Morocco: Socioeconomic Impact of Rural Roads

Socioeconomic Influence of Rural Roads

- Fourth Highway Project (Loan 2254-MOR)

Summary

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Contents:

Background

Despite sustained urbanization through the 1980s and 1990s, about 50 percent of Morocco's population remains rural. Rural inhabitants have benefited less from the country's economic growth over the last decade than urban dwellers. A result is that over 70 percent of the poor population lives in rural areas. Consequent with its objectives to improve the welfare of its rural population, the Government is launching a plan of road investments for the period 1996-2000 that aims to improve or pave 10,000 kilometers of rural roads. This report, by examining the results after several years of operation of a rural road component included in a broader road project financed by the Bank (the Fourth Highway Project, approved in March 1983), seeks to understand the impacts that emanate from improving rural roads, and how they filter beyond the physical investment to the agricultural economy and the social sectors. The intention is to derive lessons that can help Morocco and other countries better assess the long-term value of investing in rural roads.

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Methodology

This study assesses the impact of paving and other improvements (completed between 1987 and 1991) to four rural roads located in three different regions of Morocco: North, Center and South. As a starting point, the study formulated four sets of hypotheses about the impacts of the road improvements: (i) direct impact on transport infrastructure and services; (ii) impact on the agricultural economy; (iii) impact on the social sectors such as health and education; and (iv) impact on the environment.

To test these hypotheses, the study utilized two types of analyses: first, for each of the roads considered, it compared current conditions with those before the investments and, second, it compared conditions in the project road relative to a control road which did not benefit from

improvements over the period of the study. Data was obtained from extensive surveys conducted at the farm, regional and village levels, and focus groups discussions at these levels helped interpret the data. A monitoring system prepared by consultants under the road project, intended to provide a large set of indicators, was not put in place as public works officials doubted its cost-effectiveness.

A study limitation is that since comparison roads were judgmentally selected at the end of the project because they had no improvements over the study period, we cannot definitively attribute changes in the communities studied to road improvements. 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. In addition, the sample is not generalizable. We believe, however, that viewed as case studies, the four improved roads and the four unimproved roads offer useful illustrations of some of the impacts of road improvements.

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Impact on 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 elimination of frequent road closures during rainy periods, as the improved roads are open to traffic year-round. The road users benefited in several other ways: the cost of operating vehicles dropped, leading to lower prices for freight and passengers services than in roads that were not improved. Traffic on project roads increased at rates higher than before the improvement, and comprised a bigger proportion of larger, more efficient trucks. The supply of road 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. Ownership of motorized vehicles increased, both of cars and trucks. The access time by the rural population to markets and social services fell drastically. In some cases, the time to access county and village administrative offices, agricultural extension personnel, health centers and rural markets, was cut by at least 50 percent. This improvement was a result of both better roads and new facilities, whose construction was made possible in part by the roads.

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Impact on 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 orchards, which yield higher profits, thanks to the reduction in perishability risks brought about by the better quality and year-round operability of the improved roads. In two of the three study regions, land used for vegetables and fruits increased over 40 percent over the study period. Livestock production shifted towards pure breed cows, also a higher yield activity. The use of modern agricultural inputs, especially fertilizers, increased as improved transport made distribution channels better. Use of agricultural extension services by the small farms increased by more than four times over the study period. The shift to higher value products, combined with improved yields for traditional crops, raised the value added per unit of cultivated land.

Improvements in the agricultural economy led to related economic changes in workloads, employment on farm and establishment of new shops; these changes followed different patterns depending on the region. Off-farm employment grew overall by more than six times in the project zones (compared to about three times in the control zones) and happened across all three

regions. The study found that agricultural practices in the control zones, which did not benefit from improved roads, remain essentially the same today as a decade ago.

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Impact on social services

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 much 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. The rural population also nearly doubled their use of health care facilities (hospital and primary care), and, similarly to 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 a doctor, and immunization and other health prevention programs became easier to implement.

Some of the social impacts were especially large for women: girls' enrollment in primary education trebled over the period; expanded or new maternal and child care programs were made available and accessible, and the introduction of butane at affordable prices thanks to the existence of paved roads dramatically reduced women's chores of daily collection of fuelwood for cooking and heating. Rural-urban interaction increased several-fold in the two directions: urban dwellers visiting their rural relatives, and farm household members visiting cities.

