

Transport: Infrastructure and Services

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Case Study 7: Kazakhstan: Urban public transport reform serving poor users

Overview

“A community without roads does not have a way out.”

A poor man, Juncal, Ecuador
Voices of the Poor (2000)

A country's ability to unleash its economic potential is closely linked to the efficiency of its transport system. Transport is also an integral part of almost all daily subsistence and social activities. Poor households transport their water, their fuel, their food. They need transport to get to markets, jobs, and health clinics. The likelihood that the children of poor families will go to secondary school, especially daughters, is much higher if there are reliable and affordable transport services. Better transport facilitates poor people's participation in social and political processes. Without well-defined and effective transport policies and strategies, poor people will not be able to accumulate enough human, physical, financial, and social assets to get ahead. Transport therefore has to be an integral part of a country's poverty reduction strategy.

The chapter seeks to assist decision-makers in low-income countries integrate transport interventions into poverty reduction programs. Because transport has pervasive influences throughout a country's economy and social fabric it is hard to trace and measure the ultimate impacts of transport interventions on the welfare of poor households. Demand for transport is to a large extent derived from other sectors and have the greatest impact on poor people when other sectoral interventions are also adequately in place. Well-staffed health clinics have little impact on poor people who can not get to the clinics and vice versa

Good transport policy contributes to poverty reduction by enhancing efficiency and equity. Every policy intervention has both efficiency and distributional impacts. In that sense the two are not separable. Nonetheless, many governments take some actions in the transport sector primarily for efficiency reasons (major infrastructure investments, service deregulation) and some primarily for equity reasons (fare controls, subsidy of unprofitable services). While equity in general is good for efficiency, some equity oriented transport interventions have adverse consequences on efficiency (deficit financing arrangements). And inefficiency is, in the long run, usually harmful to the poor. Transport policy must therefore explicitly address the distributional effects of efficiency interventions, and vice versa.

Transport policies and strategies need to pursue a combination of interventions to meet national poverty reduction goals. For example, facilitating bicycle transport in urban areas is a pro-poor, cost-effective and environmentally sound intervention. Improving the management of road agencies and putting maintenance financing on a sustainable basis is sound business and holds enormous benefits for poor people both in terms of improved access and employment opportunities. Reforming loss-making transport agencies and providing more reliable services benefit those who rely on public transport. In the process huge amounts of public resources are freed up.

Section one outlines the objective of the chapter and stresses the importance of addressing both infrastructure and services in transport policies.

Section two places emphasis on understanding the impacts of transport on three core dimensions of poverty—economic opportunities, security, and empowerment—and the

prevalence of intersectoral linkages. It stresses the importance of public accountability for poverty outcomes, and highlights four strategic principals of a pro-poor policy framework:

1. Transport needs of poor people and poor areas should be recognized explicitly.
2. All transport interventions should address both efficiency and equity concerns. Projects that are primarily oriented to efficiency should address equity issues, and projects that are targeted at poor people should be implemented efficiently (be guided by “least-cost”).
3. Poor people should be fully compensated for any adverse effects of transport programs.
4. Transport interventions require full participation of all stakeholders, including representatives of poor people with particular emphasis on the needs of poor women and other vulnerable groups such as the disabled poor.

Section three proposes a set of diagnostic tools and key questions to assess i) the transport needs of poor people and poor communities, ii) the extent to which current transport policy supports the national poverty reduction goals, iii) the performance of the transport sector from a poverty reduction perspective, and iv) whether the sector’s institutional arrangements are conducive to poverty reduction.

Section four on policy and strategy options highlights three key areas:

1. Transport agency efficiency and effectiveness and institutional reform.
2. Formulation and implementation of a rural transport policy and strategy.
3. Formulation and implementation of an urban transport policy and strategy.

These areas are complementary and share a number of common related policy objectives such as a concern for employment generation, traffic safety, non-motorized transport, gender equality, the special needs of the disabled poor, the HIV/AIDS transport linkage, and the environment.

Section five focuses on issues of monitoring and evaluation specific to the transport sector and includes a table of proposed indicators.

The guidelines set forth in this chapter build upon current knowledge about the linkages between transport interventions and poverty reduction. While these guidelines need to be tested and refined, they can serve as a starting point for emphasizing poverty reduction outcomes in transport policy and strategy development and implementation.

1 Introduction

1.1 Chapter objective

This chapter highlights how transport is an integral part of an effective strategy to reduce poverty. Its objective is to assist decision-makers integrate transport interventions into poverty reduction programs. The chapter addresses two key questions: How can the transport sector contribute more effectively to poverty reduction? And, in this effort, what are the roles of government, the private sector, communities, and poor people and their organizations?

Responding to these questions is a major challenge because transport has a pervasive influence throughout a country's economy and social fabric. Transport affects poor people as consumers, producers, workers in transport operations, and groups exposed to adverse impacts. It opens up opportunities for regional social interaction and trade and so can also act as a catalyst for development. This pervasive and catalytic influence makes it difficult to trace and measure the ultimate impacts of transport interventions on the welfare of poor households.

The chapter addresses both the positive and the negative linkages between transport and poverty reduction. While our knowledge of the linkages between changes in transport policies and changes in the welfare of poor people is still evolving, this chapter seeks to reflect what we know to date.²

1.2 Infrastructure and services

The transport sector has often been narrowly viewed as a bricks and mortars industry and principally thought of in terms of large infrastructure projects such as highway and port construction. This is in part because government policy in many countries (and development agencies) gives high priority to efficiency enhancing interventions. But low cost infrastructures and transport services play a very direct role in poor people's lives enabling affordable access to markets, jobs and essential goods and services. They facilitates the flow of information and credit. In fact, transport is an integral part of most public interventions targeted at meeting the basic needs of poor people (for example, food, education and health care). Without adequate access roads poor farmers will not produce cash crops for urban populations, may not send their children (especially daughters) to school, or make use of preventive health care. In emergencies, their ill will often not reach clinics in time. Without adequate transport poor people in rural and urban areas will remain in physical isolation and "trapped" in poverty.

The transport sector comprises several modes (road, rail, maritime, inland waterway, aviation, and urban transport). Each mode involves infrastructure (roadways, rail tracks, ports, airports, terminals, sidewalks, footpaths and footbridges and so on) and services (such as trucking, shipping, bus passenger transport and bicycle-taxi). Each mode also provides several types of services which can be identified by both geographic coverage

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(international, domestic, rural, urban, and community) and by users (passenger and freight). Users are also a diverse group with transport needs that differ widely—for example, across rural and urban areas, between gender and for persons of different ages or with disabilities, and for motorized and non-motorized (NMT) transport services.

Transport is an important part of both the private and the public sectors. Most transport services can and should be provided by the private sector. Private sector participation in transport infrastructure privatization and financing is growing in many developing countries. Nonetheless, public investment in transport will continue to be significant in low-income countries where markets are small and risks are high and private financial markets are not well established. Public investment in transport infrastructure usually accounts for 2.0 to 2.5 percent of GDP, and it may rise as high as 3.5 percent in countries modernizing outdated infrastructure or developing new. Demand for freight and passenger transport in most developing countries are growing 1.5 to 2.0 times faster than national GDP. Value added by the transport sector typically accounts for 3 to 5 percent of national GDP.

2 Transport and Poverty Reduction

2.1 Transport and poverty linkages

Poverty is associated with very low income and consumption and is manifested in many dimensions—malnutrition, ill health, illiteracy, vulnerability, physical isolation, and political and social exclusion. Each of these dimensions tends to reinforce the others and they share important transport linkages. Good transport policy contributes to reduce poverty in all its dimensions and stimulates economic and social development and inclusion:

Creating opportunity. Better access to markets creates economic opportunities for poor people to sell their labor and products. Better transport infrastructure and services facilitate access to schools and health clinics. Good transport policy contributes to economic growth by lowering transaction costs, promoting economies of scale and specialization and hence lowering domestic production costs, widening opportunities and extending connection to rural hinterlands, expanding trade, integrating markets, and strengthening effective competition (see **Pro-Poor Growth** chapter).

Facilitating empowerment. Empowerment can take different forms, such as holding public consultations in poor communities on transport problems and plans, involving poor people and their organizations in priority setting and implementation of transport interventions, and public posting of available budgets and planned expenditures. Accessible, reliable, affordable, and safe transport services help make it possible for constituents to get to meeting places and town centers, facilitate the flow of information and so political and social participation and accountability. Nonetheless, even when transport services are available and affordable to poor households, women may not be able to use them due to cultural or social norms nor may services be available for the disabled. Transport interventions therefore must be adapted to the needs of women, the disabled and other vulnerable groups.

Enhancing security. A reliable transportation system helps a country respond to economic and natural shocks, such as major losses of export demand and droughts. Access to public transport facilitates the job search of urban residents. In rural areas, the impact of famine can be substantially reduced when food can be moved from areas with surplus to those

with deficit. Provision of all-season basic access roads and transport services can greatly reduce vulnerability and the severity of the impacts of household-level risks such as medical emergencies.

2.2 A pro-poor approach to transport policy

A pro-poor approach to transport policy and strategy development looks across the linkages of poverty and transport comprehensively, builds synergies with related sectors, and identifies effective public actions. It is important to keep in mind that transport is an intermediate service. Demand for transport is derived from activities of other sectors (health, education, farming, manufacturing, and so on.). Transport interventions have greatest impact on poor people when other sectoral interventions are also in place. Conversely, the effectiveness of interventions in the health, education, and agricultural sectors depends on the adequacy of transport infrastructure and services. (Well-staffed health clinics have little effect on the health of poor people if they can't get to the clinics.)

Three features characterize a transport policy and strategy oriented toward poverty reduction:

- **Full participation of all stakeholders, including representatives of poor men and women and other vulnerable groups (such as the disabled) throughout the process.** Too often, transport strategy has been merely an exercise for government economic planners and technical specialists (see the **Organizing Participatory Processes** chapter).
- **Close collaboration between transport specialists and specialists from other sectors.** While developing a transport policy or a transport component for a poverty reduction strategy is a task for transport professionals and policymakers, it requires collaboration from specialists and policymakers from other major sectors, especially education, health, other infrastructure sectors, and rural, urban, and private sector development.
- **Accountability for poverty outcomes.** Public actions need to be linked to poverty outcomes. The success of public actions has been typically measured by sector outputs, such as kilometers of rural roads paved and number of buses put in service, and policymakers have placed little emphasis on the real poverty impacts or outcomes. While sector indicators are important to ensure technical efficiency, they need to follow from decisions that specify anticipated poverty outcomes (see section below on monitoring and evaluation).

2.3 Policy principles

Strategic principles provide the basic guidelines for a policy framework. Four strategic principles are proposed to ensure the design and implementation of transport policies and interventions are pro-poor:

1. Transport needs of poor people and poor areas should be recognized explicitly.

This is an overarching principle. The transport sector can be a powerful ally in a country's attack on poverty—transport sector policies and strategies must support the national

poverty reduction strategy, and, in a sustainable manner, respond to the needs of poor people, poor communities, and vulnerable groups.

2. All transport interventions should address both efficiency and equity concerns.

Interventions that are primarily oriented to efficiency should address equity issues, and interventions that are targeted at poor people should be done in an efficient way (be guided by “least-cost”).

This principle arises from a recognition that transport’s dual role in growth and redistribution can involve win-win choices but also trade-offs at the program or project level. The integration of transport into a country’s poverty reduction strategy must reflect transport’s dual role in promoting economic development and in supporting poverty-targeted interventions.

Economic efficiency is important because many transport investments involve large capital investment. At the same time, sound management of transport assets (for example, ensuring roads, bridges and tracks are maintained in good condition) is generally more important than new investment, and hence a crucial element of this principle. The same applies to non-physical interventions, such as regulatory reform and private sector participation, which facilitate low cost services and use of non-motorized transport (NMT). It is usually possible to estimate a robust measure of an intervention’s economic worth in terms of its net present value or economic rate of return. Such measures should guide the design, prioritization, and selection of feasible interventions.

An emphasis on economic efficiency should be complemented with an emphasis on the distributive impact. One way of doing this is by using distributional weights in economic assessment tools. The determination of such explicit weights, however, is open to manipulation and can obfuscate efficiency measurement. Another way is to segment the benefit analysis by income group which is also a challenging task.

While economic growth generally brings benefits to poor people, in many cases their basic transport needs may be more effectively addressed through direct targeting. Transport needs of the very poor should be identified and, when justified on social/political/economic grounds, be made a coordinated part of overall government policies to assist poor groups. Cost-effectiveness is the key to successful targeted interventions. To be cost-effective, a realistic minimum technical standard should be set for basic services targeted to poor people, and emphasis be given to the least-cost solutions including assessment of any non-transport solutions.

3. Poor people should be fully compensated for any adverse effects of transport programs.

The national transport policy must provide a framework for identifying and addressing any adverse impacts of transport interventions on poor people. It should provide full compensation of adverse impacts—poor people should not be harmed by transport intervention. A number of common adverse impacts are listed in Box 2.1.

An especially difficult question is how to deal appropriately with the impact of an intervention that would directly make poor groups worse off. For example, a port development may involve resettlement of poor people, and area control of pedi-cabs may

put drivers out of work. The net final incidence on poor men, women and children should be adequately identified by analyzing the likely distributive impacts. The analysis may suggest that the affected poor groups should be directly compensated, that the intervention should be modified, or that a different intervention chosen. Both users and non-users of transport may be affected. For example, construction of a limited access road through an urban area may result in resettlement of poor households and displacement of NMT users. Both poor groups warrant compensation on the basis that they should not be harmed by interventions. To ensure that compensation takes place a national policy stance and framework are required.

Box 2.1: Common adverse impacts of transport interventions.

In appropriately designed transport policies and interventions can harm poor people. The following types of impacts are common and warrant explicit attention:

- Displacement of a transport mode that is popularly used by poor people and other vulnerable groups to make way for another (for example, the displacement of pedestrians and bicycles and other low-cost- modes by cars and trucks).
- Disruption/partitioning of low-income neighborhoods due to road construction.
- Involuntary resettlement.
- Excessive regulatory control of transport services, especially entry barriers to the informal sector.
- Transport tariff increases as a result of removal of a subsidy.
- Traffic accidents, especially for pedestrians.
- Environmental pollution emission concentrations and noise from vehicles.
- The spread of HIV/AIDS.
- Labor redundancy caused by restructuring, commercialization, and privatization of state-owned transport enterprises

Although these impacts can affect all income groups, poor people are likely to be the hardest hit as they have few if any resources to adjust to the impact imposed (for example, by relocating), i.e., these impacts are typically regressive. Poor women are particularly vulnerable and poverty reduction and compensations strategies must be gender-sensitive to ensure they will benefit.

4. Transport interventions require full participation of all stakeholders, including representatives of poor people.

Stakeholder participation is a central theme throughout this Sourcebook. It is no exception for the transport sector and participation was noted in the previous section as one of the key features of a pro-poor approach to transport policy and strategy development. It is mentioned again here because the participation of poor men and women is critical also in the planning, decision-making and management of specific transport interventions. Decisions on transport investment can easily overlook needs and concerns of poor groups (for example, for non-motorized transport) and the costs imposed on them (such as pedestrians falling victim to motor vehicle traffic accidents. See **Case Study 5** on the importance of sidewalks.) Experience demonstrates that broad-based participation by affected groups/stakeholders in decision-making can ensure that the benefits of transport improvements reach poor people. Empowerment of local communities, especially in poor rural areas—through consultation, participation, and ownership of local infrastructure—is also crucial for the social and financial sustainability of transport improvements.

