From Foodline to Lifeline: Rural Roads in Morocco

A recent OED evaluation* examined the impact of a rural roads component included in Morocco’s Fourth Highway Project, begun in the mid-1980s. The study sought to determine the broader impacts that emanate from improving and patching rural roads and understand how they filter beyond the physical investment to the agricultural economy and social sectors. The evaluation brings to light the problem of attributing project benefits when a number of factors are at play—better roads, government programs, new facilities. A comparison of the improved areas with control zones helped clarify the impacts attributable to the roads themselves.

The evaluation found that better roads led to lower vehicle operating costs, resulting in less expensive public transport, basic household goods, and agricultural inputs. The lower cost of inputs, combined with year-round operability of roads and expanded government extension efforts, in turn stimulated a more efficient and profitable agricultural economy. The delivery of butane, now more affordable, reduced and in some cases eliminated the two to three hours rural Moroccan women spent daily collecting fuelwood. Educational enrollment grew substantially, especially for girls, and project-area residents visited health professionals more regularly, as the roads improved access and set off changes such as the construction of new schools. The impact on the environment was mixed, however. The evaluation derives lessons—such as the need to establish a rural road monitoring system—that can help Morocco and other countries enhance the value of rural roads investment and the sustainability of regional development.

**Targeting the poor through road schemes**

Despite sustained urbanization through the 1980s and 1990s, about 50 percent of Morocco’s population remains rural. Rural inhabitants have benefited less than urban dwellers from the country’s recent economic growth. As a result, more than 70 percent of Morocco’s poor live in rural areas.

The government has increasingly sought ways to reduce rural poverty. The current five-year plan to improve 10,000 kilometers of rural roads through the year 2000 forms part of its broader strategy to improve the welfare of the rural population. The World Bank is expected to finance part of this effort.

**The project had many positive impacts**

The Fourth Highway Project’s rural roads component sought to improve ten roads spread throughout Morocco. The roads averaged 30-50 km in length, with traffic volumes generally below 100 vehicles per day. The study analyzed four of the improved roads, located in three different regions—one in Larache/Chefchaouen (Route 603), one in Settat (Route 1427), and two in Tensift (routes 6307 and 6308). The evaluation focused on these roads because of their diverse economic functions and because of the regions’ different rainfall/soil conditions and economic characteristics. (See box on methodology.)

The road improvements were expected to have an impact in four areas: transport infrastructure and services, the agricultural economy, social sectors such as health and education, and the environment. Impacts were not identical in all regions, though some were felt across the board. The unexpected and positive impact on women and girls in particular merits special mention.

**Transport infrastructure and services**

All four roads were improved from deteriorated gravel or unengineered track to asphalt, mostly four meters wide.

With the improved roads open to traffic year-round, the most direct im-
Methodology

Though a 1989 consultant’s report recommended the establishment of a system for monitoring the impact of rural roads, and included some 40 indicators, the system was not implemented. This was because government authorities had strong doubts that the cost of setting up and maintaining such a comprehensive system would bring commensurate benefits.

For each project road, the study therefore chose as a control a nearby road that had not been improved during the study period. Socioeconomic data for the project and control roads were collected mainly through surveys at the household and village levels, and at the provincial level for public works and local level for agriculture. The information was used to compare current conditions with those before the investments and to compare conditions of the improved roads with those of the control roads.

Road users also saved time and money. The cost of operating vehicles dropped because they sustained less wear and tear on an even, asphalt surface. Larger, more efficient trucks could now use the roads. As a result, the cost of freight and passenger services fell. A focus group (a dialogue with a group of area residents) for routes 6307 and 6308 said, for example, that the cost of shipping a truckload of merchandise—between Amizmis and Assif Al Mal county, ten km apart—went down from 300 Dh to 150 Dh. The supply of passenger services in- put from 1985-95. transport services-to see a doctor decreased. As a result of the low-cost transport and year-round operability of roads, however, markets became accessible and roads reliable. Perishability of produce was no longer a concern, and farmers shifted production to high-value fruit orchards and vegetables. The shift was enabled in part by the delivery of irrigation equipment—such as wells and pumps—and improved seeds. Yields for the main crops (fruit trees, cereals, and vegetables) increased in all project zones, with fruit orchards registering the highest gains—a 31 percent jump in output from 1985-95.

Following the trend to invest in high-profit goods, farmers’ investment in purebred livestock shot up by 150 percent, while in every other class of livestock, investments decreased. As a result of the shift to higher-value products, and the overall increase in yields, the value-added per unit of cultivated land rose.

