>
</tr>
<tr>
<td>3. Better access to health services</td>
<td>18</td>
<td>15</td>
<td>33</td>
<td>-</td>
</tr>
<tr>
<td>4. Better access to schools</td>
<td>11</td>
<td>5</td>
<td>26</td>
<td>-</td>
</tr>
<tr>
<td>5. Increase in Primary School enrollment</td>
<td>6</td>
<td>6</td>
<td>8</td>
<td>-</td>
</tr>
<tr>
<td>6. Increase in Girls’ Primary School enrollment</td>
<td>5</td>
<td>3</td>
<td>11</td>
<td>-</td>
</tr>
<tr>
<td>7. Reduced absenteeism of teachers thanks to better roads</td>
<td>4</td>
<td>2</td>
<td>10</td>
<td>-</td>
</tr>
<tr>
<td>8. Improved health services (for example, longer work hours, more personnel...)</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>9. Improved access to community services</td>
<td>13</td>
<td>15</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td>10. Improved supply of foodstuffs and other basic necessities</td>
<td>24</td>
<td>31</td>
<td>10</td>
<td>21</td>
</tr>
<tr>
<td>11. Improved access for visits with family and friends</td>
<td>10</td>
<td>14</td>
<td>0</td>
<td>13</td>
</tr>
<tr>
<td>12. Obtain better prices for my products</td>
<td>4</td>
<td>8</td>
<td>0</td>
<td>na</td>
</tr>
<tr>
<td>13. Operating and maintenance costs of vehicles are lower</td>
<td>8</td>
<td>3</td>
<td>11</td>
<td>24</td>
</tr>
<tr>
<td>14. Less dirt on the roads</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>15. Lower cost of basic products</td>
<td>15</td>
<td>16</td>
<td>14</td>
<td>14</td>
</tr>
</tbody>
</table>

Government Commitment to Rural Roads Programs\(^\text{12}\)

Until the launching of the NRRP, government funding to develop rural infrastructure was very limited. Annual road construction during the 1988-1994 period was on average 280 kilometers per year, and was insufficient to address the priority needs for improving accessibility in the rural areas.

To be able to launch the NRRP, the government expanded the resources available for the development of rural roads. First, it increased the resources of the Road Fund (itself fed from gasoline and other user charges) allocated to rural roads. Second, it modified the text of the Road Fund to allow it to reimburse loans contracted by entities such as the Agence du Nord, which is developing rural roads in the North. At the same time, the government has increased the resources available for transfer to the local governments, which will make it possible to increase the local contribution to the financing of rural roads in their jurisdictions.

Surveys and studies by the highway agency (the DRCR) of the impact of rural roads, and dissemination of the findings, have likely been influential in expanding the public understanding of the benefits of improving rural roads. For example, the DRCR in 1998 carried out a socio-economic impact study of two roads improved under the NRRP.\(^\text{13}\) This study showed an interesting result: one of the roads produced mainly economic benefits, while the other generated mainly social benefits. Some of the more striking impacts, achieved in at least one of the two roads, include: doubling of the frequency of service of public transport; doubling in the number of

\(^{12}\) The main source for this chapter is: A. Rmili and A. Imzel, 2002. Routes de Désenclavement au Maroc. 6\(^{\text{ème}}\) Congres National de la Route. Agadir, Maroc.

\(^{13}\) Source: same as footnote 11.
visitors to the local market (souks); reduction in the transport cost to the main social services of over 33 percent.

**Institutional Innovation**

The government’s emphasis on improving accessibility to rural infrastructure has also encouraged the highway agency to innovate in the way it sets the objectives in its rural roads programs. While the NRRP program aimed to achieve physical targets, that is, number of kilometers to be improved or constructed, the follow-on program, NRRP-2, currently under preparation, will set targets based on the number of people that will benefit from improved accessibility to reliable roads. This change represents a profound change in the thinking of the highway agency that will certainly influence how highway staff plan future developments of the sector. The title of the recent conference (2002) of Morocco’s highway professionals, “The Road: A Basic Social Service” further illustrates this change of mentality.

