XXIInd WORLD ROAD CONGRESS
DURBAN 2003

MOROCCO - NATIONAL REPORT

STRATEGIC DIRECTION SESSION ST5
Access to mobility: a basic social service

Opening up roads in Morocco

SUMMARY

Isolation is one of the main obstacles to overcome so as to carry out any rural world integrated development action. Roads and Road Traffic Department (DRCR), coming under the Ministry of Equipment and Transport, has undertaken, during the last ten years, important road infrastructures innovation actions in the countryside, at the level of financing, partnership, design and adapting construction techniques based on the appreciation of local materials and the creation of employment opportunities.

At the regional and local levels, rural roads are intended to service the hinterland and provide populations with opening up to allow them have access to the rest of the network. They are, therefore, the fundamental frameworks for the economic and social development of the serviced area, allowing a better spatial layout of the productive activities and facilitating the creation of new social projects.

Road financing in the countryside, falling solely to the public departments, based on the state budget, has not been allowing before 1995 to carry out more than 250 Km of new roads each year, while the needs such as inventoried by the DRCR in 1992 exceed 38000 Km of opening up roads.

To absorb this deficit, the Ministry of Equipment and Transport launched in 1995 the Rural Roads National Program (PNRR) that concerns 11236 Km and that allows servicing a population of about 6 million inhabitants. The implementation of this program has began to take shape by raising new financial means, developing partnership and improving design studies and opening up roads construction techniques.

Preamble:

The Ministry of Equipment and Transport manages a perpetually changing and developing road network. This network comes to 57.226 Km, 32.086 Km of which are surfaced roads (i.e. 56%) and 25.140 non-surfaced roads.

The road network is classified into three categories:

National Roads: 11.288 Km, 9551 Km of which are surfaced (i.e. 85%);
Regional Roads: 10.152 Km, 8520 Km of which are surfaced (i.e. 84 %);
Provincial Roads: 35.786 Km, 14.014 Km of which are surfaced (i.e. 39%).

In addition, 500 Km of highways are put into service and are contracted out to the Highways of Morocco National Company (ADM)[1].

To have a road network that meets the country's socioeconomic imperatives, the Roads and Road Traffic Department (DRCR) implements a road strategy centered on:

- **Safeguarding the road heritage to improve the state of existing road infrastructures and making up for the lost time accumulated as regard maintenance. The quantitative aim is to achieve annually 1000 Km reinforcement and 1000 Km surfacing and the qualitative aim is to keep the road network at least in the its current state**
- **Adapting the road network to traffic development to reduce vehicle traffic cost, improve the level of the service provided to the users, as well as for road safety. Many programs participate in this aim: widening narrow roads, improving routes to ensure free flow, bypassing main urban areas, improving road safety, etc**.
- **Extending the road networks to improve countryside servicing in particular that of landlocked areas and accompany economic development project.**

1 – Which function for which road network?

1-1 Accessibility and mobility notions

Accessibility allows determining to what extent it is easy for a person to have access to a given place. Accessibility to a place is all the easier since the expenditure of effort and time, and risks as well, are greatly compensated by the advantages obtained by travelling.

Mobility, on the other hand, allows determining to what extent it is easy for a person to travel. A place becomes more accessible when a person is more mobile.

Rural populations' mobility needs can be approached through examining the following points:
- the reasons for travelling,
- public transports services' availability,
- the state of existing roads,
- used mode of commodity displacement and transportation

economic and socio-administrative services' availability in relation to the population density.

[1] ADM: A private law company set up by the public authorities in 1989.

Accessibility cost is directly linked to the road network performance; therefore, to the investment made in road infrastructures. While mobility is a complex function that gives prominence to many socioeconomic factors, including mainly the populations' standard of living, spatial redistribution of socio-administrative services generating displacement and the availability of means of transport.