3 Diagnosis

This section proposes a diagnosis to determine how the transport sector can respond better to the needs of poor people and contribute to the national poverty reduction objectives. First, the integration of transport interventions within a country's poverty reduction strategy needs to start from a sound understanding of the national poverty conditions. Second, changes in policy have to be based on an assessment of current transport policy and programs, sector performance, and the institutional arrangements for management and financing of infrastructure and services.

3.1 How to determine the transport needs of poor people

3.1.1 Transport-poverty linkages at the local and household level

To determine how the transport sector can best help reduce poverty, one must first understand the basic needs of poor people and the extent to which transport is required to meet those needs. This is not an easy task—poor people are themselves a diverse group within a country and even within a community, and their specific needs vary substantially. Knowledge of the transport conditions poor people confront, and how these conditions interact with other factors (for example, residential location and income earning prospects of poor people), is typically modest, especially for urban areas. So too is an understanding of how poor people perceive their transport problems.

Local needs and priorities can be identified by consultation with poor communities. This information can then serve to develop responses in a participatory fashion. In drawing upon this information to integrate transport issues, the location, requirements for the movement of persons and goods, and capabilities of poor people can be identified. It is important to ensure that consultations are designed to ensure that the views of both poor men and women and other vulnerable groups are captured.

The sustainable livelihoods approach can be useful in analyzing the role of transport in poor people's lives (see **Technical Note 1**). This approach helps understand how transport is an integral part of livelihood strategies and how lack of mobility can be a constraint to achieve more income, better health, and reduced vulnerability.

Another tool which can help understand the transport needs of poor men and women is a transport-poverty profile (TPP). It uses quantitative data and contains basic information on the quality, quantity, and prices of transport infrastructure and services available to different socioeconomic groups, and to men and women. The information helps understand the transport needs of poor groups and sharpen the design of the transport strategy for poverty reduction. Even a simple accounting of the TPP used when identifying projects can prove very helpful in addressing transport-related poverty issues later in designing and implementing a project.

Household surveys can help establish how much time, effort, and expense, as well as other problems, poor people face in using transport. This can be done by incorporating a transport module within regular poverty and social assessments, and living standard surveys (see the chapter on **Poverty Data and Measurement**). These transport modules should cover the individual members of poor households, by age, gender, and disability.

This is important as substantial differences by gender in the transport burdens and access to transport services exist in many countries.

The transport tasks facing women and their needs can be identified from individual responses in household surveys in terms of effort (kilogram-km per day) and time spent (hours). Care must be taken to ensure that the information on women's travel activities and time use is collected directly from the women concerned, as male household heads will likely under-estimate the time women spend traveling for domestic purposes. Table 3.1 shows how strikingly different the transport patterns and transport burden are of men and women in rural Sub-Saharan Africa. Gender differentiation in transport patterns may arise from cultural as well as economic factors shaping the division of labor within households and gender discrimination in wages. It is clear that any effort to improve rural transport which does not involve women will have very little impact on rural livelihoods. (See the chapter on **Gender** and also section 4.3.3. in this chapter on gender issues).

Table 3.1. Comparison of Female-Male Transport Burdens (ton-kms per person per year)

	Kasama (Zambia)	Lusaka Rural (Zambia)	Mbale (Uganda)	Kaya (Burkina Faso)	Dedougou (Burkina Faso)
Adult females	35.7	30.3	39.0	10.3	15.5
Adult males	7.1	9.8	8.6	3.6	4.4

Source: Barwell (1996)

3.1.2 Spatial poverty-transport mapping

The inherent geographic dimension of transport lends itself to geographical targeting. For such targeting to be effective, planners must know where poor people live (as a percentage of the total population in a region) and what level of basic services they need. This knowledge can be gained by overlaying a spatial poverty map with a map that indicates the availability of transport infrastructure and services in terms of isochrones.³ Such maps could also be overlaid with data on the spreading of HIV/AIDS. All data must be collected at the lowest jurisdiction possible and the mapping done separately for men and women—men and women have different travel patterns as they often have different responsibilities and use different services (see **Poverty Data and Measurement** chapter).

While lack of recent and reliable data is a common problem, it is important to establish and integrate the process of collecting and assembling data, with the purpose, costs, and benefits of the data to be collected. Some countries already have detailed socioeconomic statistics at the local level, although frequently the data is not disaggregated by gender. With relatively low costs, these statistics can be used to construct poverty-transport maps.

³ Isochrones are like contours, linking points of equal remoteness in terms of access time from a selected point (usually a city or regional center).

3.2 Assessing current transport policy

A second step of the diagnosis is to assess broadly whether and in which way current policy is contributing to reduce poverty. A wide range of policies affect transport; the following checklist highlights the types of issues that need to be scrutinized:

- Is there a national transport policy? If yes, does it address poverty issues? Are there explicit policy targets for poor groups (e.g., targets for proximity access to all season roads and public transport)?
- Do policies require and facilitate full consultation and participation by representatives of all stakeholders in decision-making on transport?
- Do transport sector policies and regulations minimize opportunities for corruption? Are budgets and plans published in newspapers and posted in public?
- Is private sector participation an explicit element of policy for planning, supplying, managing, and financing transport infrastructure and services? Has the performance of the private sector been assessed?
- Has a priority list of policies and programs that address infrastructure condition and the adequacy of transport services, especially for poor people, been identified?
- Do government regulations support or inhibit the means of transport used by poor people? Are non-motorized forms of transport (for example, bicycles) taxed excessively?
- Do transport policies and planning procedures take explicitly into account gender? Are there discriminatory barriers limiting the entry of women as entrepreneurs of transport services or civil work contracts (for example, collateral)?
- Do transport policy and strategy maximize mobility of poor people with disabilities? Are there standards on accessibility of public transport vehicles, and the physical environment? Are these standards applied?
- Are standards applied in the transport sector (for example, rural road design standards) appropriate to the country's circumstances? What would be the consequences of adopting lower road standards for rural roads with low traffic volumes?
- Are transport sector policies and programs coordinated with other programs aimed at poverty reduction? Are donor poverty programs in the transport sector coordinated?

By answering this type of questions, analysts should be in a good position to assess a country's transport policies with emphasis on needs and problems facing poor groups. They will also gain a sense of the potential actions which can enhance the transport sector's contribution to the national poverty reduction goals.

3.3 Assessing transport sector performance

Sector-level performance indicators can provide a preliminary diagnosis of a country's transport situation. Both "objective" technical measures (for example, road roughness index) and "subjective" community survey measures (for example, road condition—good, fair, or bad) may be used. Together with comparators from other countries and other benchmarks, a few key indicators can provide initial summary information of the national

transport system's condition and performance—especially in highlighting excessive costs, bottlenecks, and barriers.

At the most aggregate level improved accessibility is the objective of transport policy, and hence the appropriate summary indicator. But the most appropriate indicator of accessibility will vary by location.

In **rural areas**, “basic accessibility” may be defined in terms of passability (by motorized or non-motorized vehicles). The degree of impassability may be measured as the (maximum) number of consecutive days motorized transport cannot use a road (or other facility, such as a waterway). To guide policy and interventions, a threshold level of “impassability” needs to be set, depending on how critical any link is to maintaining access, and drawing heavily on community views about the consequences involved with being “cut-off” for any length of time. From an individual viewpoint the critical issue is often access to produce markets, health care and other essential services. An alternative summary indicator, therefore, is the proportion of rural population living within 2 kilometers of an all weather road, or a regular transport service.

For **rural-urban and inter-urban transport** accessibility to important facilities or locations typically involves a number of transport “links.” For example, accessibility from a remote rural agricultural community to a town or regional market will involve a local rural road and probably several secondary or provincial roads. Hence the basic accessibility of the rural community depends not just on local motorized or non-motorized passability, but also on the good condition of the secondary roads linking to the market center. Often relatively remote communities will express strong priority for the good condition of the connecting secondary road, as this supports a fuller range of services. Accessibility can be indicated by the generalised cost per unit of movement for personal travel and freight—tariffs, time, and other service quality costs such as safety.

For **urban movements** where there may be many different locations at which particular trip needs can be satisfied, and origin/destination linkages are very complex, accessibility may be measured as the average generalized cost of access to major facilities (employment, schools, clinics, shops, and so on) weighted by the relative importance of those trips in household trip patterns. This can be calculated for a city as a whole or for parts of it, thus allowing the accessibility of those living in poor areas to be compared with that of those in richer areas.

More in-depth analysis will be necessary to probe particular issues and exploring ways to address them. Hence it is necessary to look at various components which contribute to good accessibility, particularly the efficiency of transport operations, which is in its turn affected by market and institutional structures and public policies.

Operational components include the adequacy of the fixed and mobile assets, indicated by the degree of congestion in their use, the quality of asset maintenance, the efficiency of utilization of the assets, the reliability of operations and their vulnerability to adverse weather and other conditions. The environmental impacts, safety and security of transport operations are also important to social efficiency of operations and should always be a policy concern.

Structural components are important because economic regulations that artificially restrict entry to the transport service market limit competitive pressure and are hence a potential source of low performance. Hence the level of competitiveness of the sector, the existence of an adequate regulatory framework, the prevalence of state monopolies, and the scope for the informal sector, are important indicators of an effective market structure.

Policy components affecting the general quality of transport supply include the allocation of public resources to the transport sector, the levels of subsidy and the efficiency of the targeting of subsidies to policy objectives. In transport, as in other sectors, performance is likely to be enhanced by ensuring that a wide range of stakeholder interests are involved in sector policy formulation at the lowest (most local) levels possible. The adequacy of policy for cycling and walking is also particularly important to the poor. A system performance indicator of particular interest to the poor is the retail cost of a non-motorized vehicle, such as a bicycle, as often this is the only mode affordable to poor people. In many countries, bicycles are subject to very high tariffs and/or taxes, making this otherwise low-cost mode unaffordable for poor people. Road transport costs can vary substantially as a result of the policy. For example, it was found that operating costs of a tractor and semi-trailer were four times as high in some African countries than in Pakistan, mainly due to taxes and an over-regulated business environment (Hine and Rizet 1991).

Performance indicators for these components need to be developed for each significant mode—road transport (covering both motorized and non-motorized services), railways, inland water, maritime, urban public transport, and aviation—covering both infrastructure and service components. They should also consider differences of service received by gender where possible. Annex 1 sets out a possible list of performance indicators grouped relating to operational performance, structure and policy both at a sector wide level and disaggregated into urban, inter-urban and rural sub-sets. These indicators are inevitably only partial measures and therefore must be interpreted with care.

These indicators can be used both for assessing existing conditions; and as the basis for monitoring sector development over time under the impact of policy interventions, as discussed in Section 5. Using these indicators a diagnostic profile and analysis can be put together, preferably at a sub-national/regional level, both in quantitative (for example, domestic freight rates) and qualitative (for example, regulation of entry and prices) terms. For this to be most helpful acceptable or desirable ranges of value and appropriate “benchmarks” need to be established for a particular country’s circumstances.⁴

To learn more on the selection of indicators, see Gannon and Shalizi (1995): http://www.worldbank.org/html/fpd/transport/publicat/twu_21.pdf.

⁴ We encourage practitioners to send us your feedback on appropriate levels so that this toolkit can become more useful to you: transport@worldbank.org.

3.4 Assessing institutional arrangements

3.4.1 The roles of the public and private sectors

An assessment of the market structure of transport infrastructure and services is necessary for two main reasons. First, the transport sector throughout the world typically has long been subject to substantial government regulation and there is strong evidence that increased involvement of the private sector in management and financing of both infrastructure and services produces better value for money, also for poor people. Second, the transport industry market structure will indicate which groups are likely to retain the benefits from transport projects. In a transport market with ineffective competition, up to of the order of one-half of the benefits (lower transport rates) of transport infrastructure improvement may be captured by the service providers and hence not passed on to users, such as the poor farmers in the area served by the road.⁵

Most transport infrastructure must be supplied in discrete “lumps” (such as a roadway, rail link, bridge, port/berth, or airport runway) and therefore by one agent—often the government as “asset owner.” In contrast, many transport services (especially in the road sector) can be supplied under conditions of free or contestable entry, and in high volume markets, by many competitive operators. Even subsidized services that are justified on poverty policy grounds can be efficiently provided by a private firm through competitive tendering for a specified level of service. As a result, both public and private sectors have a varying degree of participation in the ownership, provision, and operations of transport infrastructure and services. In addition to the commercial services, many transport needs are met by individualized modes of transport—non-motorized and motorized.

Certain types of transport infrastructure and services involve economies of scale and thus can be natural monopolies or have significant monopoly power. On the presumption that competition in such markets is likely to be wasteful or not possible, regulations in the transport sector often limit the number of providers. This limits competition both in the market and for the market. (An example of competition for the market is the competitive tendering of bus franchises.) The emergence of new technologies in the last several decades, however, has significantly reduced scale economies and eliminated or weakened concerns about the monopoly power of some components of transport infrastructure (for example, terminals, berths and contracting-out maintenance) and most services. While many governments have responded to the changes and reduced the range and severity of regulation (especially by allowing competition for market franchises), some governments remain far behind in reforming their regulatory frameworks.

Road management and financing is another area where government is increasingly working in partnership with the private sector. In countries as diverse as Guatemala, Lao PDR, Latvia, the Philippines, and Zambia, governments and road users, frustrated by the poor state of the road network, are commercializing the management and financing of their

⁵ Moreover, even where transport service markets are competitive and transport cost savings are passed on to users, in the long term, part or all of these benefits may translate into increased land values because people are willing to pay more for more accessible land; landowners benefit. If rich owners hold the land in an area, the ultimate outcome of the transport improvement may be regressive, depending on whether this is addressed effectively by various forms of property and income taxation.

roads. They set up road management boards and road funds in order to involve civil society and make road users pay for the level of road service they want (see section 4.2.5 of this chapter on institutional reform, and Heggie and Vickers, 1998). In addition, where adequate capacity of the private sector exists or can be developed, many of the functions associated with managing the road system (design, construction, and maintenance) may also be contracted out to the private sector under performance contract arrangements.

Against this background, it is useful to identify how involved the private sector is in transport, in especially infrastructure: where, in what way (full concession or management contract), under what regulatory or contractual conditions that govern prices and quality, and with what results. Indicators of efficiency include the degrees of financial autonomy, commercialization, tariffs of each mode, and trends relative to benchmarks of international "good practice."

The core roles of government in transport include developing and administering policy (including the allocation of expenditures across functional areas), dealing with issues that transcend private action (notably market failures including monopolistic power and externalities such as traffic accidents, congestion, and pollution), managing social obligations arising from the transport sector, and monitoring sector performance. Key questions to assess the allocation of public expenditures and the need for institutional reform include:

- Are market failures being tackled? If so, which ones and how?
- Are distributive concerns being addressed by explicit policies targeted at poor groups?
- Are public expenditures for the sector adequate for addressing the sector issues?
- Does the budget allocation fund the capital spending and neglect the recurrent costs?
- Is there any way to reform the recurrent cost funding mechanism?
- Does the budget process take into account spending for traffic safety and pollution mitigation?
- Are services provided efficiently, at least cost, and responsive to user demand?
- Are state-owned enterprises' financial obligations/deficits on budget?

Additional questions concerned with intergovernmental institutional arrangements, include:

- How do the current intergovernmental fiscal relations affect transport investment and maintenance at the national, state, and local levels?
- Are these arrangements efficient and responsive to the needs of poor groups?
- What is the local fiscal capacity if some transport responsibilities (for example, road maintenance) were to be decentralized?

3.4.2 The role of communities

An assessment of the involvement of communities in the transport sector will indicate the type of policy and strategy interventions required to make them formal partners to local government transport agencies. Poor people and communities are often viewed as beneficiaries or passive targets of interventions. But they can play a significant role in improving physical access and transport services, and government agencies need to recognize that the role of poor people and their organizations go beyond participation in public consultations.