On the institutional side, in addition to the impact of adopting accessibility as a target, the NRRP-2 is expected to result in: (a) a strengthened participation by the provinces and communes in the planning of rural roads, that will elicit a stronger commitment to maintenance; (b) strengthened management capacity by the local communities of their roads supported by a new system of agreements between the Ministry responsible for roads and the Provinces for the financing and maintenance of local roads, that goes beyond partnership agreements with local communities (*Partenariats*) used in the past (c) a monitoring and dissemination system at provincial level of rural roads programs that will make planning and execution of the rural roads programs more transparent and provide an opportunity for better integration of rural road programs with other sectors and activities planned at the local level.

**The Role of Local Governments and Rural Communities in the Development and Management of Rural Roads**

Planning and construction of the rural roads until 1994 involved very little participation by the local governments. Participation improved radically during the preparation of the NPRR. Local elected officials and the Provincial Councils chaired by the Governors took an active role during the preparation of the NRRP.

Since 1990s, local governments at various levels have contributed financially to the rural roads programs. The contribution has been arranged through ‘partnership’ agreements between the municipalities and the highway agency. Overall, the local contribution to the program was small, about 3 percent of the total cost. Due to a wide range in financial capacity of the provinces and their municipalities, the contribution was significant in a few municipalities, but small or null in the majority. The partnership approach was especially successful in the Southern provinces. There, some of the municipalities have contracted 10-year loans from a special government fund (Fonds d’Equipement Communautaire) in order to finance their counterpart contribution. The contributing municipalities normally financed paving of roads, rather than lower-cost
improvements, which shows the importance the population in those municipalities, give to the establishment of all-weather roads.\textsuperscript{14}

The participatory process will be further strengthened under Second Rural Roads program. The process will entail, in each province, consultation on the proposed rural road program between the provincial DRCR and the Provincial Government. Agreements reflecting the consensus reached will be signed with the respective rural municipality for inclusion of the project in the DRCR work program. In fact, the process leading to this agreement in fact will be more complex, and will involve the following stages:

- During initial preparation of the provincial Rural Roads Inventory (RRI), the views of the Communes are sought to identify the roads to be included in the inventory
- Once the RRI is prepared in draft, it is sent back to the provincial authorities for identification of the roads to be included into the Provincial Rural Roads Master Plan (PRRMP)
- Thereafter, the roads selected are validated by the provincial government and the respective municipality
- The municipality willing to contribute funding for a road project have an additional say in the selection (and design standard) of the road it will help finance.

Non-classified roads, that therefore do not fall within responsibility of the highway agency, will be identified by the various stakeholders/sponsors, following their own consultative process.

The Second program also foresees a stronger and more formalized contribution at the local level in the financing of the improvement and maintenance of the rural roads. Agreements are expected to be signed between the highway agencies and the provincial governments (with all municipalities represented) as well as between the highway agency and the central government agency responsible for local governments.

**The Role of External Catalysts**

The need to develop Morocco’s rural road network and to better understand the benefits of rural roads has been recognized by external financiers. A World Bank highway project ($57.6 million loan) that included a component of rural roads has recently been completed, and a follow-up loan to support the Second program is under preparation.

Beyond the financial contribution to the rural roads programs, the Bank’s 1996 study of the impact of the rural roads, which was followed by a workshop well attended by government officials, has been instrumental in understanding the impact of rural roads and in helping gain support for the development of the rural road network. The 2002 survey under the highway project, and the workshop that followed, attended by representatives from various ministries, mayors and representatives from local communities, provincial and regional highway personnel and World Bank representatives, further disseminated knowledge about the role of rural roads in

\textsuperscript{14} World Bank (2002). *Implementation Completion Report on a Loan in the Amount of $57.6 million to the Kingdom of Morocco for a Secondary, Tertiary and Rural Roads Project.*
improving the life in the rural areas. It is significant, as already noted, that Morocco’s highway agency has incorporated among its practices the implementation of surveys to assess the impact of their works and that it has extended the conventional ex-post analysis focus on only the economic impact to also cover the social effects of such investments.