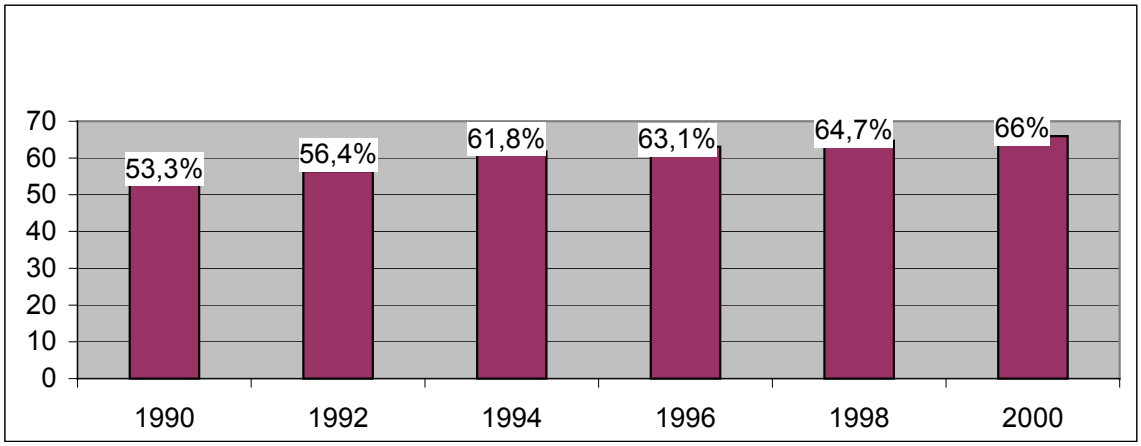
1-2 Road network performance

In Morocco, indicators used to measure road network performance are the following:

- Network densities in connection to the population and to the area,
- Percentage of the surfaced network,
- Surface indicator (ISU) : this indicator is used to characterize the state of roadways surface,
- Shoulder indicator (IAC): this indicator is used to characterize the state of shoulders.
- Structure indicator (IST) : This indicator is used to characterize the structural state of roadways,
- The UNI indicator: this indicator is used to characterize the functional state of roadways.

The ISU, IAC,IST and UNI indicators are worked out every two years for the entire surfaced road network. They are quantified through 4 rating categories: A = good state, B = satisfactory state, C = bad state and D = very bad state.

Surface indicator (ISU) evolution A + B in %



The aforesaid indicators were supplemented in 2002 by three others, concerning non-surfaced roads. They are worked out for a 2 years periodicity as from 2002. These indicators are:

- Practicability indicator (IPR) : that conveys the state of deterioration of the track traffic band,
- Cleaning up indicator (IAS) : that gives the draining system functioning state,
- Functionality indicator (IFO): that allows giving information about traffic conditions.

2 – Opening up roads in Morocco

2-1 Situation before 1995

The development of the countryside constitutes a national development requirement to which all community agents strongly join, were it for reasons of regular national and regional development, reinforcing national cohesion, by reducing regional disparities, improving the socioeconomic environment of the population by promoting employment and reducing poverty, or finally preserving the country's national resources.

Up to 1994, budgets allocated to the opening up roads have been very limited. The annual construction of surfaced roads was established on an average of 280 Km for the 1988-1994 period and did not allow meeting countryside opening up major needs.

In 1992, DRCR, inventoried more than 38000 Km of rural tracks requiring interventions. This inventory brought to the fore the level of isolation of rural spots that was as follows :

- 22% of the spots are inaccessible by vehicles every time and are therefore completely hemmed in,
- 35% of the spots are accessible with difficulty and were suffering, thus, from seasonal isolation,
- 43% of the spots were easily accessible in all seasons.

2-2 Genesis of the Rural Roads National Program (PNRR)

Given that all needs in opening up roads could not be met, a preselection has been made as of the 38000 Km of inventoried tracks in 1992, on the basis of an economic evaluation, with the help of the HDM pattern and a multi-criteria analysis that takes into account the factors hereafter:

1) **the degree of isolation of the area serviced by the road** to which we attribute a wintry traffic indicator that gives information about traffic conditions during winter. The grades used to appraise this indicator are the following:

- Grade 10: Wintry traffic conditions "very bad" for a light vehicle (or duration of annual breakdowns higher than or equal to 60 days).
- Grade 5: wintry traffic conditions "bad" or duration of annual breakdowns higher than or equal to 30 days.
- Grade 0: Road that does not fulfil the previous conditions.