The physical and financial reality in many developing countries dictates that communities have no option but to get involved in improving their roads, tracks, and footbridges. Community ownership and management of these types of infrastructure is a viable way of progressing to sustainable basic access for all. In fact, even if some countries could afford to publicly provide sustainable transport infrastructure to all their remote and poor communities, government ownership would not necessarily be the best option. There is strong evidence that when local transport infrastructure is voluntarily owned and managed by communities, its condition is better and the cost of upkeep and maintenance is significantly lower than when the same type of infrastructure is owned and managed by a public agency (Malmberg Calvo 1998). When the incentives are right, communities have shown that they will seize such responsibilities.

The role of governments—at local and national levels—is to leverage the strong will of poor communities to improve their livelihoods, and to strengthen their capacity—organizational, technical and financial. Transport professionals in technical ministries and local government departments need to reach out to community based and non-governmental organizations who work in villages and poor urban neighborhoods. Opportunities should be pursued to work through these organizations, as well as to assist directly communities who want to improve their infrastructure.

The following six questions serve to guide an assessment of the role of communities in transport, and a formulation of policies and programs to stimulate community involvement and ownership of local transport infrastructure:

- Is there a legal framework which enables communities to register ownership of their local roads?
- Are government transport agencies at local and national level aware of the benefits from stakeholder consultations and community involvement?
- Are the processes through which investment decisions are reached in the community democratic and involve poor and other vulnerable groups including women and the disabled? If this is not so, there will likely not be local ownership and wide-spread commitment to maintain the improved assets and the needs of poor people are not served, or there may have been other types of investments which would have served better the interest of the community's poor.
- Are communities making informed investments decisions being fully aware of the implications of their options and choices (particularly with regard to future maintenance requirements)?

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- Does the national transport policy support the creation of user associations which represent the transport needs of poor people (pedestrian, bicycling, hand-carts, rural passenger taxis, animal-draught, and so on)?
- Is there transparency in planning and decision-making, and with budgets? Do transport agencies facilitate community access to information?

*To learn more see chapter on **Community-Driven Development**.*

4 Policy and Strategy Options

This section provides guidelines for integrating transport into a national poverty reduction strategy and aligning transport sector priorities in a resource constrained environment. It points to the importance of ensuring transport agencies operate efficiently and effectively, and highlights the value of specific policies and strategies for rural and urban transport. It also addresses a number of related policy concerns such as employment generation, traffic safety, non-motorized transport, gender equality, the special needs of the disabled poor, the HIV/AIDS-transport link, and the environment.

4.1 Setting priorities

4.1.1 Aligning transport priorities with the national poverty reduction strategy

From time to time, governments modify their transport policies and investment programs to serve better the defined national goals. In most countries, transport policy and strategy mainly serve economic development. Increasingly national goals include specific poverty reduction targets. Transport policies and strategies must be revisited to ensure the sector contributes effectively to reduce poverty in all its dimensions.

A number of factors condition transport policies and strategies, including the size of the population, physical geography, resource base, location or proximity to the world markets, level of urbanization, extent and condition of transport assets, institutional capacity, regulatory status, and potential for private sector development. In addition, the transport policies and strategies must be supportive of the national growth strategy. All this means that the appropriate areas of emphasis will vary. As illustrated in Table 4.1, for low-income countries where the majority of the population is rural, provision of basic accessibility from farming communities to markets and social services will be a major concern. And for a country with major economic activities in urban areas (manufacturing and services), city efficiency and livability are very important and hence urban public transport is a high priority. Many countries clearly pursue a combination of growth strategies, and their transport policy and priorities will depend on, among other things, their stage of economic development.

Table 4.1. Growth Strategy and Transport Priorities

Growth Strategy	Transport Priorities
Agricultural development	Farm to market access; Inter-city transport corridors linking with market centers
Manufacturing and services sector development and urban efficiency	Inter-city transport corridors linking major centers; Urban public transport
International trade	Logistics and facilitation; ports

4.1.2 Choosing interventions

A major challenge for a low-income country in fighting poverty is that the wish list of things to do is long but available resources are limited. Economic efficiency and social equity objectives will not always be compatible at the program or project level, even though these are mutually reinforcing in the longer term. Setting priorities under resource constraint is thus important. Decisions about priorities often involve trade-off and are therefore political. Decisions should be made on the basis of participation of, and consultation with, all stakeholders, especially poor groups.

Most public actions in the transport sector aim to improve the efficiency of a mode or a corridor, or provide physical access to income-generating activities (such as mining or tourism). Usually, the demands in these cases can be estimated. To prioritize these public actions, analytical tools such as net present value (NPV) and economic rate of return (ERR) should be used.

Estimation of the distributive impact of these kinds of transport interventions should be part of the evaluation task. In many cases, however, tracking the “full and final” changes in the welfare of various groups will be impractical to estimate. But there are some guidelines that can help in identifying “dominant” impact linkages, for example, knowing the influence of different market structures. The main focus should be on estimating the impact on poor groups, with primary attention to adverse impacts.

The criteria for choosing directly poverty-targeted public actions are different. Such interventions should not be prioritized along with efficiency-oriented public actions on the basis of conventional measures such as NPV or ERR as most cannot be evaluated by cost-benefit analysis. Cost-benefit analysis typically measures benefits by monetary willingness-to-pay (WTP) as revealed through the market system. When poor people do not use transport services because affordability is low or service is unavailable, the applicability of their WTP is limited, although still relevant to policy design.⁶ A more appropriate priority measure is the cost-effectiveness of the resources allocated to reduce poverty. Poverty-targeted public actions should still be concerned with economic efficiency by focusing on the least-cost options to achieve objectives. An example is given in Case Study 3 from Andhra Pradesh, India.

⁶ Low income commuters may be paying higher fares for inferior service by formal public transport while informal sector transport services are both economically and commercially viable.

Given limited knowledge of the relationships between separate specific inputs to reduce poverty (for example, improved travel time to a local health clinic) and poverty outcomes (for example, the local infant mortality rate), it is necessary to develop cost-effectiveness indicators as intermediate indicators. For example, an intermediate outcome of provision of basic access—to health clinics—can be adopted on the working assumption that this will improve the health/capabilities dimension of poverty. To guide the allocation of resources, the unit cost of providing basic access to various communities, in terms of dollars per poor person/household served, indicates the level of cost-effectiveness. This dollar cost can then be compared with dollar costs of providing other intermediate outcomes related to poverty reduction.⁷ Government can consider the information these indicators provide in determining how to allocate limited resources across different instruments and sectors for poverty reduction. The disadvantages of cost-effectiveness as a criterion to judge public spending options are outlined in the **Public Spending** chapter.

In situations where different transport modes/sub sectors are not functionally related, i.e., one mode does not depend on another, cost-effectiveness measures can be developed and compared across sub sectors. Again, these measures will typically represent intermediate indicators (and not poverty outcomes). For example, the cost of providing basic access by a rural road (in dollars per poor person served per annum)—an intermediate indicator—can be compared with the cost of providing that basic access in different regions, by different modal infrastructure (such as inland waterway, jetties, and ramps), and with the cost of providing road access for public transport service into poor communities in peripheral settlements of urban areas (again in terms of dollars per poor person served per annum).

Where sub sectors are related (as is the case, for example, with a bus feeder service to an urban rail line), similar cost-effectiveness measures can be developed, but these need to be based on the various combinations (alternative levels of cost) of the related sub sectors. In all these situations, stakeholders should be consulted on the choice of cost-effectiveness measures.

Cost-effectiveness analysis is particularly important for assessing the potential benefits of different interventions for poor women. As many women do not have access to income earning (or credit) opportunities, many of the benefits from time and energy-saving interventions must be measured in terms of increased time to ensure children attend school, taking children and the elderly to health centers, and increased participation in the management of community infrastructure.

4.2 Institutional reform of transport agencies

4.2.1 The problem of inefficient transport agencies

Inefficiently managed transport agencies invariably provide expensive and unreliable services. This impacts poor people because unnecessarily high costs of transport translate directly into more expensive bread and milk. High tariffs also act as a brake to travel for social reasons making it difficult for rural households to maintain important social contacts in the city, and for urban migrants to remain close to the families they have left behind. Put

⁷ Alternatively, comparison of indicators may be made easier by using specific effectiveness to cost indicators, such as the number of poor persons served with basic access to a health clinic per thousand dollars spent.

another way, inefficiently operated roads agencies, ports and railways subtract value from the economy—the deficits of the old state railway of Argentina, Ferrocarriles Argentinos (FA), consumed nearly one percent of GDP and generated almost 10 percent of the public deficit while offering unreliable, dirty, and unsafe service at high prices. FA was actually impoverishing the Argentine population (Thompson 2000).

4.2.2 Policy actions for reform

By concessioning railway and port operations to the private sector, and by involving the private sector and civil society stakeholders in the management and financing of roads, societies and people (poor and rich alike) benefit from better services at lower tariffs (and lower economic costs). A more efficient transport sector greatly influences competitiveness and reduces the cost of trade (see chapter on **Trade**). Better management of the port in Chile gave a major boost to trade (Fink et al 2000), and in Zimbabwe farmers supply fresh vegetables to the London market—the vegetables are trucked to the airport and flown overnight to London (Krugman 1998). In addition, a large amount of public money can be saved when loss-making agencies are reformed. In cases where tariff increases result, part of the savings can be allocated as subsidies for the transport services poor people use. Argentina pioneered the use of negative or social concessioning for urban passenger services in which maximum tariffs are set by government to ensure access for poor people, and concessionaires bid for the minimum subsidy. After concessioning in Buenos Aires, traffic doubled on both the metro and the suburban passenger lines while tariffs were controlled and service quality vastly improved.

Reform of road management and financing is high on the agenda of many developing and transition countries for some very good reasons (see Box 4.1). Roads carry 60 to 80 percent of all passenger and freight transport and the cost to the economy of neglecting road maintenance is huge—when a road is allowed to deteriorate to poor condition, each dollar deferred on road maintenance increases vehicle operating costs by about \$2 to \$3. In Africa alone, the extra cost due to insufficient maintenance amounts to about \$1.2 billion (Heggie and Vickers 1998). 75 percent of this cost is paid for with scarce foreign exchange (about 5 percent of total value of exports in Sub-Saharan Africa, Heggie 1995). Not surprisingly, experience shows that road user organizations, including representatives of peasant farmers associations, are willing to pay for roads if they can be assured that the money is actually spent on maintenance and the work is done efficiently. Countries that have reformed their road agencies have seen expenditures on maintenance increase. In Ghana, the road maintenance budget increased tenfold between 1994 and 1999. In Malawi it increased fourfold in the same period. This is good news—road maintenance is a sound investment that holds immediate benefits for farmers and urban residents alike.

International experience suggests the national transport policy framework set the objectives and directions for sector reforms and that these aim to follow four guidelines :

- Manage transport infrastructure and services like a business with accountability, not a bureaucracy.
- Introduce competition in both transport infrastructure and service markets.
- Ensure sufficient funding for maintenance of core assets.
- Develop mechanisms to give users and other stakeholders a strong voice and real responsibility.

An example of how these four guidelines can be implemented in practice is illustrated in Box 4.1.

Box 4.1 Commercial management and financing of roads

The road sector is big business—in terms of assets, employment, and turnover. For some developing and transition countries roads are their largest assets with replacement costs amounting to well over \$500 billion. The asset value of a relatively small road agency like the Roads department in South Africa is the same size as Northwest Airlines. Given the size and importance of the road industry, it is extraordinary that these agencies are still managed and financed through general budget allocations—in the same way that governments manage the health and education sectors. They keep their accounts on a cash basis, and are subject to little market discipline. And yet, they are perfectly capable to stand on their own feet. Roads should be managed like a business, brought into the marketplace and put on a fee-for service basis. This involves creating an arm's length agency to manage at least the main road network on a commercial basis, introducing an explicit road tariff, making sure the road users pay for extra spending on roads, depositing the proceeds from the road tariff into a road fund, and appointing a representative public-private board to oversee management of the road fund. In order to ensure the road fund will benefit poor communities with low traffic volumes it is essential to include representatives of organizations representing the interests of poor groups on the board.

The road fund in many countries pay for specific interventions to enhance the safety of pedestrians and improve public transport in urban areas.

Source: Heggie and Vickers 1998

4.3 Rural transport policy and strategy

The scope for poverty-targeted transport interventions is substantial in poor rural areas, because geographic targeting can be effective when poor people are concentrated in particular areas (poverty traps) and are relatively homogenous.

Rural transport interventions are usually undertaken by a wide range of actors—national ministries, local governments, NGOs, free-standing donors and communities themselves. While this is an expression of the need for transport improvements in rural areas, there is a substantial risk of efforts being piece-meal and unsustainable. It is strongly recommended that countries formulate and enact an explicit rural transport policy and strategy. Without a rural transport framework, the sustainability of rural roads and other transport infrastructures often fails, and there often is inadequate attention to transport services and mobility. The policy development process should follow the features and principles outlined in the sections 2.2. and 2.3. above.

4.3.1 Rural transport problems: lack of basic access and mobility

More than two thirds of the world's poor live in rural areas, and will continue to do so for many decades to come (Ravallion 2000). Effective transport is a complementary input to nearly every aspect of rural life, and as such, an essential element of a strategy for rural development and poverty reduction.

The lives of poor rural men, women, and children are characterized by isolation, exclusion, and unreliable access to even the most basic economic opportunities and social services.

Villagers walk and carry their loads—in rural Sub-Saharan Africa, the most common means of transport are the legs, heads, and backs of African women (Malmberg Calvo 1998). Lack of all-season access to markets, non-farm employment, schools, or health clinics deepens poverty and increases vulnerability. Numerous poverty assessments document the hardships which come with physical isolation, and the hopes which improved access and mobility bring:

"If we get a road, we would get everything else: community center, employment, post office, water, telephone."

Young woman in a discussion group, Little Bay, Jamaica
Voices of the Poor (2000)

The transport situation poor people in rural areas frequently face can be characterized as follows:

- Poor communities are isolated for extended periods as they lack reliable all-season road access. Visits by motorized vehicles are rare and often limited to right after harvest or occasional visits by government agencies and NGOs.
- The majority of journeys are short, numerous, time-and effort consuming, and for production or subsistence needs (such as collecting water and fuel, crop production, harvesting and processing, see Table 4.2).⁸
- Less-frequent, longer journeys are also essential to livelihood strategies—visiting hospitals or clinics, marketing produce, or searching further afield for jobs.
- Poor people do not own and rarely can secure access to motorized transport. Walking and non-motorized transport (NMT) especially head-loading and/or other physical portorage, predominates along with motorcycles and low-cost motorized vehicles.
- The transport burden for domestic tasks tends to fall disproportionately on women (see Table 2.1 above), and social rules and customs often limit their access to available means of transport.

Table 4.2 Average Time Spent by Rural Households on Transport for Different Purposes: Sub-Saharan Africa

Purpose	Distribution (percent)
Food production and Grinding	30
Fuel and Water	45
Local and External crop market	15
Other	10

Source: Dawson and Barwell (1993).

To learn more, see Barwell (1996) and Howe (1997).

⁸ Notwithstanding that household surveys clearly suggest that most transport takes place in and around the village for the purpose of basic survival, interventions to improve rural roads are often justified on the basis of projected increases in agricultural production and rarely take account of the needs and benefits of other travel purposes.

4.2.2 Improving and maintaining rural transport infrastructure

Rural transport infrastructure (RTI) is a broader concept than the conventional term “rural roads.” It includes both the lowest levels of the designated network for which government is responsible (tertiary, district, and feeder roads) and the undesignated network of village access roads, tracks, paths and footbridges over which poor people travel. In some countries for example in South-East Asia, waterways and associated wharves, piers, and ramps are an integral part of the rural transport system, and warrant equal attention.