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Impact on the environment

Changes in transport conditions and in the agricultural economy had both negative and positive impacts on the environment although, overall, no environmentally sensitive areas were 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 used of fertilizers and other chemicals which in all likelihood 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 broader use of butane substituting for fuelwood, whose demand is larger than the size of Morocco's sustainable forests.

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Economic analysis

The improvements in the agricultural economy and in access to social services translated into increases in the roads' traffic levels at rates substantially higher than on unpaved rural roads. The study quantified the economic benefits accruing to road users in the form of savings in vehicle operating costs compared to the original, unpaved roads, and the economic gains resulting from people and freight being able to move at any time, without the risk of road closures. Social impacts, although real, could not be isolated for attribution to the road investment and were not quantified in the analysis.

The economic returns as well as the timing of the improvements for all project roads were found to be satisfactory (economic rates of return ranging between 16 and 30 percent). Even under a worse case scenario assuming lower traffic growth and reduced benefits from operating costs

savings, the returns would have remained acceptable. The benefits from the investments are expected to accrue to farmers in the form of expanded use of commercial freight services substituting for non-motorized carriage of loads, including operation of heavier, more efficient trucks. The rural population in the roads' areas is expected to benefit mainly by the availability at affordable prices of frequent services by share-ride taxis.

Although some of the benefits appeared to be dependent on paved surfaces and the economic returns are satisfactory, this does not ensure that paving was an optimal economic solution, compared, for example, to rehabilitating the roads to a gravel surface maintained at a good standard.

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Sustainability of benefits

Historic trends showing steady traffic growth over long periods on Morocco's paved roads, even during drought years when agricultural production fell, suggest that the stream of benefits is likely to be sustainable. The main issue is route 603 which currently, seven years after completion of the works and in part because traffic reached unexpectedly high levels, is in poor condition. While improvement of this road is included under the MPW's maintenance program for 1994-1998, inadequate budgetary allocations for road maintenance raise uncertainty about the level of benefits on this road over the long-term. The transformation and improvement of the agricultural economy is based on sound business decisions and is likely to be sustained, with the possible exception of the sugar beet planting in the North (a small component of traffic on route 603) which is uneconomic and may lose market depending on the outcome of the privatization program for the state-owned sugar factories. The gains in agriculture are also dependent on government trade and fiscal policies, and as well as the access of Moroccan produce to European Union markets. The sustainability of the social service impacts appear as likely in view of the high value assigned to them by the direct beneficiaries and because of government policies and the increased funding it is allocating to improve social services.

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Recommendations

The following recommendations are offered:

- Establish a practical rural road monitoring system. In the current program to pave 10,000 km of rural roads, an effective monitoring system could be set up with the following characteristics: (i) comprise a small number of road, agriculture and social sector indicators; (ii) arrange for each type of indicator to be collected by the respective sectoral, local-level authority, maybe once every two or three years; (iii) integrate the collection of agricultural and social indicators in the annual surveys carried out by these sectors; (iv) arrange for local authorities, ideally with assistance by a university, to compile the data into a single report for each selected road, and disseminate the report to local and central authorities.

- Increase local community participation in rural roads through: (i) exchanges such as "village meetings", at the planning stage, to ensure that road plans are properly and timely taken into account within the planning of all local-level activities, and (ii) for road maintenance, by direct participation of local stakeholders in the funding allocation for this activity, through, for example, the establishment of local "road boards".

- Consider and require if cost-effective, the introduction of mitigation measures such as education campaigns and road signs to reduce and or prevent the likely increase in road accidents and their consequences, resulting from the increased traffic levels and speeds when rural roads are paved.

- Consider adopting identification and evaluation methodologies based on multi-criteria indicators for rural roads that: (i) combine a minimum acceptable economic return with well defined social sector (mainly education and health) objectives and with social sectors investments integrated in local government budgets, or, (ii) for very low traffic levels and for a small part of the budget for rural roads (20 percent is a good practice), apply multi-criteria based solely on attaining social objectives represented by well-defined indicators.

- Reassess the optimal pavement width for rural roads and compare with rehabilitation to gravel surface maintained in good standards. The very latest version of the Bank's Highway Design Model (HDM) model allows to conduct this kind of analysis.

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