2) **The socio-administrative interest** to which we attribute a socioeconomic indicator that evaluates the importance of the road as regards socio-administrative centres servicing. The socio-administrative indicator is the a_i x n_i /L form in which:

- a_i is a balancing factor according to the spot type and serviced social equipment, (i.e. 3, 2, 1, and 0,25 respectively for the county town of the district and commune and for the *souks*, then all social equipment, health centre, schools and Gendarmerie);
- n_i is the number of concerned spots
- L is the length of the road in kilometres.

The interest is considered to be null (grade 0) when the indicator is equal to 0. It is considered as “strong” (grade 10) when the road serves at least one *souk* every five kilometres. A linear application has been done as of this rule.

3) The agricultural potential level to which we allocate an agricultural potential indicator that tells about the importance of potential productions in the road sphere of influence. An agricultural potential indicator is an a_i x p_i form in which:

- a_i is the ratio indicated hereunder;
- p_i (0, 1, 2, 3) values according to the importance of the agricultural productions of the road sphere of influence.

The a_i ratio value to be allocated to the type of farming is the following :

* Cereals	: 3000 MAD/ha (ratio 3000/3000=1)
* Leguminous plants	: 3500 MAD/ha (ratio 1,2)
* Industrial crop	: 36000 MAD/ha (ratio 12)
* Truck farming	: 37000 MAD/ha (ratio 12)
* Arboriculture	: 43000 MAD/ha (ratio 14)
* Forage	: 36000 MAD/ha (ratio 12)
* Cattle breeding	: 650 MAD/ha (ratio 0,2)
* Wood	: 650 MAD/ha (ratio 0,2).

Grade 0 is assigned to the null value of the indicator. The potential is maximal for a gain equal to the above maximal value (ratio 14) with a “high” importance, to wit, 3x14=42. A linear application has been applied according to this rule.

The overall grade allocated to the road is equal to the average of the above 3 grades.

This preselection allows identifying 13300 km of priority rural roads. Subsequently, this batch has been the subject of a broad consulting with the elected representatives and with local authorities and of deliberations at the level of provincial councils chaired by governors. This participative approach ended in defining the Rural Roads National Program (PNRR) that applies to 11236 Km of tracks divided into 5472 Km for the construction of surfaced roads and 5764 Km to be planned as non-surfaced roads.

The construction of non-surfaced roads is a technique which consists in opening the platform and carrying out draining systems with the possible addition of the foundation layer, especially when the existing track's support surface has weak mechanical features. This technique ensures traffic permanence at a lower cost (at the rate of 1/3 of the construction cost of a surfaced road). Hydrocarbon coatings constitute the last stage of improving the constructed track to be adapted to traffic evolution.

The launching of the PNRR in 1995 allowed raising the rate of opening up road construction from 300 km/year before 1995 to about 1200 km after this date.

2-3 PNRR implementation process and attending measures

PNRR is implemented and followed up by Regional and Provincial Departments of the Ministry of Equipment and Transport. These territorial entities are fitted with human and material means and with technical tools continuously dynamized and levelled.

At the financial level, as soon as the Rural Road National Program is designed and evaluated, it seems that materializing this comprehensive program is practically impossible relying mainly on the government's general budget that cannot mobilize more than 17 M US $/year, whereas the overall annual need is estimated at 73 M US $/year.

Therefore, the Road Special Fund (FSR), set up in 1989 to contribute in incurring expenses related to road maintenance, the resources of which were levelled off up to 1995 at 53 M US $, has been reinforced by about 46 M US $ assigned to construct rural roads.

The main taxes that supply the FSR are:

1) Fuel tax (TIC)
2) Vehicle registration additional tax
3) Axle tax

Although the PNRR allowed substantially raising the construction of rural roads (1200 km/year), this rate shall allow meeting the countryside's needs (38000 km) only far in the future (about 2030). That is why the FSR text has been modified within the framework of the year 1999 finance law to enable the FSR redeem loans taken out by the concerned public law legal entities.
This step shall allow raising the rhythm of construction of rural roads progressively from 1200 Km/year to 2000 Km/year.