The size of the RTI network is unknown in many countries. Some data is usually available on the magnitude of the local government road network. But there is often no information at all on the community network. Surveys, case studies, and anecdotal evidence indicate that there are often twice as many undesignated or community roads as local government roads, and even more tracks and paths.

Lack of basic motorized road access in rural areas is often a result of inadequate road maintenance, caused, in part, by political influence that favors urban areas or network expansion and upgrading over maintenance of existing core networks. But lack of maintenance is often a direct outcome of inappropriate institutional arrangements—confused ownership and management responsibilities, distorted incentives and weak accountability, and lack of secure financing and local capacity. A dual approach is required to address these problems: the strengthening of local institutions as the centerpiece of rural development and poverty reduction, and the formulation and implementation of sound rural transport policies and strategies.

The rural transport strategy should provide clear answers to three key questions:

- **Who should own and be responsible for the various levels of the rural transport infrastructure network?** Define separate institutional arrangements for local government roads and for community roads and paths. Without commitment and ownership by local stakeholders there are no strong incentives to secure realistic and affordable solutions for sustainable improvements in access to poor communities.
- **How can local capacity for managing and planning rural transport infrastructure be mobilized?** Most communities and local governments are too poor and their networks too small to afford and justify in-house expertise. To solve their capacity deficit, they need to explore innovative arrangements including contracting with higher level road agencies or the private sector and seek scale by joining with neighboring communities and districts in service committees. Key public interventions would include strengthening their ability to become effective clients, and developing local enterprises to manage and execute maintenance and minor upgrading. Such efforts must remove any barriers to the equal opportunity for female entrepreneurs to participate in bidding for contracts.
- **Who will provide an adequate and steady source of funding, especially for maintenance?** Secure and adequate funding for maintenance is the Achilles heel of most local government roads. Given the very incomplete administrative and fiscal decentralization process in many developing countries, most local governments rely on central transfers or block grants or an allocation from the road fund. These mechanisms should preferably be designed to encourage local resource mobilization for both government and community level maintenance.

In addition, experience from past rural development programs and policies suggests that the poverty impact of RTI interventions will be enhanced by emphasizing a least-cost approach—basic access (the minimum-cost engineering solution that ensures all-weather motorized passability). In this way access can be extended to a greater number of households given available budgets. When technical standards are set too high, a large proportion of poor communities are left unserved. Cost-effective and innovative techniques include spot improvement, labor-based approaches, and low-cost structures such as cross-drainage facilities (bridges and culverts) durable to withstand heavy rains.

To learn more see Malmberg Calvo (1998) and Lebo and Schelling (2001 forthcoming).

4.2.3 Improving rural transport services: motorized and non-motorized

Rural transport services provided by both motorized and non-motorized vehicles are vital for rural communities. The single pick-up truck that arrives in the village once a week with essential supplies for the health center and school and agricultural inputs, is of immeasurable importance. And the bicycle trader which takes produce from the village to the nearest market performs a critical role in the life of near-subsistence farmers whose surpluses are too small for them to market on their own. It should be clear to all who support infrastructure improvements, that what really matters are services. Any investment program for improving transport infrastructure needs to carefully examine the constraints to effective provision of transport services and to the ownership of intermediate means of transport (IMT).

Key characteristics to keep in mind when trying to improve rural mobility:

- **Motorized rural transport services.** Motorized transport services usually consist of pick-up trucks for both passengers and freight, and are generally provided by small entrepreneurs who either drive their own vehicle or employ a driver (often on the basis of a quasi hiring arrangement). The vehicles are typically old and in poor condition. Operators in some countries work in associations that allocates routes and specific fares. Associations are often organized cartels representing the interests of their members. They often overlook the wider interest of the communities they serve, keep prices high, and give little attention to route design. With some capacity building these association can evolve and become important quality improvement agents improving road safety and route design.
- **Intermediate means of transport (IMT).** For distances up to five kilometers, and even as far as 20 kilometers in some circumstances, walking is by far the most common mode of transportation in rural areas of developing countries. Where for-hire non-motorized services exist they are usually provided by bicycles, rickshaws, donkey carts, and sometimes motorcycles. Lack of access to credit and information severely limits adopting more efficient and less onerous IMT. Non-motorized transport are discussed in further detail in 4.5.3. below.

Financial profitability is arguably the most important single factor determining whether or not a particular technology is adopted. Unless subsidized, a commercial service has to generate profit. Successful approaches to improving rural transport services must therefore generate a response to low population density and transport demand. One solution is to license a number of routes together and require operators to competitively “bid for the

market.” Route frequencies, fare levels, reliability, and the amount of any required subsidy would be made explicit in the bidding and negotiating process. Groups of existing operators could be encouraged to form companies to place bids. Important factors that influence whether rural transport services will be viable are listed in Box 4.2.

Solutions will clearly depend on the local context. Rural areas are far from homogenous, and whether they can be characterized as low density or high density, as poor or more affluent, will determine the emphasis of potential interventions such as removal of fiscal impediments, targeted subsidies, credit, and type of infrastructure. Improving economic conditions and cash flow and stimulating local initiatives will increase the incentives for provision of rural transport services as well.

Box 4.2. Factors that influence whether rural transport services will be viable:

- Level of economic demand for transport including critical mass of users and service providers and support services.
- Availability and cost of a range of transport technologies and inputs.
- Availability of credit facilities (for users, suppliers, repair facilities).
- Competitive transport markets—regulatory restrictions, especially on entry licenses and rates.
- Quality of infrastructure.
- Policy and fiscal environment, for example, excessive taxation.
- Culture, and social and gender relations.

To learn more see Starkey, Ellis, Hine and Ternell (2001 forthcoming).

4.2.4 Non-transport solutions: location and quality of facilities

Given poor people’s transport needs, when feasible non-transport solutions exist they should be evaluated along with transport solutions. The distance from households to wells, forests, grinding mills, schools, and health centers determines the amount of time and effort rural dwellers spend on transport activities. This time is a drain on potentially productive labor—the principal economic resource for most rural households. Since the majority of time and effort poor rural households spend on transport is for domestic activities (Table 4.2), the most effective transport-reducing interventions are usually related to better provision of water and energy-supply facilities (such as well construction and tree planting for firewood), provision of grinding mills near households, and facilitating access to credit for low cost means of transport.

4.2.5 Integrated provision of rural infrastructure services

Experience shows that when a country has a rural transport policy and strategy, interventions to improve the transport situation of poor people can usefully be pursued as part of both single-sector and multi-sector programs. Inadequate transport access is typically just one of many infrastructure problems facing the poorest rural communities. While single-sector programs usually pay more attention to addressing sector policy issues critical for sustainability, more comprehensive programs can have greater impact on the incomes and quality of life of poor communities (see Box 4.3 and **Case Study 2** on

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Bangladesh) although they tend to be more expensive. Multi sector approaches can allow rural communities set priorities according to their own needs. They also facilitate a coordinated approach to strengthening capacity of local governments and communities. It makes far better sense to try to improve local governance in investment decisions across all sectors rather than focusing on any single sector. A multi-sectoral approach can thus provide an opportunity to use rural infrastructure as a means for addressing governance and institution building at local levels.

To learn more see Pouliquen (2000).

Box 4.3 Infrastructure Development and Rural Incomes in Bangladesh

A study of sixteen villages in Bangladesh shows how the development of infrastructure—roads, electric power, banks, markets, schools, and health centers—affects the incomes of rural households. The study identified which villages had and had not benefited from the provision of public infrastructure. With other factors controlled, the study found that greater infrastructure development was associated with a one-third increase in average household incomes. Crop income increased by 24 percent, wage income by 92 percent, and income from livestock and fisheries by 78 percent. These three changes largely benefited the poor.

Source: World Bank (1990).

4.4 Urban transport policy and strategy

4.4.1 Urban transport problems: symptoms vs. causes of poverty

The urban poor face rather different basic access problems from those of poor people in rural areas. They are more concerned with access to job opportunities and labor markets than to product markets. In many large developing cities, poor people find it difficult to obtain formal jobs partly because they live either in informal settlements within the city inaccessible to public transport or in locations on the periphery of the city distant from the main centers of employment. Both money and time costs of access may be high. Even informal income earning possibilities are limited by this inaccessibility. More specific transport problems faced by poor people in urban areas are noted in Box 4.4:

Recognizing the nature of poor people's transport problems in urban areas is necessary, but not sufficient, to determine the appropriate policy response. Because urban transport patterns and characteristics depend on conditions in other markets, especially those for labor, land, and housing, the urban poor may choose less accessible housing locations precisely because this best serves their overall interests (in terms of availability of shelter, access to activities, and so on). The heavy burden of transport costs is thus a symptom of their poverty rather than its cause.

In contrast, if transport suppliers are bound or motivated by institutional and structural constraints from meeting the needs of poor people at a cost they can afford, high transport costs do contribute to their poverty. Other contributing causes include inappropriate government regulations on land and housing markets that curtail the residential location choices of the poor. (See the **Urban Poverty** chapter.)

This distinction between the co-existence of high transport cost as a potential symptom and cause of poverty suggests that policy questions about urban transport and poverty should be addressed at two levels, namely:

- Where transport is a symptom of poverty rather than its cause, are transport interventions more appropriate than acting more directly on the fundamental causes?
- Where transport sector inefficiencies or inequities are a contributory cause of urban poverty, what is the nature of those inefficiencies and inequities, and what should be done about them?

These questions should be applied both to infrastructure investment and service provision policies. The answers to them will typically generate a wide ranging agenda of urban transport policies which are both pro-growth and pro-poor, yet which are consistent with the fiscal capabilities of even the relatively poorest countries. For a summary of poverty reducing interventions and impacts of urban transport interventions, see table 4.3 at the end of this section.

Box 4.4 Transport problems facing the urban poor.

Poor people's transport problems are many and complex:

- The poorest groups rely heavily on NMT, including walking, since NMT modes are more affordable, accessible, and safer, but facilitation of their use is often neglected.
- Poor neighborhoods are often severed by new highways, creating barriers to workplaces and social services.
- The high cost of motorized transport relative to cash income means that small changes in public transport fare and service levels can significantly reduce the mobility of the urban poor.
- Protected public transport monopolies (whether publicly or privately owned) tend to increase costs and fares or with fare subsidies, lower services and sustainability.
- Restraints on the informal transport sector often limit the provision of viable and affordable services to where poor people need to travel.
- Increased dominance of private motorized vehicles, which the poor are largely unable to use, marginalizes or displaces NMT and public transport, upon which the poor depend heavily.
- Not only do the poor not benefit (directly) from private car-focused transport interventions, in fact they often suffer a disproportionate share of external costs.
- Women are often badly served by public transport as much of their travel is at off-peak times and off the main transport routes, where transport services are poorest.
- Sexual harassment of women—both as pedestrians and as passengers—is often a substantial problem (see Box 4.10).
- Poor people are especially vulnerable to injuries caused by motor vehicles, partly because they are the primary users of non-motorized transport, especially walking.

Poor people also have high exposure to motor vehicle emissions pollution where they live or work (for example, as NMT providers or street vendors) close to major roads.

4.4.2 Focusing urban transport infrastructure investments

Growth focused road investments. Some of the most intransigent urban transport problems arise, as in Bangkok, where the space devoted to movement is both inadequate

and poorly structured. The availability of an adequate road infrastructure is a pre-requisite for efficient urban movement. But there is a fine balance to be struck. In the absence of a strategic vision of the desired transport system, including management of available space (and efficient pricing for use of scarce road space), piecemeal adjustment to emerging bottlenecks will simply encourage people to make extra trips. To avoid this bias, allowance should be made for the congesting effects of generated traffic in estimating the benefits of road investments.

Over-provision of road space will also almost certainly benefit the relatively wealthy at the expense of the poor. Because conventional transport planning is largely driven by willingness to pay, relatively low value tends to be assigned to investments which cater for more dispersed and off-peak transport needs, which often include those of the very poor and of women. Moreover, much of the travel of the poor is on foot and receives little attention in conventional transport planning. These problems can to some extent be handled by properly incorporating all modes of movement and by assigning a common value to all non-working time savings for evaluation purposes. Even participatory planning methods may fail to improve matters if the process under-represents women, the disabled and/or the very poor.

Poverty focused road investment. To some extent, investments in road infrastructure can be focused to specifically benefit the poor.

- First, road rehabilitation expenditures can be concentrated on major public transportation routes to improve public transport, as in Kyrgyz.
- Second, investments can be made in the provision or segregation of routes or right-of-way for non-motorized transport (including walking), to make them quicker and safer, as in recent projects in Lima, Accra, and elsewhere.
- Third, road expenditures more generally may be directed specifically to improve access to poor or informally settled areas (for example the Pueblos Jovenes of Lima, Peru. See also **Case Study 6** from Brazil).
- Fourth, particularly in informally settled areas (such as in Hanna Nassif in Dar es Salaam),⁹ the use of employment intensive methods may generate income for poor people as well as creating a sense of local ownership conducive to good maintenance.
- Fifth provision for NMT has an important role to play in both rural and urban contexts, and is discussed in section 4.5.3. below.

Urban rail investments. Investment in Mass Rapid Transit (MRT) has direct effects on poor groups, in terms of the fares and quality of the transport that they receive and the consequences of those factors on their location, employment and lifestyle. It also has indirect effects on their incomes through its effects on the efficiency of the urban system and its burden on city finances. Subsidies to MRT, however, may militate against the interests of the poor unless it is also clear that the subsidies are well targeted to them, do not precipitate declines in service quality which are more harmful than higher fares would be, do not leak away through inefficient operation, and do not create an unsustainable fiscal burden. Integration of systems brings its own problems (see Box 4.5).

⁹ Howe J.F. and D Bryceson. 2000 *Poverty and Urban Transport in East Africa* Topic Review Paper prepared for the World Bank Urban Transport Strategy Review:
<http://wbln0018.worldbank.org/transport/utsr.nsf/Topic+Review+Papers?OpenView>.

The most basic consideration is what modes of public transport the poor actually use. In many cities in East Asia buses are the transport of the poor and rail transport the mode of the relatively affluent, while in many Latin American cities income of rail users is much below the average and very similar to that of bus users. The pattern is one of great variety, emphasizing the importance of relating policies sensibly to poverty focused objectives on a case by case basis.

Box 4.5 Integrated Public Transport Systems and the Poor

Restructuring of bus services to feed into higher capacity trunk links (either rail or bus) is commonly advocated as a central part of integrated urban transport developments as in Singapore and Curitiba. But this will tend to increase the number of multi-leg trips involving separate payment. Given the typical flat or very shallowly tapered fare structure, this can increase total fare costs, particularly for those (often the poor) living in locations most remote the MRT line. That impact may be reduced by the introduction of multi-modal through-ticketing systems, which have been shown to yield high benefits to users in a number of countries. But that may be difficult to achieve in systems where there are a number of independently operated modes. It will tend to be easier to achieve when the bus industry is relatively highly concentrated, (as in many Brazilian cities). Even where it is achieved, adverse distribution effects on the very poor may occur if the effect of incorporating a high cost / high fare metro in a revenue pool may be to increase fares. The lesson is that, wherever an integration is being introduced, it is necessary to analyze and design fare structures and cross-modal revenue support very carefully.

4.4.3 Designing urban transport service strategies for the poor

Public transport as social service. In most socialist economies, public transport was traditionally viewed as a basic social service. This philosophy has emphasized mobility as a “merit good”, to be provided, as a social imperative, through a complete and integrated public transport network, with extensive fare reductions or exemptions for disadvantaged groups. The employment of a single private operator, either under a management contract or some form of system concession, tends to give incentives to operators to supply unprofitable locations both on the part of the operators who do not wish to abandon any part of their monopoly domain, and the public authorities who wish to sustain urban integration.