Two other international financiers are helping to develop Morocco’s rural roads, with a focus on Morocco’s Northern region. The European Investment Bank is providing $60 million and the French agency for international cooperation (AFD) $24 million. These two agencies are working with Morocco’s Northern Development Agency (Agence du Nord). The program under the Agence du Nord also includes the preparation of a study of the socioeconomic impact of the roads financed under their program. The study\textsuperscript{15}, that will follow an approach similar to that utilized in the Bank’s study, will attempt to measure the roads’ impacts in five areas: (I) on infrastructure and the provision of transport services; (ii) on the agricultural economy (iii) on the social services such as education and health (iv) on the area’s economy, and, (v) impact on the environment.

**Lessons Learned**

Three major lessons emerge from this case study:

**The impact of rural roads is broad and touches a variety of sectors**

While many of the impacts stemming from improved rural roads can be predicted as a response to the economic stimulus of lower transport costs and more reliable accessibility, such as the transformation of agricultural production, leading to the planting of higher-yield crops and better and more intensive use of inputs, other impacts are more difficult to anticipate and very dependent on local conditions. This was the case in Morocco, with two unsuspected but positive effects: one, a sharp increase in school enrollment especially for girls, and two, a dramatic effect of freeing women from the daily chore of collecting firewood for cooking, resulting from the introduction of butane (itself made possible by a sharp drop in transport costs and by improved accessibility), allowing women to undertake more productive activities.

**Changing rural road objectives from physical road construction to improved accessibility for the rural population allows better targeting of the rural poor**

While investments under the first rural roads program improved many roads and were clearly beneficial for the rural population, the strategic shift in the preparation of the second program

towards accessibility rather than physical outputs makes it more likely that road services will be made available for the less accessible populations, which normally include a higher proportion of the poor.

**Local governments can participate effectively in the planning process for rural roads programs**

While a decentralized approach was not a feasible option for the preparation and implementation of rural roads programs because of the weak financial and technical resources at the sub-national level, an effective participatory process was developed involving several levels of local governments. Such participation will be further strengthened as the participatory process is further formalized under the second program (NRRP-2).
Annex: Impact Assessment Methodology

The study assessed the impact of paving and other improvements (completed between 1987 and 1991) to four rural roads in three regions of Morocco: Northern (Chefchaouen), Central (Settat) and Southern (Marrakech). As a starting point, the study hypothesized four sets of impacts for the road improvements:

- direct impact on transport infrastructure and services (such as increased motorized traffic, decreased transport costs, improved access to services);
- impact on the agricultural economy (such as reduced farm input prices, improved access to markets, increased outputs, changed output mix);
- impact on the social services especially health and education (such as increased use of existing facilities, improved capacity to recruit and retain qualified personnel); and
- impact on the environment (such as effects from increased traffic and economic activity, and transformation of output mix).

Two types of analyses were used to test these impacts: first, for each of the roads considered, it compared current conditions with those before the investments (before and after comparison) and, second, it compared conditions in the project road relative to a control road that did not benefit from similar improvements over the period of study (with and without analysis). Control roads were located near the project road so that they would reflect, to the extent possible, the ‘without project’ situation. Data were obtained from statistical records and from extensive surveys conducted at the farm, regional and village levels. Focus group discussions at these levels helped interpret the data.

A limitation of the study is that comparison roads were selected at the end of the project because they had no improvements over the project period, and so we cannot definitively attribute changes in the communities studied to road improvements. Despite the care in selecting control roads, it is possible that the communities near improved roads may have been systematically different from those in areas where the roads were not improved. For example, communities near improved roads may have been targeted for other improvements. Small sample size also necessitates caution in interpretation of the results.

An additional caveat refers to the weather, and its influence on agricultural and socio-economic conditions. During the 10-year period studied, Morocco experienced periods of drought, when traditional agricultural production, notably cereals, fell sharply. The most recent agricultural statistics, which were used in this study, were for the year 1993/94, a year when rainfall was above normal. Thus, comparison of agricultural output with earlier years may be distorted. However, for other aspects of the agricultural economy, as well as for most social impacts, rainfall conditions are immaterial to the analysis.