At the technical level, and to take up the challenge of passing from a construction rate of 300 to 1200 Km of rural roads per year, many measures has been set up including:

At the level of studies:
Rural roads' design has been adapted to the local specificity. The deadlines to work out enforcement files have been reduced and the approval thereof has been delegated to the Equipment Regional Directors.

At the level of works:
Specifications applied to current road works have been amended to take into account rural roads' specificity and avoid, thus, that looking for a quality level that is inappropriate to the non-surfaced roads context generates an unjustified addition.

At the level of the adapted and economic techniques:

In its concern to maximize the cost of road construction in the countryside, the DRCR initiated in 1996 an important research program, which focuses on improving techniques of rural roads construction and maintenance and the use in road techniques of less costly local materials.

These measures allowed indeed diminishing significantly costs up to 35 % in connection to the initially estimated cost.

2-4 Obtained results:

Rural roads construction aims are many and include mainly:

- Opening up the countryside;
- The socioeconomic development of rural populations;
- Improving access to socio-administrative services;
- Generating employment and fighting against illiteracy and poverty.

PNRR operations, launched since 1995, total up to the end of November 2002 a 7652 Km line divided into 4519 Km construction and 3133 Km laying-out. The line carried out is 7147 Km, 4207 Km of which is constructed and 2940 Km lay out.

To reach the opening up ambitious aim, other rural roads programs were started last years, such as the program of fighting against drought effects (4850 Km between 1998 and 2001) and the program of fitting out tracks by materials of the Equipment provincial teams (3000 Km between 1998 and 2001).

Thanks to the efforts made in this sense, the DRCR multiplied five times the annual financial resources allocated to rural roads and eight times the annual rate of rural road construction between 1990 and 2002.

2-5 Partnership in the road domain:

The partnership experience initiated within the PNRR has developed outside this program and concerned important rural roads projects sought by partners and co-financed with a contribution of the Ministry of Equipment and Transport.

Therefore, the content of conventions signed since 1990 between the Ministry of Equipment and Transport and its partners (Local communities, road users Associations and others) to carry out road projects in the various provinces of the Kingdom focus on 5423 Km and concern new roads construction, tracks fitting out and surfaced roads maintenance projects with an about 4.28 billion MAD overall budget. The Ministry's contribution is 2.52 billion MAD, i.e. 59% of the overall cost.

Thus, 294 partnership agreements have been signed including:

- 225 agreements are fulfilled
- 40 agreements, the operations of which are underway
- 29 agreements, the operations of which are not yet started.

Dividing up these agreements by type of partner appears as follows:

Partner	Length (Km)	Cost (M MAD)	Share of the Ministry of Equipment	Share of the partner
Local Communities	3712	3218	1778	1439
Associations	1277	805	599	206
Others	254	256	137	119
Total	**5243**	**4279**	**2515**	**1764**

Rural roads represent 87% of all projects carried out in partnership during the last three years and concern 1261 Km, 884 Km of which are constructed and 377 Km laid out tracks, with an overall budget that reached 774 million MAD. The Ministry's contribution represents 73% of the overall cost. These road projects carried out in partnership have had a positive impact on the improvement of living standards of the concerned rural populations.

3 – Rural roads socioeconomic impacts

Several studies of the rural roads' socioeconomic impact made in Morocco allowed giving prominence to the road infrastructures contribution to improve the living standards of populations in the countryside. Direct impacts thus quantified refer to:

- the impact on the transport infrastructure and services,
- the impact on the agricultural economy,
- the impact on social services such as health and education,
- the economic impact,
- the impact on the environment.