Maintaining such a basic social network may depend on high levels of operating subsidy as well as state contributions to finance capital. In many African countries attempts to maintain social obligations in the absence of a fiscal basis for support has resulted initially in the traditional suppliers serving only those with fare concessions (who may not be the very poor, and ultimately in their bankruptcy and disappearance.

Fare controls and general subsidies. Another common response to the heavy burden of transport costs borne by poor people is to control public transit fares, on the grounds that prices above some threshold level would be unacceptably burdensome on poor people. However, if governments control fares without making any accompanying fiscal provision for subsidies, operators are forced to try to cross-subsidize unremunerative services from remunerative ones. In practice, however, there are often no profitable services from which to finance cross-subsidies. In these circumstances the main effect of fare controls is to reduce the quality and, eventually, the quantity of public transport service (frequency, coverage, and capacity).

Evidence from surveys is needed to examine whether poor people consider themselves hurt more by low availability of transport than by its price and are indeed willing to pay more than the existing regulated fares to get better service. In such instances, policymakers should carefully consider the likely supply outcomes with different levels of fare intervention and subsidy and set fares consistent with demand-driven outcomes, not on the basis of some normative concept of an “affordable fare.”

Even where there is a fiscal basis for subsidies, whether that is an appropriate use of funds depends partly on the relative efficiency with which funding can be targeted in different sectors, and partly on the political and practical feasibility of taking poverty-reducing actions elsewhere. Two factors argue against using a general transport subsidy. First, users of a particular mode may have wide variations of income. Second, substantial evidence indicates a large proportion of government subsidies to public transport “leaks” to public sector monopoly operators, either through inefficient operations or through operators and organized labor capturing the subsidy.

Targeted subsidies. An alternative approach is to treat transport supply more as a commercial business, and to try to target subsidies explicitly at disadvantaged groups on a personal basis. Transfer of responsibility for “social” subsidies from the accounts of the transport operators to those of the relevant line agencies, is also being widely advocated as a means of addressing the decline of public transport service in many of the countries of the former Soviet Union.

This approach not only imposes a lesser fiscal burden but also has the merit of giving clear signals and incentives to the operators to adjust their services and fares in such a way as to maintain their equipment in operation. A potential disadvantage is that there is no clear institutional channel through which the more strategic and structural considerations concerning the role of public transport in urban development strategy, and the response to the various externalities which impinge on urban public transport, can be addressed. This can be countered by the use of competitively tendered franchises for service provision, to allow the public authorities to retain some controlling influence on the structure of services provided.

Financing concessionary fares. Many countries have extensive lists of passenger categories qualifying for free, or concessionary fare, travel. Rarely is there any specific explicit mechanism for remunerating suppliers for these fare exemptions or concessions. This has two effects. First, it means that some passengers are paying more, or receiving poorer service than would otherwise be the case. As choice of transport mode is highly income related this means subsidy of the poor by the poor. Second, non-transport line agencies (health, education, police) may have a vested interest in maintaining such mechanisms, which they might not support to the same extent if they had to finance them from their own budgets.

The lesson here is that, in the interests of poor people, any public transport fare concessions or exemptions should be carefully considered in the light of other sources and uses that might be made of the resources involved. This consideration is probably best ensured by making the line agencies that benefit responsible for financing concessions, with the obligations on transport operators contingent on receiving appropriate explicit compensations.

The informal sector. Regulations that constrain supply and limit alternative providers are generally regressive. The existence of informal sector services provided with smaller and cheaper vehicles, may often be traced to excessive government regulations. To the extent that the informal sector provides a lower quality of service at a lower price than the formal sector can achieve, or even a valued service at above the regulated fare, it may result in a more realistic matching of supply to demand. There are, however, some problems—pollution and congestion—which could be exacerbated by expansion of the informal transport sector.¹⁰ It is therefore recommended that policies for the informal transport sector should take the impacts on poor people explicitly into account. Where there are environmental or congestion impacts, policy measures can include limitations of access to particular locations, or enforcement of relevant environmental regulations. Another problem which warrants specific attention is traffic safety (see section 4.5.2 in this chapter).

Competition in supply. Effective competition in, or for, public transport markets may both decrease costs and increase supply of services to poor people. For example, the introduction of competition for franchises in major cities in Western Europe has reduced costs per vehicle kilometer by up to 40 percent in real terms and has allowed higher service frequencies to be maintained even within constrained budgets than under traditional monopoly supply mechanisms. Those advantages that were first exploited in OECD countries are now being seen as effective in developing economies and transitional economies. The capability to combine some central service coordination with competitive supply varies from country to country according to administrative capability and legislative law enforcement, so no single pattern fits all countries. But the lesson is that attention to the potential for competition can improve the services the poor demand (see **Case Study 7** from Kazakhstan).

4.4.4 Multi-sector interventions

Even where they are designed to serve low income areas the operations of the land market mechanism may result in the benefits of transport improvements passing on to others. Insofar as a metro reduces travel time to central areas of the city (along a few corridors and note the urban area as a whole) it will tend to increase land values, and hence land rents at the newly advantaged locations. The poor only capture those benefits if they own the land themselves, and hence acquire the windfall capital gain, or are protected against being charged for the increased value of the land in property rents. That can be done if public housing programs and mass transit developments are undertaken jointly by a development authority with a specific responsibility for the welfare of the poor. That has been done in a very systematic way in Singapore, and sporadically and less systematically in a number of other cities such as Fortaleza in Brazil.

Targeted interventions to improve accessibility in urban areas could be considered as an integral part of a more comprehensive intervention, such as multi sectoral approach-based urban slum upgrading programs where housing and neighborhood infrastructure are improved in an integrated way with tenure security and legalization. Moreover, regulatory reform to make zoning laws and building codes more flexible can expand the number of places the poor can choose to live, helping alleviate their travel requirements (see the chapter on **Urban Poverty**.) Since the central policy objective is to improve the overall

¹⁰ In some circumstances competition in the informal sector can lead to undesirable behavior by individual operators, including criminal acts.

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welfare of poor people, to come to terms with major sectoral interdependencies, including issues of causes and symptoms, sectorally-based actions need to be considered together.

To learn more, see Allport (2000), and World Bank (1996), (1999b), and (2001 forthcoming).

To learn more on the design of regulatory policy for the informal sector in urban areas, see World Bank (2000c): <http://wbi0018.worldbank.org/transport/utsr.nsf>.

Table 4.3 Poverty Focused Urban Transport Interventions

Specific Intervention	Nature of Impact	Cost / Fiscal Impacts	Implementation Ease	Examples
Urban road investments				
Maintaining public transport routes	Faster/cheaper public transport	Moderate	Easy	Kyrgyz
Paving in poor areas	Access for public transport	Moderate	Easy	Lima
Sidewalks	Fewer fatalities and injuries	Low	Moderate	
Bicycle tracks	Safer trips. Encouraging NMT	Moderate	Moderate	Lima, Accra
Separation of NMT on existing roads	Safety. Speed for all modes	Low	Difficult	Dhaka, Guangzhou
Urban rail investment				
Concessioning	Improved service to users: fare effects uncertain	Cost saving	Moderate	Rio, Buenos Aires
Redundancy payments	Protects (poorer) workers	Small	Moderate	Buenos Aires
Resettlement arrangements	Protects disturbed residents from consequences of development	Small/medium	Difficult	Mumbai
Converting suburban railways	Improves speed and frequency	Moderate	Moderate	Fortaleza, Brazil
Public transport service planning				
Introduce competition in public transport	Cost reduction; Service growth	Cost saving	Moderate	Uzbekistan, Kazakhstan
Public transport interchange	Faster, safer trips	Medium	Moderate	Pusan, Manila
Bus priorities	Faster, cheaper trips	Low	Politically difficult	Bangkok
Develop informal sector	Lower cost service	None	Moderate	Uzbekistan
Finance strategies				
Subsidy finance reform	Line agencies to finance exemptions Better focus of support	Uncertain	Moderate	Russia
P.T. fare integration	Enables use of faster modes	Low	Moderate	Sao Paulo, Fortaleza
Congestion pricing	Direct impact small. Provides basis for public transport improvement	Generates revenue	Difficult	Kuala Lumpur, Bangkok

4.5 Related policy objectives

4.5.1 Generating employment for poor people

The transport industry is a major source of employment for poor people because it requires massive amounts of unskilled labor. Transport related activities commonly account for 5 to 8 percent of formal sector employment, and in some countries, total employment (formal and informal) in the sector is estimated at 15 to 20 percent. Many transport services used by poor people are also provided by the poor (for example, bechaks, jitneys and rickshaws). In addition, many transport related services (for example, vehicle maintenance, cargo handling, warehousing, roadside food services) involve low skill jobs. Transport construction projects employ many unskilled workers but could usually employ many more if labor-intensive technologies were used.

When equipment-intensive construction methods are used in rural road projects in low-wage countries, the cost of equipment amounts to 60 to 65 percent of total project cost, with the wage bill amounting to about 5 percent. If, in the same project and for the same quality and overall cost of output, labor-based methods are used, the cost of equipment would amount to 30 to 40 percent of total project cost, while the wage bill would account for 30 to 40 percent. When the volume of labor-based projects becomes large—say about 10 percent of total investment in infrastructure—this can have a measurable impact on both the local and the national economy, as is evidenced by macro-economic studies carried out in Madagascar and Uganda.

Road construction and maintenance has proved an important potential source of employment for women in countries such as Bangladesh, Lesotho, Peru, and Zambia (see Box 4.6). In order to provide equal employment access for women it is necessary—at least initially—to provide incentives to contractors to hire women (for example, requiring that a certain proportion of the labor force be women), and to design the work to facilitate the participation of women (for example, arranging for women to work as close as possible to their villages, dividing the work so that men can handle the heaviest physical tasks, and arranging some minimal child-care services).¹¹

Pro-poor transport policies should recognize the rights of workers to a decent wage and safe working conditions. Policies should also cover the scope of public works programs that offer food or cash to poor laborers in exchange for transport construction civil work (**see Social Protection** chapter.) When well-designed, labor-intensive public works programs can be an effective way of offering self-targeted safety nets and improving infrastructure. Example of two successful public works programs which have a heavy emphasis on roads are the Maharashtra Employment Guarantee Scheme in India and the Trabajar in Argentina (World Bank 2000a). These programs provide major insurance benefits to poor people because employment is guaranteed.

¹¹ To learn more see the report on the gender dimensions of labor-based road construction in Lesotho [World Bank Gender and Transport Web Site <http://www.worldbank.org/gender/transport> (see section on Grants and Pilots).

Box 4.6 Generating employment for women in labor-based road construction in Lesotho and Zambia

In Lesotho, the out-migration of men to work in South Africa has long created a labor shortage and has made road construction contractors more willing to employ women. A study completed in December 2000 found that large numbers of women have been employed on road construction projects and that the experience has generally been positive. Contractors indicated their willingness to contract women but pointed out that the greater leniency with respect to punctuality given to women workers (for example mothers with small children) can put an extra burden on male workers. The study provided concrete guidelines on how to plan road construction to effectively integrate women workers.

In Zambia many donor agencies now require quotas for hiring female workers on road construction projects they finance. The feedback from contractors has generally been positive and women have been promoted to administrative and management positions. Women have proved particularly successful as road toll collectors where they are more efficient and honest than men.

In both countries it has been found easier to contract women in food for work programs. When payment is in cash, husbands are more likely to take the jobs themselves.

Source: Gender and Transport Web Site <http://www.worldbank.org/gender/transport> (see section on Grants and Pilot projects).

4.5.2 Improving traffic safety

Motorization is the modern plague of developing and transition countries. They own a mere 40 percent of the world's motor vehicles, but account for a staggering 86 percent of its road fatalities. And, like AIDS, the situation is getting worse, not better. While industrialized countries have seen a consistent fall in annual road fatalities, the toll in most developing and transition countries continues to grow at 3 to 5 percent per year. WHO estimates that, by 2020, road accidents will have moved up from ninth to sixth place as a cause of death worldwide and will be in second and third place respectively in terms of years of life lost and disability-adjusted life years.

Worldwide, road accidents cause around 1 million deaths (of which 70 percent occur in developing countries and 35 percent are children) and 10 to 15 million injuries every year. In many low-income countries road accidents are now the leading cause of death among 3- to 35-year olds, result in more disabilities than any other type of accident or illness, and will soon be the third leading cause of death worldwide, if current trends continue. The annual cost of road accidents is estimated to average approximately 1 percent of GNP in many countries. In some countries it is much higher, for example, almost 5 percent in Malawi and Kwa-Zulu Natal, South Africa. In Vietnam, traffic accidents are the leading cause of accidental death which by far outnumbers other death causes of communicable and other important diseases. Fatality rates (road related deaths per 10,000 motor vehicles) are highest in African countries, particularly Ethiopia, Tanzania, and Uganda. The total economic cost of road accidents in developing countries is estimated at about \$65 billion per year—more than the entire annual flow of Official Development Assistance.

Road accidents disproportionately affect poor groups. In developing countries, where many people do not have access to motorized vehicles, more than 50 percent of road accident victims (injuries and fatalities) are pedestrians, motorcyclists, bicyclists and other non-motorized vehicles (NMV) occupants. In Africa, pedestrian fatalities account for about 40 percent of all road fatalities. Hence, poor people are among the most vulnerable road users. They have no choice but to rely on the type of motorized transport services they can afford. These are usually old, ill-maintained vehicles and poor people are crammed onto the beds of trucks and pick-ups.

Data on traffic safety is very deficient in most countries because of serious under-reporting and under-recording of traffic accidents. There are strong indications that material damage accidents are more frequently reported and recorded than accidents without such damage, even if serious injury occurs. Frequently, police does not record accident deaths if the victim cannot be identified. Again, these common practices especially affect poor people.

Often without insurance, poor households disproportionately suffer economically from traffic accidents. In addition, the transport services which poor people use are often underinsured if insured at all. This is one important cause of the human tragedy in which traffic accidents result. A non-poor family can become poor almost overnight if the breadwinner is killed or disabled. The situation can be even worse for a poor household. (See chapter on **Social Protection**.) Survivors of traffic accidents frequently suffer physical and/or psychological damage that remains with them for the rest of their lives. Sixty three percent of Brazilian orthopedic and trauma hospital beds are occupied by traffic accident victims.

Box 4.7 A road safety strategy for low-income countries could include the following elements:

- Raising public awareness of the risks involved with transport, especially road safety issues, through public campaign and education programs, particularly in primary schools.
- Reforming the institutional setup, with clear legislative guidelines on responsibilities, especially among police, transport, public works, and insurance agencies for coordination of safety programs at local and national levels.
- Protecting NMT traffic, including pedestrians and disabled persons , through proper road design and physical separation , from motor vehicle traffic where possible.
- Increasing the effectiveness of enforcement of traffic safety rules and vehicle safety inspection and the reporting/recording of accidents.
- Ensuring adequate funding for safety components in infrastructure investment programs.
- Eliminating infrastructure safety deficiencies.
- Developing effective means of managing ribbon development to reduce the traffic safety risks by petty activities in the right-of ways.
- Identifying champions in the public and private sectors to advocate, and marshal resources for, transport safety in general and road safety in particular.