The use of modern agricultural inputs—which grew as improved transport made distribution channels better—was a key factor in improving the agricultural economy. Fertilizer use in particular leapt by more than 60 percent in two of the three project areas. Small farmers’ use of agricultural extension services, now within easy reach, increased more than fourfold during the study period.

These improvements in turn led to changes in off-farm employment and the number of new businesses. Off-farm employment, as a result of improved husbandry and mechanization, grew sixfold in the project areas (compared with threefold in the control zones). Though there is no clear overall impact when all three regions are considered, Settat registered a marked rise in the number of new shops; the most striking gain was in the number of kiosks in the weekly market—from 10 in 1985 to more than 500 now.

Agricultural practices in the control zones today are essentially the same as they were a decade ago. Relatively low-value cereal cultivation accounts for more than 90 percent of tillable land.

Social impact

In the past, rural health facilities, where they existed, had difficulty recruiting and retaining professional staff because of their isolated location. The result was erratic delivery of service. When facilities were not available, rural residents had to travel far—and often with difficulty because of inadequate transport services—to see a doctor or nurse. Either way, rural inhabitants did not see a health professional very often, usually only once a year, and not for preventive health care.

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Visits by project beneficiaries to health care facilities (hospital and primary care) nearly doubled, thanks to
the improved roads and government efforts. More professionals were willing to work in areas that were no longer isolated. The improved roads made it easier to deliver medicine, leading to higher-quality service. At the same time, the government, under its social development strategy to extend basic social services to the poor, launched a campaign to establish new facilities and to staff rural health centers with doctors. Immunization, family planning, and other health prevention programs became easier to implement with the existence of permanent health personnel.

One of the main benefits of the project and government efforts in the Chefchaouen area was that a doctor and several nurses now staffed each of its three health centers. Each center also had an ambulance to transport patients to the hospital. Pregnant women, who were taken to the hospital by mule in the past, especially benefited.

Rural dwellers in the project zones changed their dietary habits. Focus groups in Chefchaouen reported that they rarely ate fish in the past, but did so now at least once a month. Consumption of fresh vegetables and fruit increased as well. Better roads and year-round operability made the delivery of these highly perishable foods possible.

School enrollment rates made an impressive leap. In all three areas combined, the 1995 primary school enrollment rate reached 68 percent, compared with 28 percent in 1985. While enrollment in the control zones also grew, the rate of improvement was lower than that of the project areas.

What accounts for this change? The enhanced roads made the remote schools more attractive to higher-quality teachers, and the caliber of education improved as a result. With roads open year-round, and transport more readily available, absenteeism of both teachers and students dropped. Physical improvements also played a part. The number of primary schools and satellite classes increased, as a paved road is a key criterion for the construction of primary schools in rural areas. The supply of materials—such as potable water, often transported by the teacher with a hand-cart—needed for teaching, maintenance, and day-to-day operations also improved.

Gender impact

Girls' primary school enrollment increased dramatically-reaching 54 percent in 1995, more than three times the level in 1985. What makes the gains especially impressive is that rural parents had generally preferred for girls to stay home to help with household chores. Parents also feared for their daughters' safety when tracks and roads were unpaved and distances long and difficult to traverse. Focus groups conducted by OED cited this as an important reason for not sending girls to school. With the roads paved and enrollment rates up substantially, this anecdotal finding gains credence. But focus groups also attributed the higher attendance rates to the new primary schools and satellite classrooms.

Some women had much more free time. Before roads were improved, women normally spent two to three hours a day collecting fuelwood for heating and cooking. The enhanced roads made the delivery of butane more affordable and thus reduced or eliminated women's need to collect wood. This freed up a substantial block of time each day that they could devote to other needs and interests. Mechanization also provided women who previously helped in the wheat fields with more free time. The expansion of taxi services, in turn, enabled these women, who now had more leisure time, to visit relatives in nearby villages and cities more frequently.

Others had new work opportunities. The milk cooperatives that sprang up in parts of Tensift as a result of the paved roads required more labor to take care of the cows. Municipal programs encouraged women to work on the cooperatives. In exchange they received a share of the revenues from milk sales, thus increasing their participation in Morocco's formal economy. This is an important impact, given women's low participation in the monetized economy.

Environmental impact

Changes in transport conditions and in the overall economy had both negative and positive impacts on the environment. The roadwork itself did not involve any new construction and presented no risk to environmentally sensitive areas. Rather, negative impacts resulted from increased traffic and economic activity—that is, air and noise pollution and road accidents—and increased use of fertilizers and chemicals, which may have contaminated the water table.

While overall levels of traffic increased, the improved roads led to more fuel-efficient and quieter vehicles and reduced dust pollution. Positive impacts also resulted from the transformation in the agricultural economy. Notably, farmers curtailed the extensive goat and sheep herding that damaged the soil cover. In addition, butane, now widely available at low cost, substituted for fuelwood, the demand for which exceeds the level Morocco's forests can sustain.