3-1 Study of the rural roads' socioeconomic impact in the northern area of Morocco

This study was launched in 2002 to evaluate the socioeconomic impact of ten rural roads projects in the provinces of Taza and Taounate, located in the northern area of Morocco. The methodology used is based on two kinds of complementary analysis, to wit:

- Before and after the project: the analysis to be undertaken consists in comparing the current state (state of reference or zero state) and the state after the project is carried out (five years later).
- With and without the project: the final aim of this stage is to compare the project area's economic data with those of a test area that had had the same characteristics as those of the project area before it is carried out and that shall not undergo any change (no road construction) during the next five years.

The analysis of the results of already held inquiries allowed identifying follow up indicators and to assess relevance thereof. The main indicators are given in the synoptic chart hereunder:

Selected effect		Indicator	Unit
Agriculture and Cattle breeding	**Agriculture and cattle breeding heritage**	Total SAU	Ha
		Irrigated SAU	Ha
		Bour SAU	Ha
		Cereals SAU	Ha
		Leguminous plants SAU	Ha
		Truck farming SAU	Ha
		Plantations (Olive trees)	Number
		Fallow SAU	Ha
		Number of tractors	Number
		Number of power-driven pumps	Number
		Number of harvesters	Number
		Number of sheep/household	Number
		Number of bovines/household	Number
		Number of local race/household	Number
		Number of crossbred race/household	Number
	Production factors	Quantity of used fertilizer	Qx/Ha
		Quantity of used seed	Qx/Ha
		Mechanized area	%
	Yield	Cereals yield	Qx/Ha
		Leguminous plants yield	Qx/Ha
		Truck farming yield	Qx/Ha
		Plantations yield	Kg/tree

SAU : **A**gricultural **U**seful **S**urface

Selected effect		Indicator	Unit
Socio-economic	**Education**	Number of classes (primary) Number of registered pupils (primary) Including girls Schooling rate Girls' schooling rate	Number Number % % %
	Health	Sanitary establishments attendance rate Doctor's presence rate Community clinics rate (treatment room)	Time/year D/week D/week Number
	Housing	Permanent structures rate Pisé structures rate	% %
	Incomes, consumption and prices	Average monthly income per inhabitant Average consumption per inhabitant Basic products average prices Sugar (2Kg) Oil (1L) Tea (125g) Gas (small bottle) Gas (big bottle)	MAD MAD MAD MAD MAD MAD MAD
Transportation & Travelling		Number of rural transportation vehicles (truck/pick-up) Number of private cars Number of motorcycles Traffic (normal day) Traffic (particular day) Journey cost in MAD/Km Commodity transportation cost (MAD/T/Km) Time (in Km) Road closure rate	Number Number Number Number/Day Number/Day MAD MAD Mn Day/year
Non-agricultural activities		Number of handcraft units Number of employees in services Number of flour-mills Number of employees (flour-mills) Number of press olive oil (*Meassarats)* Number of employees (*Meassarats*) Number of commercial units Number of handicrafts Number of commercial employees	Number Number Number Number Number Number Number Number Number

3-2 Study of the impact of infrastructure investments on development

This study, made by the Ministry of Equipment and Transport in 1998, focuses on the socioeconomic impact of two rural roads constructed within the framework of the PNRR. One located in the province of Beni Mellal and the other in the province of Tiznit.

This study brought out that the main impacts are of a more economic kind in the area of Beni Mellal and of a more social kind in Tiznit. Indeed, the road constructed in Tiznit aims at opening up *douars* seriously hemmed in, where agriculture is less developed. It is then normal that the impact of the road is due to the improvement of access to the main social services (schools, community clinics, administrations, etc.).
On the contrary, the road studied in the province of Beni Mellal fits in with an irrigated area where expenses per household are more important. Thus, the road, which favours marketing local agricultural products, has had a more evident economic impact (mechanization, livestock growth, diversification of crops, etc.).

The main conclusions made from this study appear in the following chart:

Impacts	Extent
Infrastructure and transportation service	
• Cut in the duration of journeys to the main social services	Up to 7 %
• Cut in the cost of transportation to the main social services	At least 33%
• Increase in the number of urban contacts of hemmed in households.	+2/3
• Increase in traffic	From 10 to 200 veh/day in Tiznit From 10 to 70 veh/day in Beni Mellal
• Increase in public transport's shuttle services.	Doubling
• Cut in commodity transportation	Divided by 2 in Tiznit (by 3 in winter) - 25% in Beni Mellal during winter.