A strategic approach to road safety can tackle the sources of road accidents and reduce the severity and consequences of accidents (see Box 4.7). Most traffic accidents are due to a combination of factors. Human failings, such as speeding, driving under influence, lack of seatbelt compliance are a major contributing factor in high-income countries. While this is also true in many developing countries, lack of training, infrastructure deficiencies, vehicle defects, and lack of attention to NMT are also significant factors. Lower design standards, rapidly increasing motorization, and lack of regulation, enforcement, and maintenance often prevail, exacerbating the risk of traffic accidents, especially in low income countries. Although this area is generally regarded as primarily a government responsibility (due to market failure), successful initiatives have been taken by the private sector (see Box 4.8).

Box 4.8 Brazil—Reduced Pedestrian Fatalities under Toll Concession

The Via Dutra toll concession in Brazil (in which the IFC is an investor) has instituted a successful pedestrian and traffic safety program that has cut pedestrian and traffic fatalities from a level of 481 fatalities in 1997 by around 40 percent in three years, and reduced pedestrian accidents by around the same proportion. In September 2000 the company won the Volvo Safety Award (for its class) sponsored by the International Bridge, Tunnel and Turnpike Association (IBTTA). (Accident rates and changes in traffic levels are not recorded.)

The company has disseminated safe road use practices to some 200,000 school children and taken innovative measures to separate access for pedestrians from vehicle lanes and to coordinate locations for public bus stops with overpasses for pedestrians.

Source: IFC.

Notwithstanding the many specific interventions that can improve road safety, few developing countries have succeeded in improving road safety in a systematic fashion. Because of the multi-sectoral nature of the road safety problem, road safety programs are often perceived as rather low priority components of programs of international development assistance implemented by the Ministries of Work. Lack of capacity and commitment to address the problem in a comprehensive manner result in piecemeal approaches including treating black spots, road safety audits, and training.¹² An important reason why these efforts have not been institutionalized or mainstreamed is because the agency in charge of road safety issues (often the transport ministry or the traffic police) lacks the mandate and professional capacity to establish a broad-based coalition of stakeholders to address road safety as the cross-sectoral social and poverty issue it is.¹³ Three pivotal aspects to keep in mind in such an effort are:

- Improve accident data collection and analysis. Without the right numbers, policy- and decision makers will not grasp the magnitude of the traffic safety problems and implications

¹² A coalition of concerned agencies—the private sector, civil society, the World Bank, the International federation of Red Cross and Red Crescent Societies and other international agencies—has recently established a *Global Road Safety Partnership (GRSP)* to help countries around the world develop effective and sustainable road safety policies and activities to combat the huge human suffering caused by traffic accidents.

¹³ Road accidents are a major health problem in developing and transition countries. On average, 30 to 40 percent of casualty wards are occupied by road accident victims and they account for up to 5 to 10 percent of all in-patient bed days in low income countries. The medical costs associated with these accidents are around \$3 to \$4.5 billion per year, with about two-thirds incurred in hospitals. No country can afford to waste hospital resources on such a grand scale.

- Establish a broad based national coalition involving transport, enforcement, education, and health agencies as well as civil society associations and the private sector.
- Ensure the effort is financed. A sustainable financing mechanism is critical and can preferably involve the private sector, such as the insurance industry, car manufacturers and oil companies.

To learn more, see Jacobs, Aeron-Thomas, and Astrop (2000).

4.5.3 Facilitating use of non-motorized transport

In most developing countries there is a policy mismatch between the significance of walking and non-motorized transport (cycling, hand-carts, draught animals, and so on) to low income people, and the attention given to these modes, particularly in infrastructure design and management. In the poorer countries more than half of all trips are undertaken on foot, yet pedestrians are typically treated peripherally. Cycling offers a relatively cheap means of improving poor people's mobility, but is often inadequately planned or provided for. In rural areas, spot improvements on paths and tracks which provide shortcuts between communities and are heavily used by pedestrians and load carrying animals, can have a high impact on micro-level social and economic development. Notwithstanding the importance of engineering interventions to mitigate displacement of NMTs by motorized vehicles and facilitate NMT usage, in terms of poverty impact, however, the establishment of a policy stance that recognizes the role of NMT for poor groups is critical (see Box 4.9).

Walking. For very short trips, walking is an important mode of transport in most societies, rich or poor. For longer trips, however, it reflects the lack of options of low-income persons. Recent studies show that between 25 and 50 percent of trips in the major Indian cities, and around half of all trips in major African cities are entirely on foot, and that trips undertaken primarily by public transport also involve significant walking distances. In medium and smaller cities the share of all-walking trips increases to 60-70 percent.

Nevertheless, the attitude to pedestrians is often curiously hostile or neglectful. Pedestrian space is continually being eroded by traffic or commercial uses. For example, as city authorities find it difficult to manage and control street market and footway activities, the trend has been towards getting rid of these altogether, rather than taking a functional approach to road hierarchy an assign some roads primarily to pedestrians and market activities rather than fast flowing motor vehicles.

There are many ways to improve the condition for pedestrians:

- building paved tracks for pedestrians (and staircases where the hilly terrain demands it) in low-income area upgrading schemes;
- ensuring that road rehabilitation schemes not only cover the upgrading of the carriageway, but also the provision of paved sidewalks (see Case Study 4 from Kenya and Tanzania);
- in road improvement schemes, avoiding the common mistake of widening the road at the expense of pedestrian space;
- repairing sidewalks which often have been neglected for decades;
- measures aimed at improving safety and security of pedestrians;

- improve pedestrian and NMT accessibility of public transport terminals and stops.

On low volume roads, where physical separation of pedestrians and bicyclists cannot be justified, priority must be given to reduce potential conflicts through measures such as:

- traffic calming measures where roads cross built up areas;
- provision of marked pedestrian and NMT space on long bridges;
- adequate warning signs where footpaths and tracks cross;
- road safety training of motorists, bicyclists and pedestrians;
- improve visibility of pedestrians and bicyclists at night (use of reflective clothing).

Cycling. For short or medium distance trips, bicycle use is normally much cheaper than the alternative by formal or informal public transport. In the context of a World Bank project in Lima, it was found that cycling costs less than a fourth of the equivalent bus expenditures.

While this calculation does not take account of accident risks nor the infrastructure needed for the bicycle (or the bus), it also does not try to measure the travel time benefit of the cyclist, who will generally be faster for trips up to 5-7 km because of the door-to-door capability of the bike, and no need to wait for the bus; nor does it measure the environmental benefits of this non-polluting mode. Despite these seemingly obvious advantages, cycling is rare in many countries or declining where it used to be common. This may be due to such factors as cultural views on status or gender, the expected longer travel time rather than what often is actually a shorter travel time, the possibility of getting the bike stolen, and above all the greater accident risk and perceived discomfort of using a bike compared with a bus. These latter two aspects increase in importance as anti-poor transport policies lead to motor vehicles crowding out non-motorized transport from often scarce road space.

In rural areas, the viability as a transport mode is frequently demonstrated by health extension workers, teachers, traders and middlemen, but such practices go often unnoticed or are perceived to be backwards.

To overcome these problems, efforts in Ghana, Mozambique, Peru, the Philippines and Vietnam have attempted to promote the acceptability and use of the bicycle through:

- provision of bicycle lanes and construction of segregated bicycle tracks,
- spot-improvements of paths and tracks in remote areas,
- modern traffic engineering standards and educational campaigns to improve bicycle safety,
- abolishment of tariff barriers that treat bicycles as luxury goods or protect inefficient local manufacturing,
- provision of guarded bike parking facilities,
- micro-finance schemes for low-income persons to purchase bicycles,
- promotional campaigns to communicate the advantages of bicycle use, and

- institutional strengthening within Government departments to cater for bicycle needs (in addition to car traffic).

To learn more, see World Bank (2000b).¹⁴

Box 4.9 Improving School Attendance through NMT Policy and Action

In rural South Africa, many primary and secondary school students live more than 5 miles away from their school. Few schools operate school buses or offer boarding. As a result, students in remote areas can often not attend school, or can attend only at great difficulty. Given the time it takes to get to and from school, they have little time to complete school assignments and help their families.

In an effort to improve school attendance, the South African Minister of Transport, Dullah Omar declared that "The time has come to promote bicycle transport as a strategic solution." In response, Afribike, a South African based NGO, promoting cycling and bicycles, in partnership with provincial and national transport departments, launched a program—Learners on Bikes. In the first 12 months of the program 10,000 students will be able to buy a bicycle. The program will cost about \$300,000. It is funded by the National Department of Transport and executed through the National Road Agency in collaboration with Afribike and local communities.

Learners on Bikes will enable primary and secondary school students to purchase refurbished bicycles through a combination of cash/credit (min US\$ 12) and sweat-equity (working on the local refurbishment and assembly of bicycles under the program). While no student will be excluded under the program, preference is given to students traveling the greatest distances to and from school and within this group to female students. Qualifying students will take part in a training course highlighting the associated benefits and opportunities of cycling, safety and maintenance/repair issues as well as environmental and health impact of cycling.

The students will purchase the refurbished bicycles through 10 Afribike Bicycle Retail Outlets throughout South Africa's nine provinces. The Outlets will be community-owned franchises and run by female instructors. The standing of women in their respective households and communities makes them a preferred, although not exclusive, partner for the program. Each Outlet will receive the necessary tools and training that will see the Outlet turn into a sustainable micro enterprise after an initial 12 month start-up phase. Income through sales will see a certain percentage returned to Afribike, who as the franchiser, recovers the initial setup investment costs and subsequent (post 12 month subsidy phase) establishment cost.

Each outlet/franchise will undergo periodic three month assessments to establish their commercial viability. Close monitoring of the program will allow for strategic adjustment in the approach and also yield valuable lessons for scaling up the initiative.

Source: Afribike

4.5.4 Reducing gender inequality

A pro-poor national transport policy must explicitly tackle gender inequality in transport.

¹⁴ A "package" providing task managers with the information, guidelines and documentation required to incorporate a bicycle component into a larger transport project is available on the World Bank Gender and Transport Web Site (<http://www.worldbank.org/gender/transport>). The package is designed in the form of short modules which can be downloaded onto a computer or sent as e-mail attachments. Modules are designed so that they can be given to consultants, used in presentations with governments agencies, or easily adapted for inclusion as annexes in project preparation documents.

In many low-income countries, and particularly in Africa, women have less access than men to private vehicles and public transport, and even to non-motorized vehicles. As a result, women, who take almost exclusive responsibility for household and child-rearing tasks, also spend long hours carrying out transport burdens, leaving little time and energy for more productive and social activities (see Table 3.1 above). Excessive head and back loading may also cause long-term health problems. Because women lack access to means of transport, they tend to benefit less than men from most transport infrastructure improvement programs. This cultural division of labor and economic power within households in many societies leads to gender inequality in transport, which directly reinforces the gender inequality in economic status (see **Gender** chapter). Therefore, transport interventions that respond more to women's transport needs can help women expand their income-earning activities, increase their productivity, promote gender equality, and improve their quality of life. To achieve such changes, it is essential to identify the specific transport needs of women and devise cost-effective interventions.

In urban areas, the transport problems faced by women often involve personal vulnerability. A major constraint on women's mobility in many major cities is the fear of violence and sexual harassment for pedestrians and riders on public transport. The insecurity of the urban environment is a major deterrent on travel to work and school, and a particularly severe problem for women working late at night (see Box 4.10).

Options to address gender issues both transport and non-transport options include the following:

- Eliminating gender biases by integrating the transport needs of women into the mainstream of transport policy and planning.
- Making intermediate modes of transport, including non-motorized vehicles (bicycles, wheelbarrows, animal carts) available for woman to buy in areas where there is no affordable alternative to head-loading, if possible through microcredit schemes (see Case Study 5 from India).
- Conducting, where culturally acceptable, gender-awareness sessions to convince transport professionals and male household members that gender inequalities in the transport sector must be addressed.
- Extending safe, affordable, and culturally acceptable transport services for women users, where the demand warrants. In India there are in many cities a reserved carriage for women on commuter trains.
- Locating facilities (for example, water supply) closer to communities to reduce the need for transport.
- Ensuring at least adequate participation of women in the planning and design of transport investments and other infrastructure development programs.
- Designing road work schemes that facilitate participation by women and also training women to take supervisory positions (see Box 4.6).

Box 4.10 Peru: Sexual harassment and violence constrains women's mobility

A study in Lima, Peru found that one of the major constraints on women's mobility was the fear of sexual harassment and violence against pedestrians and on public transport. This was a particular concern on transport operated by informal enterprises. Female students reported that when riding on public transport they put nails and open safety pins in their backpacks to discourage unwelcome contact from male passengers. Women reported open sexual harassment and even rape on buses in the presence of other passengers, and even many poor parents reported that they must save money so that their daughters can travel to university by taxi as it is not safe for them on buses. In an effort to enhance security on public transport, some companies are now operating in teams of male and female drivers and conductors. The participants in the survey found this to be a positive intervention.

Source: World Bank Operations, Peru.

A comprehensive policy guide to gender issues and poverty is set out in the Gender chapter. To learn more, see <http://www.worldbank.org/gender/transport>, World Bank (2000b), Bamberger and Lebo (1999), and Malmberg Calvo (1994a and 1994b).

4.5.5 Mobility for the disabled poor

Of the various groups of poor people in developing countries, the disabled poor often have the most serious problems in terms of access to the transportation system. It can be difficult for them to board buses and maneuver swiftly in crowds. They are particularly exposed to fast moving vehicles when there are no sidewalks or designated road crossings, and speed limits are not enforced. In addition to physical obstacle such as sidewalks to wheelchairs, and steps in railway terminals, there are often open holes in sidewalks and roads creating peril for the blind.

Key factors that need to be addressed to improve the transport environment for poor people with disabilities include the following:

- Barrier-free design. Standards and regulations that ensure that all new investments in transport infrastructure and rolling stock (buses, trains) are barrier-free.
- Attention to non-motorized transport (wheelchairs, handpowered trikes, and so on).
- Removal of access obstacles—curbs, lack of walkways within the current transport system.
- Promote the development of mobile services.
- Support the creation of representative interest groups to champion the mobility and safety issues of disabled poor people.

4.5.6 HIV/AIDS, transport and poverty

The transport sector has critical links to the HIV/AIDS epidemic. For example, the early stages of the pandemic in Africa clearly followed major transport corridors. This linkage is today perpetuated by transport operators, who may spend significant amounts of time away from homes and family. The impact of their sexual behaviour (which extends to those involved in the construction of transport infrastructure, such as road works crews) is not only directly felt by themselves, but also their wives, children and members of the

communities in which they live and work. Ironically, the same mobility and opportunities that epitomize a well-functioning transport system, can lead to potentially high rates of HIV infection and worsening social conditions, including poverty.

The predominate segment of the population infected with HIV/AIDs may not be poor, but the impact of infection has important poverty implications. For example, while prime-age males are typically the most infected segment of the population, their wives and children often bear the long-term impacts, including subsequent infection.

The public health system alone cannot be relied upon to address the HIV/AIDS problem. The incidence of the disease is very high among long-haul transporters and the behavior of the drivers would be a key target for any public health agency aiming to reduce the spread of the disease. Most public health agencies, however, are not equipped to provide services to such a highly mobile workforce, who work across national borders, often travel at night, and may purposely avoid urban centers (the location of most public health facilities). A complex and well-developed institutional structure exists for transporters (for example, border crossings, rest/fuel stops, vehicle queuing stations, and transport associations), and these can be an important entry point for prevention activities. At these places, in partnership with public health agencies, transport associations and government transport agencies can distribute condoms, treat sexually transmitted diseases, offer voluntary counseling and testing, and carry out public awareness/education campaigns.