Calculation, distribution, and sustainability of benefits

Economic returns for all project roads were satisfactory, ranging from 16 to 30 percent. (The returns were calculated based on the difference in cost of operating vehicles on improved and unimproved roads. The benefits derived from avoiding road closures were also considered.) Even under a worst-case scenario—combining lower traffic levels with higher vehicle operating costs—the returns would have been acceptable. Social and environmental impacts, normally considered intangible, were not quantified in economic terms. Lack of data also precluded quantification of benefits to pedestrians and to users of nonmotorized vehicles, such as carts and bicycles.
Economic benefits accrued directly to users of motorized passenger and freight vehicles. For farmers, the primary benefits arose from expanded use of commercial freight services and from year-round operability of roads. Both of these allowed farmers to produce the more profitable fruits and vegetables. While these benefits are significant, farmers would have likely derived even greater advantage had Morocco’s road freight transport market been less regulated and more competitive. The rural population in general benefited from affordable, frequent public transport, lower household expenses due to lower shipping costs, and savings in vehicle operating costs.

Will benefits be sustained? Over long periods, traffic on Morocco’s paved roads has grown steadily, even during drought years when agricultural production was down. The transformed and improved agricultural economy is based on sound business decisions. Beneficiaries and government place a high value on improved, and improving, social services. These factors suggest that the project’s transport, agricultural, and social benefits are likely to be sustained. It is important to note, however, that gains in agriculture also depend on government trade and fiscal policies, as well as on access to European markets.

Inadequate budgetary resources for road maintenance have been a perennial problem in Morocco, however. At issue is funding allocation—that is, whether funds are allocated to the roads and types of maintenance with the highest payoff. Of immediate concern is Route 603. Seven years after completion of works, and following unexpectedly high levels of traffic, the road is in poor condition. (The condition of the other roads is good.) While the road is scheduled for resurfacing under the Ministry of Public Work’s 1994-98 maintenance program, inadequately budgetary allocations for maintenance nationwide raise uncertainty about the sustainability of the road’s long-term benefits.

Recommendations for future rural road projects

- Establish a practical rural road monitoring system. The program to improve 10,000 kms of rural roads could incorporate a simple but effective monitoring system—for a sample of roads—that would designate a small number of road, agricultural, environmental, and social sector indicators. Local-level sectoral authorities could collect data from indicators every two to three years. The collection of agricultural and social indicators could be integrated in the annual sector surveys. The system could also arrange for local authorities, ideally with university assistance, to compile and disseminate a report for each selected road.

- Multicriteria indicators may help identify and evaluate rural road projects in areas where economic benefits are hard to measure. Traditional means of allocating funds and evaluating road projects may overlook important social factors, particularly when traffic levels are low. In such circumstances, an economic return calculated on a road being considered for improvement might not appear acceptable—but the road could have a large population that would greatly benefit from the project. Or an area might have a school to which more children would have access with an improved road. The government might consider allocating a small percentage of the rural roads budget (20 percent is good) to such cases, based on well-defined multicriteria indicators and attainment of social objectives rather than on economic returns.

- Increase local community participation in roads. Communities could be involved in the allocation of money for road maintenance, through the establishment, for example, of local “road boards.” (Such boards, composed of stakeholders and government officials, would be empowered to make decisions on allocation of maintenance funds.)

- Coordinate local government activities with road enhancement activities. The synergies between road improvement and government initiatives, particularly with regard to construction of new schools and health facilities, should be encouraged to enhance the impact of projects. This could be done by coordinating exchanges at the project planning stage to ensure that all local-level activities take the extent and timing of roadwork into account.

- The number of road-related accidents and fatalities increased along the improved roads, according to anecdotal information. On a smooth surface, vehicles tend to move faster. Pedestrians, on the other hand, do not change their habits. Future rural road projects should consider cost-effective measures—such as education campaigns and road signs—to prevent or reduce the likely increase in road-related accidents and fatalities.

- Paving was not necessarily the most cost-efficient solution. Rehabilitating roads to a well-maintained gravel surface, for example, would have cost less and perhaps yielded higher returns. Road width is also an issue. Current thinking in Morocco’s Ministry of Public Works would appear to favor pavements at least six meters wide, regardless of traffic levels. This conflicts with the study’s finding that four-meter pavements can be cost-effective for low levels of traffic. Future projects should reassess the optimal pavement width for rural roads and compare with rehabilitation to a well-maintained gravel surface. The latest version of the Bank’s Highway Design Model allows for such analysis.

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