Economic impacts

Prices	
• Prices of basic products in hemmed in *douars* are equal to those of the county. • Near disappearance of prices between seasons.	Difference lower than 2%
• Cut in the prices of basic products	From 3% to 5% during a normal period From 7% to 10% during a wintry period
Supply, expenses and consumption	
• A better supply of *souks* and increase in the number of visitors.	Doubling
• Increase in households' expenses	4% to 5%
• Economies for the purchase of a basket of basic products.	From 5% to 10% in Tiznit From 8% to 12% in Beni Mellal

Agricultural development	
• No modification of the allocation of crops	
• Livestock growth especially for crossbreed bovines.	From 16% to 95% pursuant to the species
• Important increase in the number of individual (especially motorcycles), commercial and farming vehicles.	The number of tractors multiplied by 5 in Beni Mellal and by 2 in Tiznit. The number of commercial vehicles multiplied by 8 in Beni Mellal.
Employment and activity	
• Diversification of jobs	
• Increase in the number of worked days	+ 14%
• A better share-out among the household members.	
• 15% of households have at least one of their members who works directly on a project during days average for a total salary of 2300 MAD.	
• Development of new activities	

Social impacts

Health	
• A better access to community clinics (reduction of the journey's time and cost	
Education	
• A better access to junior high schools (reduction of the journey's time and cost) and access continuity. • Increase in the schooling rate	12 points for boys and 23 points for girls.
Women's living standards	
• Increase in leisure (more free time) • Increase in the schooling rate of the rural girl.	

3-3 World Bank study

According to a study made in 1996 by the World Bank about the assessment of the socioeconomic impact of rural roads in Morocco, it comes out that:

At the level of transport infrastructures and services, vehicles use cost decreased seriously. Commodity transportation cost has fallen from 30 US$ to 15 US$ per ton over a 10 Km distance and passengers transport services highly increased.

At the agricultural level, on the one hand, the fruit production increased up to 31% between 1985 and 1995. Farmers raised by 150% their investment in thoroughbred livestock. On the other hand, the use of fertilizers raised by 60% and the number of non-agricultural jobs multiplied by six.

At the social level and in particular, the standards of living of girls and women, medical centres attendance doubled and the road has, indeed, facilitated the provision of care and afforded a better service quality. In addition, a great number of professionals proved to be ready to work in the accessible areas. Boys' schooling rate raised by 28% in 1985 and by 68% in 1995 and that of girls increased from 18% to 54%. Moreover, women have more free time and benefit from new job possibilities. Indeed, the insufficiency of transport infrastructures in the countryside limits the chances offered to rural women to participate to socioeconomic activities. These women spend much time to carry out hard works linked to wood gathering, in the absence of butane and to looking for drinkable water. In addition, transport problems due to the limits of the road network prevent women from getting necessary medical care and hinder efforts made to improve schooling rate, in particular for rural girls.

4 – Opening up road projects durability

Adapting road design to the ground features and to its use future use, as well as its maintenance, are essential factors of its durability.

The road network continuity is ensured by a regular maintenance according to standards that aim at keeping the level of service offered to the user. DRCR has developed and implemented, since 1990, a road maintenance management aid system. This system is based on three main modules:

The first module allows knowing better the road network. It uses a road data bank (BDR) and a SIG system that covers the cartography of the entire road network. The BDR, which is regularly supplied by data from visual inspections and data from UNI high-yield auscultation and deflection devices, enables to elaborate indicators that help the network administrators identify programs of wearing away layer replacement (surface indicators), reinforcement (structures indicators) or shoulders reloading (shoulders indicators).

The second module concerns the evaluation of road maintenance strategies based on the use of the HDM pattern that has been adapted to the Moroccan context. Strategy studies under budgetary constraints allowed planning better road maintenance operations, taking into account two ends, to wit, preserving the heritage and improving the service provided to the user.