The recognition that the transport sector has an important role to play in HIV/AIDS prevention, has prompted some countries and their trucking industries to undertake prevention activities specifically targeted at the transport sector and workers. Examples of interventions include:

- Incorporation of HIV/AIDS prevention clauses in public works contracts (for example, prevention training for construction and maintenance teams).
- Education and prevention campaigns targeted through operators and associations (see Box 4.11).
- Public health activities in partnership with border transport institutions and communities (immigration, sex workers).
- Creation of inter-ministerial steering committees (including equivalent transport ministry) to plan and undertake cross-sectoral prevention programs.
- Setting up of transport specific social safety net programs in cooperation with private sector companies and transport associations.

Box. 4.11 Trucking against AIDS in South Africa

In 2000, nearly 20 percent of the 54,000 employees involved in South Africa's road freight industry received some form of training related to HIV/AIDS. A cooperative effort between the trucking industry and the Learning Clinic, a private education and training provider, the "Trucking Against Aids Projects" work with industry leader to design training for shop stewards, managers, truckers, sex workers, as well as mobile one-on-one training and counseling for industry workers. Training takes place in a variety of situations, inside trucking companies during lunch or tea times, between trained peers throughout the workday, as well as through three newly established on-site clinics along major trucking routes. Trainers also "hit-the road" and move from truck stop to truck stop nationally delivering one-on-one sessions, crash courses, and short 45 minute presentations to drivers and sex workers at key activity "hot spots." While it is too early to determine the long-term impact of the program, it is clear from South Africa's experience there is demand and opportunity

Source: The Learning Clinic

4.5.7 Environmental concerns

Environmental protection is an essential part of the task of improving the quality of life of all people, including poor groups. But there are sometimes tensions between poverty reduction, transport and environmental objectives which must be recognized and addressed.

In urban areas, many of the public transport vehicles on which poor people depend are old and highly polluting. Lead ranks as one of the most serious environmental threats to human health, especially in poor urban areas. Perhaps the most alarming effect is on the mental development of children. Poor children are most at risk because malnourishment intensifies lead absorption. Leaded gasoline accounts for 80-90 percent of airborne lead pollution. Phase out is technically simple and highly cost-effective, and in some cases it may save governments money since the majority of fuel on the world markets is now unleaded and cheaper than leaded fuel (Lovei 1999).

Enforcing higher vehicle standards (such as Euro 2 engine requirements) may be ineffective because of the absence of the technical capability of maintaining the more sophisticated electronics of the modern engine. And even when the vehicles can be maintained, their extra sophistication increases costs and fares. This may, in its turn, induce competition from an informal sector using smaller and more polluting vehicles. Liberalization of entry, which in some countries such as Tanzania has reduced public transport fares, may similarly threaten environmental quality.

The most appropriate policy response to these tensions is not simply to forgo the benefits of competition by maintaining traditional monopolistic supply arrangements, but to design competitive market arrangements under which sensitive locations can be protected. An example of this is the bus franchising arrangement in Santiago, Chile. Here the capacity and quality of vehicles entering the most environmentally sensitive areas is controlled, but the rights to operate those services are put out to competitive tender. The important concern for a poverty reduction strategy is to identify the particular forms and locations of environmental impact that are most harmful, and to devise mechanisms which best reconcile that protection with the continued provision of affordable public transport.

In rural areas two key environmental concerns are the risk of inducing deforestation and soil erosion. Building new roads in forested areas can result in corridors of deforestation several kilometers wide.¹⁵ By dramatically reducing the cost of transporting agricultural goods and, increasing the returns to agriculture, new roads encourage the conversion of forest land to agriculture. The conversion radius is especially large where towns are nearby and soils are good.

Depending on why and where roads are built, they can generate lose-lose, win-lose, or win-win outcomes with regard to development and deforestation. Roads sited in remote forested areas with poor agronomic suitability may be lose-lose propositions as they can expose indigenous people to disruptive forces and open an area to the poaching of large mammals, while generating little in the way of sustainable agricultural development.¹⁶ Roads that open up forested areas that are not too remote and have reasonable agricultural prospects can present difficult win-lose tradeoffs. Many forest areas can support sustained agriculture and roads into these areas will benefit local populations and may provide employment opportunities for migrants. But these economic and social benefits can come at the expense of deforestation. The environmental impact of forest loss will depend greatly on what kind of agriculture replaces the forest. Finally there is a possibility of win-win outcomes from road intensification in non-critical forest areas near markets.¹⁷

In most developing countries today, however, the focus is on rehabilitation of existing road networks. Few new roads are built, particularly in forested areas. Nonetheless, where there are environmental tradeoffs, these have to be addressed up-front. For road construction to contribute to the fight on poverty, it will need to be accompanied by complementary interventions such as land titling and credit programs. Technical mitigation measures, as in Nepal, can address many negative local environmental impacts (see Box 4.12).

¹⁵ This finding holds robustly across a range of sites with diverse economic, social, and ecological characteristics, including Belize, Brazil, Cameroon, Mexico, and Zaire (Chomitz and Gray 1995, 1996).

¹⁶ Since poor people have great difficulty obtaining credit, and tend to be relatively disadvantaged in terms of physical capital and have little opportunity to do well elsewhere, if land is accessible and sufficiently cheap, their best strategy is to "mine" the soil through an unsustainable extraction of nutrients and then to move on (Schneider 1995).

¹⁷ Schneider 1996.

Box 4.12 Mitigating Tradeoffs in Road Construction and Environmental Outcomes in Nepal

The cumulative impact of road construction due to steep topography, often unstable geology, high rainfall, and intensive land use, leads to the destabilization of terrain and production land. To mitigate such outcomes Nepal has pursued environmental assessments and bioengineering with local varieties to control slope erosion and geotechnical solutions to resolve difficult terrain issues. Much of the success in establishing bioengineering technology has depended on identifying the relevance of vegetation types to roadside households and on facilitating the development of local small scale enterprises to supply and plant the appropriate vegetation.

Extensive geotechnical engineering measures and certain forms of bioengineering complement the more traditional civil engineering structures and practices and help to resolve most of the difficulties faced on the road lines. With the promulgation of environmental law, all development projects, since 1993, are subject to environmental screening in accordance with His Majesty's Government of Nepal's Environmental Impact Assessment Guidelines. These guidelines address the need for implementing environmental mitigation measures in the surveying, design, construction, maintenance, and operation of road projects, and include environmental mitigation measures, socioeconomic considerations, public participation, and coordination with other institutions. The department of roads is now implementing bioengineering works on a routine basis throughout the strategic road network. A complete set of interim standard specifications for bioengineering works were produced in July 1996 by the Geo-Environment Unit of the department of roads.

Source: Sonia Kapoor.

5 Monitoring and Evaluation and Feedback to Policy Design

Monitoring and evaluation are an integral part of the process of policy and project formulation and implementation. Both are critical for improving our understanding of the most effective poverty reducing interventions (see chapter on **Monitoring and Evaluation**). The focus of this section is on issues that are specific to the transport sector.

5.1 Monitoring and evaluating transport interventions for poverty reduction

Transport is an intermediate service. Transport improvements reduce poverty not through increased consumption of transport *per se* but through improving the quality and security of access to work, markets, and services, and through release of scarce resources for consumption and production. Tracing the poverty impacts of transport interventions is thus rather complex.

Monitoring of transport performance has two functions: to ensure transport interventions contribute to attaining a country's poverty reduction objectives, and to diagnose ways in which the performance of the transport sector itself can be improved. Monitoring of poverty outcomes asks the question: "What has happened over the last period in a nominated area to a key welfare indicator such as infant mortality rates?" Monitoring of the sector includes tracking the change over time in the implementation and outcomes of a specific policy and project interventions, say, the change in the number of poor communities with all season road access.

More generally, monitoring involves observing changes over time, not only in transport sector inputs (e.g., maintenance expenditures per km of and type of road, invitations to public consultations), but also in outputs (e.g., transport time and fares, contract awards announced in newspapers or on bulletin boards) and transport sector outcomes (e.g., marketing of crops, access to health facilities, responsiveness of transport interventions to poor people's needs, improved accountability in the transport sector) as well as in poverty reduction outcomes (rural incomes, literacy).

Evaluation asks questions such as: "What net impact did a local road improvement have on infant mortality rates?" Its objective is to assess the extent to which changes in outcomes can be attributed to specific interventions such as transport policies or projects. Evaluation involves the establishment of causal links between the transport inputs and final outcome in circumstances where many influences are operating simultaneously. This requires a comparison between the situations with and without the intervention. A good example of the linkages which may be traced is shown in the **Case study 1** which demonstrates a causal link between a rural road investment in Morocco and a range of poverty objectives such as increased rural incomes, female literacy, and health.

Evaluation of ultimate poverty impact is thus a subtle in-depth exercise which is rarely undertaken as part of investment projects. The analytical methods for identifying causality and an example of assessing the poverty impact from the improvement of rural roads can be found in the chapter on **Monitoring and Evaluation (Technical Note 9)**. Instead, monitoring and evaluation of projects is usually limited to transport outcomes and outputs which, have been shown, in most occasional and in-depth analyses, to be closely associated with the desired poverty reduction outcomes and impacts. The rest of this section focuses on monitoring of transport interventions.

5.2 Designing a transport monitoring system

Designing a monitoring system involves identifying indicators relevant to the agreed poverty reduction goals, setting realistic targets, and determining the data needed and the frequency of monitoring.

5.2.1 Setting the goals and targets

A country's poverty reduction goals will be determined as part of the policy-making process. When this process involves a wide range of country stakeholders, it will contribute to build consensus and commitment to the goals. These will subsequently guide the allocation of resources, serve to prioritize national and sectoral programs, and also to monitor progress. It is important that both transport agencies and users are represented in the policy dialogue as they will be held accountable for implementing the agenda and have to design sector interventions so that they contribute to these goals. The way in which these goals and targets are expressed will vary with country context. For illustration purposes, Table 5.1 exemplify goals to reduce poverty in three dimensions by creating opportunity, facilitating empowerment, and enhancing security (reducing risk and vulnerability).

5.2.2 Selecting the monitoring indicators

After defining the goals of the poverty reduction strategy, the next step is to select indicators to measure progress towards those goals. It is preferable to select only a few

indicators that can be measured well on a timely basis and provide useful information for decision-making rather than selecting too many, measuring them badly or not using them at all. It is important to distinguish between a cross-sectoral core set of indicators for monitoring the overall PRSP progress from a larger and more comprehensive set of indicators for sectoral monitoring.

Impact indicators measure the ultimate effect of transport interventions on well-being. They depend on a multitude of cross-sectoral factors. Many, such as household behavioral responses, are outside government control. Moreover, changes in these variables may occur only in the medium to long run. Thus, it is important to complement these indicators with sector indicators. The sector indicators that will contribute to these poverty reduction outcomes have been separated into three categories: outcome, output, and input indicators (see Table 5.1). The transport outcome indicator can be thought of as a final sector indicator, and the output and input indicators as intermediate indicators because they provide information on actions taken and measure reflected policy changes which serve to achieve the poverty goals. Generally the monitoring system would include as intermediate indicators a combination of measures including investment and expenditure levels in the transport sector that contribute to pro-poor growth, some measure of the services generated, the efficiency of their production, how the decisions were made, and if the sector agencies are held accountable.

As noted, the selection of specific indicators should in each country be driven by the specific goals, policy choices, data availability, monitoring capacity, and the views expressed in the participatory processes.

Poverty reduction impact indicators monitor overall progress on the poverty reduction goals, and will, in most cases, be set at the national level, not at the sector level. In Table 5.1 we have listed a selection of poverty reduction outcome indicators including poverty incidence, income distribution, poverty incidence in rural areas, literacy rates per gender, child and maternal mortality rates, increased transparency in contract award in the transport industry, social capital among poor and vulnerable groups, and proportion of affected population accessible after last major calamity.

Transport outcome indicators measure the effect of transport interventions that contribute to attain the desired poverty goals. They should provide information relating to policy or program outcomes, for example, industry competitiveness (transport costs as percentage of c.i.f. price of major exports), money income from cash crops, labor participation¹⁸ in road work by gender, school attendance and teacher availability, and the usage of health clinics for preventive care. A transport outcome indicator for empowerment can be the extent to which the general public, including poor constituents, feels better informed about transport plans and budgets, and, the extent to which, poor people's priorities are reflected in sector interventions. Reducing the risk and vulnerability of poor people from a transport point of view includes improving the safety of public transport, pedestrians and NMT users, and reducing lead omissions. Outcome indicators include traffic fatalities, ambient lead concentration, transport time to get food from surplus to deficit

¹⁸ Statistics on labor participation has to be carefully interpreted. In countries with large unemployment rates, labor-intensive construction and maintenance technologies are efficient because they make use of an abundant and cheap resource. In such cases large and growing numbers of person days employed is positive, particularly when these are jobs in the private sector. On the contrary, in cases where work is done by force account or there are labor shortages, having a labor-intensive transport industry is not efficient. In such cases one would want the indicator to decrease rather than increase.

areas, and more general indicators such as affordability of transport services, and percentage of population with all-season road access.

Transport intermediate (input/output) indicators provide information relating to network condition (% of roads in good and fair condition) and average travel time to markets and other important services by affordable modes. They should also measure transport service frequency, fares and costs (personal travel and freight) for different trip purposes and modes, and modal shares (motorized/NMT). In order to assess the extent to which transport interventions respond to the concerns of poor constituents, it is useful to gauge the frequency of public meeting on transport plans, the transparency of budgets and contract awards, and the frequency of transport services to facilitate participation in educational and social events. Increased security is best measured by network condition, transport costs and availability. Transport inputs include policy measures to encourage user involvement in the sector (public consultations), eliminate fiscal bias against public transport and NMT usage, and improve pedestrian safety. Inputs also include expenditures on network improvements and maintenance.

5.3 Using transport sector monitoring to inform policy decisions

The aim of sector monitoring is to feedback to inform future policy decisions. That feedback can operate at four levels, to inform the design and selection of pro-poor transport interventions by assessing:

- progress towards set goals and targets, and how these are best served indirectly by transport interventions,
- the direct distributional consequences of various types of transport intervention,
- the most cost effective ways of securing specific poverty objectives, and
- how, and the extent to which, different types of transport interventions improve the general quality of transport supply.

Assessing progress towards set goals and targets is often done at the national level. How transport interventions best contribute towards this progress requires an in-depth understanding of the transport and poverty linkages. This is best achieved through rigorous impact evaluation. As part of monitoring, periodic collection of the indicators proposed in Table 5.1, will help assess the sector's contribution to the main dimensions of poverty: opportunity, empowerment and security. Some of these indicators will require both quantitative and qualitative analysis, the latter including focus group discussions.

Assessing the direct distributional impact of transport interventions can, in a crude way, be done by examining the spatial distribution of the direct transport benefits between rich and poor areas, and where possible according to gender. For transport network and service flows that involve connections among many locations/areas, this can pose problems of associating a transport intervention with a designated geographical area in a policy relevant way. This is less of a problem the more localized the transport intervention. For example, for monitoring improvements in basic accessibility or the facilitation of rural NMT services, the zone of influence is generally confined to the local area. In the urban context, where zonal disaggregated analysis has been used information can be structured and presented to show the distribution of benefits between rich and poor areas, and particularly to check that interventions which look to be good in aggregate do not have adverse impacts on poorer groups. Such an analysis should also incorporate the distribution of adverse

occupational redundancy and environmental effects, and resettlement which should be mitigated wherever they occur.

Assessing the best way of meeting poverty objectives may be addressed by using cost effectiveness analysis. In doing this, however, it is important to take into account the status/level of complementary inputs.¹⁹ For example, both transport and health inputs might affect health outcomes of an improvement of rural access. Put simply, getting to a hospital faster will have no separate effect on the infant mortality rate if the hospital has no qualified staff. Recognizing there are multiple interactions of inputs can increase the effectiveness of resources allocated to improve poverty outcomes (such as health and security). In some situations, the effectiveness of any one sector input, such as transport, will be governed by the weakest link in the chain of complementary inputs (for example, no vaccines at the hospital) needed to change particular poverty outcomes (for example, infant mortality). Some substitution among inputs is typically possible at the margin with little sacrifice of outcome (for example, nursing staff for qualified doctors and travel time for more specialist care), but these are limited. Thus, co-ordination across sectors can raise substantially the productivity of individual inputs, especially transport, which enters as input into several sectors, especially health, education, and income-earning opportunities.