The third module enables to follow up periodically (every two years) the road network service level and thus evaluate the effectiveness of the strategy used in maintaining this network.

Therefore, thanks to the efforts made to perpetuate the investments made, the part of the road network in a good to acceptable state switched from 53% in 1990 to 66% in 2000.
At the financial level, the durability of resources assigned to carry out and subsequently maintain projects carried out is guaranteed by the stability and even the continuous growth of the returns of the Road Special Fund, the main tax base of which is the fuels consumption tax.

A new opening up roads durability medium which we are witnessing today is that of the setting up of intervillage unions that tool up with equipment to develop and maintain rural tracks under their respective territory. Indeed, the purchase of this equipment cannot take place by having recourse only to the means available in one commune.

This new partnership process that comes to consolidate the action of the Ministry of Equipment and Transport in terms of rural populations opening up, and which has started to develop in many provinces of the Kingdom of Morocco, shall effectively contribute in ensuring the continuity of constructed roads.

5 - Lessons drawn

The economic and social development of the countryside constitutes quite obviously a strategic and inescapable choice of the Moroccan government in its interventions aiming at integrating the Moroccan economy in the free-trade area by the year 2010 or so. This development is conditioned by achieving road infrastructures that ensure permanently servicing hemmed in areas and contribute in their intra and interregional integration. The main lessons drawn from implementing the PNRR and partnership are summed up as follows:

1 - The opening up of the countryside takes on a large consensus of the various participants in the social development strategy. It is a national design to which join the government, local communities, civil society, as well as national and foreign investors.
The DRCR's experience in terms of partnership, which is many years long now, allowed overcoming difficulties met at the level of projects design and financing, institutional aspect, organization and follow-up of works.

Indeed, important efforts have been made by the DRCR to rationally and more effectively manage the partnership program. These efforts ended in progressively implementing new measures that allowed making partners aware of their responsibilities, facilitate budgeting operations and programming them so as to fulfil commitments made. A standard convention has been, therefore, established to integrate the main rules to be met the most essential of which are:

- Physical description of the project, the liabilities and the program of works to be borne by each partner
- Improving communication with the partner for a better coordination on site
- Restriction of the convention validity duration

These measures, progressively implemented, allowed to make partners aware of their responsibilities, facilitate budgeting operations and undertake a stricter follow-up based on a more and more controlled partnership strategy.

2 – Although the annual rate of rural roads' construction currently exceeds 1000 Km, this rate shall allow meeting opening up roads needs of the countryside only in the far future (2030). For that purpose, and to speed up this rate, the FSR text has been modified within the framework of the year 1999 finance law allowing, at first, to raise two loans to finance carrying out a rural road additional program concerning more than 900 Km in the northern area. The DRCR is preparing new programs with the aim of putting them into practice within the framework of generalizing the approach created for the other provinces of the Kingdom.

3 – Developing non-surfaced roads, at the opening up level, is an approach based on the minimal or fundamental access that ensures a continuous traffic at the less cost (at the rate of 1/3 of the construction cost), namely during rainy period. Hydrocarbon coatings constitute the last stage of improving these roads to adapt them to the traffic evolution and to the aggressiveness thereof and to justify for this purpose the equilibrium between services costs and benefits to the users.

4 – At the level of studies, national engineering made studies of more than 11000 Km of roads. At the level of works, more than 90 firms participated in carrying through operations of the PNRR.

5 – As far as the hierarchical organization of rural roads projects investment needs, the multi-criteria analysis method is widely used in Morocco by the DRCR to hierarchically organize the needs of improving these roads. In addition, the DRCR implemented in 2000 an economic evaluation pattern of low-traffic road construction.

This pattern is intended to provide a integrated tool allowing to measure the economic interest for the community of developing a track or constructing a surfaced road. The characteristic of this pattern is that it explicitly takes into account the main impacts of road planning at the level of the concerned economic sectors, in particular those related to agriculture, cattle breeding and tourism, in addition to advantages (called endogenous advantages) that are calculated with the help of the HDM4 model.