Assessing the link between transport interventions and transport quality has traditionally involved cost/benefit analysis. That technique remains important, and will be informed by many of the sector performance indicators set out in the Annex. The main significance of the poverty focus is to recognize that the conventions for adding up benefits in that format at best tend to give equal weights to a unit time or money saving to rich and poor alike, and in some cases actually weight benefits to the rich more highly than those to the poor. As discussed immediately above, it is therefore important that the cost benefit analysis is supplemented by distribution analyses to provide policymakers a more complete picture of an intervention's poverty impact.

¹⁹ Technically, the functional relationship between a poverty outcome, such as the infant mortality rate (as the dependent variable), and several interventions (as the independent variables) is multivariate and not simply separably additive; i.e., the interaction ("cross product") terms are important! For example, the marginal effect of transport (access time improvements) on infant mortality depends on the level of health input, such as staff and supplies at the hospital, and vice versa.

Table 5.1. Monitoring Indicators

POVERTY REDUCTION OUTCOME INDICATOR	TRANSPORT OUTCOME INDICATOR	TRANSPORT OUTPUT INDICATOR	TRANSPORT INPUT INDICATOR	COMMENTS	
<i>Goal: Creating opportunity (through improved transport system efficiency, access and mobility)</i>					
<ul style="list-style-type: none"> • Incidence of extreme poverty: population below \$1 per day • National income per capita • Income distribution: poorest fifth's share of national consumption 	<ul style="list-style-type: none"> • Land transport costs as % of c.i.f. price of major exports 	<ul style="list-style-type: none"> • % of roads in good and fair condition • Ave main road speed • Ave cost per freight ton km • % of roads in maintainable condition receiving regular maintenance 	<ul style="list-style-type: none"> • Expenditure on maintenance per km and type of road 	Competitiveness in trading can be significantly reduced by high inland transport costs due to poor state of road infrastructure. Regular maintenance is critical to safeguard infrastructure condition and preserve competitiveness. Most of the indicators are readily available from Ministries of Transport, Trade, or Finance.	
	<ul style="list-style-type: none"> • Maximum distance to public transport services • Time spent in travel to work 	<ul style="list-style-type: none"> • Public transport fares • Public sector transport deficit 	<ul style="list-style-type: none"> • Reform of urban public transport regulatory regime 		Many of the urban poor are dependent on public transport for their major activities; reducing time and money expenditure increases their disposable income and facilitates wider access to employment, social services, and so on.
	<ul style="list-style-type: none"> • Transport costs per capita 	<ul style="list-style-type: none"> • Modal share of non-motorized transport 	<ul style="list-style-type: none"> • Expenditures on physical separation measures for NMT • Availability of micro-credit for NMT/IMT • Removing fiscal distortions to NMT purchase 		Measures to improve access to safe NMT increases job opportunity as well as access to social and administrative services and the potential for participation in empowering activities.

POVERTY REDUCTION OUTCOME INDICATOR	TRANSPORT OUTCOME INDICATOR	TRANSPORT OUTPUT INDICATOR	TRANSPORT INPUT INDICATOR	COMMENTS
<ul style="list-style-type: none"> • Incidence of poverty in rural areas • Rural employment rates • % of rural household incomes from non-farm employment • Rural literacy rates, per gender • Child and maternal mortality rates in rural areas 	<ul style="list-style-type: none"> • Money income from farming • Farm gate receipts as % of market price • Road workers employed from lowest income quintile, by gender • Primary school enrollment and attendance by gender • Percentage of pregnant women receiving pre-natal care. • Maximum continuous number of days per year of impassability 	<ul style="list-style-type: none"> • % of rural roads in maintainable condition receiving regular maintenance • # of person days employed in rural road maintenance 	<ul style="list-style-type: none"> • Expenditures on improving rural basic motorized access • Expenditures on rural road maintenance per km • % of road work being labor-based (% of wage bill in total costs) 	<p>Rural incomes depend on access to local markets, which requires all season passable links, but not necessarily high quality infrastructure. Transport can also be a direct income generator. Measures of the attention to this are not normally kept and may need to be occasionally specially surveyed.</p> <p>Educational and health access is similarly dependent on reliable and affordable transport services. School enrollment data is commonly available from the Ministry of Education. If data on health visits are not available at the national level, it can usually be collected from a sample of hospital administrators.</p>

POVERTY REDUCTION OUTCOME INDICATOR	TRANSPORT OUTCOME INDICATOR	TRANSPORT OUTPUT INDICATOR	TRANSPORT INPUT INDICATOR	COMMENTS
<i>Goal: Facilitating empowerment (through better communications and increased stakeholder participation in transport planning)</i>				
<ul style="list-style-type: none"> • Increased appreciation of participation among both decision-makers and users (surveys) • Reduced corruption in the transport industry 	<ul style="list-style-type: none"> • General public, including poor users, are better informed of transport budgets, plans, decisions, and contracting process • Responsiveness of transport interventions to poor people's needs (surveys) 	<ul style="list-style-type: none"> • Budgets, plans, and contract awards, amounts, and content are publically announced in newspapers, webpages, and/or on bulletin boards • Attendance by poor people and their representatives at public meetings • Bids for road works opened in public 	<ul style="list-style-type: none"> • Number of public meetings & consultations on transport plans and budgets 	
<ul style="list-style-type: none"> • Social capital (bridging & linking) aggregation, part. among poor and vulnerable groups 	<ul style="list-style-type: none"> • Increased use of transport services among poor groups 	<ul style="list-style-type: none"> • More regular, affordable and safe transport services linking remote areas with service centers 	<ul style="list-style-type: none"> • Pro-poor and active transport services policy • Remove distortion in fiscal regime to NMT purchase 	
<ul style="list-style-type: none"> • Female literacy and education • Social activity participation 	<ul style="list-style-type: none"> • Increased female participation in education and training and social activities 	<ul style="list-style-type: none"> • Passengers by gender, peak/off-peak hours • Frequency of transport services • Km of side-walks & shoulders improved 	<ul style="list-style-type: none"> • Measures and expenditures to increase personal security on public transport, NMT and walking 	<p>Female activities are often the most inhibited by poor transport provisions: the indicators here tend to be poor and may need occasional sample collection.</p>

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POVERTY REDUCTION OUTCOME INDICATOR	TRANSPORT OUTCOME INDICATOR	TRANSPORT OUTPUT INDICATOR	TRANSPORT INPUT INDICATOR	COMMENTS
<i>Goal: Reducing risk and vulnerability (through improved transport reliability, affordability, and safety)</i>				
<ul style="list-style-type: none"> Morbidity rates Mortality rates 	<ul style="list-style-type: none"> Total road transport fatalities Total road transport serious injuries 	<ul style="list-style-type: none"> Road transport accident rates 	<ul style="list-style-type: none"> Expenditure on road safety campaigns 	Road accidents are often under-reported. Road accident deaths, by category are probably the most secure indicator. Effort is needed to improve data collection and analysis.
		<ul style="list-style-type: none"> NMT & pedestrian accidents rates per capita NMT modal share 	<ul style="list-style-type: none"> Expenditure on NMT / pedestrian infrastructure 	Non-motorized transport and walking are the most vulnerable, but least well addressed or measured transport activities
<ul style="list-style-type: none"> Child intelligence measures Deaths from respiratory diseases 	<ul style="list-style-type: none"> Ambient lead concentration ; % of days with PM and ozone exceeding WHO standards 	<ul style="list-style-type: none"> % of leaded gasoline % of vehicles failing emission tests 	<ul style="list-style-type: none"> Expenditure on local air pollution reduction 	WHO standards exist for six major transport related air pollutants. Vehicle testing is often rare or corrupt. National standards should be established and a centralized testing capacity established.
<ul style="list-style-type: none"> Infant and maternal mortality rates 	<ul style="list-style-type: none"> Immunization coverage Percentage of pregnant women receiving pre-natal care 	<ul style="list-style-type: none"> All-season passability/no. of day cut-off Availability and cost of transport service 	<ul style="list-style-type: none"> % of roads in maintainable condition receiving regular maintenance Km. of roads improved to all season standard Policy & fiscal environment facilitate low-cost transport services 	
<ul style="list-style-type: none"> Nutritional status: prevalence of underweight children under five 	<ul style="list-style-type: none"> Farmgate prices Variety of goods in the local market Transport time to get food to deficit areas 			
<ul style="list-style-type: none"> % of population accessible after last major natural calamity 	<ul style="list-style-type: none"> % of population with all season motorized transport access 	<ul style="list-style-type: none"> All season road kms per km² 	<ul style="list-style-type: none"> Expenditure on primary and secondary roads 	Drought and flood relief efforts depend critically on the extent of a continuous passable transport network

Annex 1. Transport Sector Performance Indicators

	TRANSPORT SECTOR (incl. International)	INTER-URBAN	URBAN	RURAL
SUMMARY PERFORMANCE INDICATOR				
Accessibility	Inland transport cost as % of export fob price (major commodities) Inland transport cost as percent of food costs (CPI)	Average cost per ton km Average cost per passenger km	Weighted average generalized cost of access to major facilities	% of rural population with all season access % of households served by some form of mechanized transport % of households owning a vehicle (cycle, donkey, cart, motorbike etc)
Operational components				
Costs	CPI transport component price increase	Freight cost per ton km <ul style="list-style-type: none"> • Road transport • Rail transport Cost per passenger km <ul style="list-style-type: none"> • Road transport • Rail transport 	Transport cost as % of household budgets % of household time devoted to transport	Transport cost as % of household budgets % of household time devoted to transport % of adult female time devoted to transport tasks Cost of new bicycle in terms of household annual income
Asset maintenance	% roads in good or fair condition % truck fleet active percent % locomotive availability % berth availability (largest ports)	% roads in good or fair condition % truck fleet active	% roads in good or fair condition % urban bus fleet active	% roads in good or fair condition % of obsolete bridges
Congestion	Waiting time to berth (days, mainport) Number of ships waiting to berth	AADT major intercity highways by lane	Average urban traffic speed (3 largest cities) Crush loading % of nominal capacity (urban bus) % of daily traffic in a.m. peak	Not applicable
Asset utilization	% airline load factor % empty backhauls (trucks) % berth occupancy (largest ports) Rail wagon turnaround (days)	% empty backhauls (trucks)	Miles per bus per day Average bus capacity occupancy rate	% empty backhauls

	TRANSPORT SECTOR (incl. International)	INTER-URBAN	URBAN	RURAL
	Estimated percent of workforce redundant (by mode)			
Reliability	% of firms using Just-in-Time inventory management % cargo theft and damage, by mode Schedule enforcement program in use (bus, airlines, rail)	% on-time performance (scheduled air, bus and rail service) % truck overloading	Variability in bus commute time	% of population with all season access to main transport network % of time without access to main transport network Seasonal variation in freight rates
Safety	Annual road fatalities per 000 vehicles Annual road fatalities per 000 people Annual transport work related fatality rate	Truck overloading (H/M/L; Y/N) Roadworthiness program enforced? (Y/N, trucks, buses) Airworthiness standards enforced (Y/N)	Annual road fatalities per 000 vehicles Annual road fatalities per 000 people Annual transport work related fatality rate	Annual road fatalities per 000 vehicles Annual road fatalities per 000 people Annual transport work related fatality rate
Environment	% leaded gasoline sold Sulfur in diesel (PPM)	Road projects subject to environmental assessment (Y/N)	% of days in major cities exceeding WHO norms for <ul style="list-style-type: none"> • ozone • suspended particulates • carbon monoxide 	Use of bio-engineered local road techniques(Y/N)
Structural Components				
Ownership	Existence of state monopolies (Y/N) % Private sector share of transport market by mode	% share of private trucking	% buses privately operated % public transport passengers carried by informal sector	% of rural roads gazetted to districts and communities respectively
Competitiveness	National competition law applicable to transport (Y/N)	Concentration Ratio /market shares (top three suppliers): <ul style="list-style-type: none"> • intercity freight market • intercity passenger market 	Concentration ratio/market shares (top three suppliers): urban public transport, 3 largest cities	Number of hauliers/merchants serving local product markets Ratio of market to farmgate prices of products
Regulatory framework	National agency responsible for transport quality regulation(Y/N)	Trucking subject to <ul style="list-style-type: none"> • Quality control(Y/N) • Quantity control (Y/N) • Price control (Y/N) 	Urban buses subject to <ul style="list-style-type: none"> • Restricted entry • Competitive tendering • Fare control 	

	TRANSPORT SECTOR (incl. International)	INTER-URBAN	URBAN	RURAL
Policy Components				
Resource allocation	% of transport budget for poor regions % of transport budget for urban areas Deficit/surplus of transport SOEs	Existence of user managed Road Fund Road Fund management able to determine user charges and expenditures (Y/N) % of road budget to capital expenditure % of road budget to maintenance (less salaries) % of roads in good condition receiving regular maintenance	% of municipal budgets allocated to public transport % of road budget to capital expenditure % of road budget to maintenance (less salaries) % of roads in good condition receiving regular maintenance	% of national road budget or Road Fund allocations devoted to rural roads % of road budget to capital expenditure % of road budget to maintenance (less salaries) % of roads in good condition receiving regular maintenance
Subsidies	Transport sector subsidies (fare and fuel) targeted at the lowest quintile. Transport budget per capita, urban versus rural Transport budget per ton-km (pax-km) urban versus rural	% cost coverage by inter-urban buses % cost coverage by inter-urban rail r	% of full urban bus transport costs covered by fares % of passengers eligible for reduced or free fares Subsidies paid for transport services \$m and \$ per pax	Do local councils have the power to procure transport services (with or without subsidies)
Voice and Participation	% of: national transport expenditure by local government and municipalities National safety and health standards enforced? (Y/N) Compulsory labor redundancy compensation (Y/N)	Existence of user managed Road fund (Y/N) Local consultation arrangements for major transport investment schemes (Y/N)	% local spending paid from national budget Public consultations on transport plans and budget allocation	% local spending paid from national budget Community involvement in road investment and maintenance decisions
Inclusiveness	National strategies are gender sensitive and formulated for <ul style="list-style-type: none"> • transport for disabled • transport for the elderly 	Availability of public intercity transport (Y/N)	% of workers walking more than 30 minutes to work	% of rural population within 2 hours walk of a market or administrative center Use of labor-based road construction/maintenance (Y/N)

	TRANSPORT SECTOR (incl. International)	INTER-URBAN	URBAN	RURAL
Provisions for pedestrians and non-motorized transport	<p>Does a national policy exist for</p> <ul style="list-style-type: none"> • non-motorized transport • pedestrian movements • specific pedestrian safety program in force (Y/N) • NMT safety program in force (Y/N) <p>Spending on NMT as percent of investment</p>	Protected pedestrian crossings of major routes in populated areas (Y/N)	Facilities for pedestrians and NMT on new urban road construction (Y/N)	Taxation levels on bicycles and vehicle spare parts Facilities for bus stops
Vulnerability	<p>Emergency response plan exists (Y/N)</p> <p>Is transport policy conducive to low-cost transport services.</p>	% of bridges functionally obsolete (main road network, secondary road network, rail)	Transport services are available and affordable to poor households	<p>Average travel time to health facility</p> <p>Transport services are available and affordable to poor households</p> <p>Number of unbridged water crossings</p>

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