



Poverty Reduction Strategy Paper
A Sourcebook

***Transport:
Infrastructure
and
Services***

(Gannon - Liu)

Transport: Infrastructure and Services

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Summary

Adequate transport is necessary for poverty reduction, so transport policies and investment programs are an important part of a poverty reduction strategy for low-income countries where transport is typically underdeveloped. Transport reduces poverty by supporting economic growth, complementing most poverty-targeted interventions, and encouraging the poor to participate in social and political processes. However, transport alone will not alleviate poverty. More transport does not necessarily translate into less poverty, and inappropriately designed transport policies and investment programs may harm the poor and deny scarce resources for other poverty reduction efforts.

It is a challenging task for low-income countries to design appropriate transport sector inputs for a poverty reduction strategy. Transport has pervasive influences throughout a country's economy and social fabric that make it hard to comprehend and measure the ultimate impacts of transport interventions on the welfare of poor households. Unanticipated effects — both good and bad — can emerge.

The practical tools proposed in this chapter are built upon current knowledge about various linkages between transport interventions and poverty reduction and their effectiveness. Emphasis is placed on understanding : (1) the dual role of transport in poverty reduction, i.e., its role in promoting economic growth and in supporting poverty-targeted interventions; (2) the impacts of transport on four core dimensions of poverty: economic opportunities, capabilities, security, and empowerment; (3) the distinction between infrastructure and services; (4) the prevalence of inter sectoral linkages and interindustry dependencies; and (5) the importance of participation by the poor in policymaking.

The chapter has four parts: (1) **diagnosis**; (2) **strategic formulation**; (3) **policy options**; and (4) **monitoring and evaluation**.

The diagnostic tools are designed to assess transport problems in terms of how transport conditions and performance affect the welfare of poor groups. Some diagnostic tools are widely used and have proved to be very helpful. Others are just emerging, but have promising potential to improve decision-making. As a starting point for diagnosing poverty-related sector issues, it is always a wise idea to use a checklist for a quick assessment of whether current policies are helping reduce poverty.

A small number of **sector-level performance indicators** can provide preliminary, quick, diagnoses of a country's transport conditions and performance. The chapter includes a comprehensive menu of quantitative and qualitative indicators. These indicators should be selected according to each country's circumstances and based on the availability of data, the cost of collection and maintenance, their scope for sound interpretation, and their power to provide policy-relevant insights and guidance.

The transport needs of the poor can be better understood through low-cost local and household surveys. These surveys typically provide quantitative and qualitative data to establish a **transport-poverty profile**, which represents an important step in linking the outputs of transport interventions to poverty outcomes.

Distributive impacts of transport policies and investment programs can be difficult to estimate. However, to the extent possible, the impacts on poor groups should be carefully measured. This

requires an assessment of the market structure of transport services, including any associated regulatory regime. In general, the more competitive a market, the more the benefits of improved transportation are passed on from service providers to traveler and shipper users. In the urban context, the outcomes of transport improvements require a sound understanding the interdependencies among transport, labor, land, and housing markets.

A strategic approach is needed to develop appropriate transport inputs for a poverty reduction strategy. Central to the strategic approach is a set of strategic principles to guide transport sector policies to ensure that the policy framework is most effectively pro-growth and pro-poor:

- The integration of transport into a country's poverty reduction strategy must reflect transport's dual role in promoting market-based economic growth and in supporting poverty-targeted interventions.
- Economic efficiency is, and should remain, the primary objective of most transport policies and investment programs as the basis for supporting economic growth.
- Transport needs of the very poor should be recognized and, to the extent possible, should be addressed through a combination of least-cost and cost-effective transport and nontransport interventions.
- Adverse effects of transport programs on the poor should be addressed at the program level under a national transport policy framework. The national transport policy framework should ensure the adverse effects be minimized and/or the poor groups affected fully compensated.
- Transport interventions should be safeguarded through wide consultation of all stakeholders and full participation of the poor in the decisionmaking process.

A range of policy tools can be used to address specific transport problems that face the poor, including basic accessibility, affordability, the need for employment generation, high risks of traffic accidents, gender inequality in transport activities, and lack of attention to nonmotorized transport.

The policy tools for addressing transport problems of the rural poor are relatively straightforward and mainly focus on cost-effective transport *and* non-transport options to improve physical access to markets and social services in rural areas. As lack of basic road access in rural areas is often a result of inadequate road maintenance and inappropriate institutional responsibilities and financing, emphasis should be given to a sustainable rural road financing and management policy framework.

Transport problems facing the urban poor are more complicated, and it is important to distinguish symptoms from causes. Treating symptoms, such as attempting to lower high commuting costs through public transit fare control without proper fiscal provision for subsidies, can be counterproductive and eventually hurt the poor. An important policy area to help the urban poor is to reduce excessive regulations that prohibit the informal sector from providing affordable transport services, especially in peripheral settlement areas. However, this requires prudent regulatory reform and oversight.

Transport investment programs often offer potential to generate **employment**. When economically warranted, labor-based methods for road work in basic construction, rehabilitation, paving, and maintenance should be promoted as one important means of supplementing employment for poor men *and* women.

Traffic accidents are an increasing contributor to poverty: poor groups especially are exposed to, and suffer from, transport-related accidents because they use vulnerable modes such as walking and non-motorized transport, and because poor households have little financial

capacity to cope with the tragic impacts. For most low-income countries, a strategic approach to road safety by governments is urgently needed to reduce fatalities and injuries through improvement in the protection for, and education of, the public in general, and the poor in particular.

Gender inequality in transport contributes to the lower welfare and productivity of women. Transport interventions that are more responsive to the transport needs of women can help them expand their income-earning activities, improve their access to social services and participation, 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. Keys to success are to recognize the particular transport needs of women and to encourage the participation of women in policymaking.

Nonmotorized transport (NMT) modes are popularly used by the poor. There is a notable neglect of NMT in government transport policies and public actions, however. This harms the poor. Governments in low-income countries should take a clear policy stance for protecting NMT for the benefit of the poor. Various engineering and policy options are available for achieving this objective.

Monitoring outcomes, evaluating the impact of interventions, and feedback to policy are crucial steps for improving the effectiveness of public actions to fight poverty. This is especially so, given the substantial gaps in current knowledge about the links from transport interventions to poverty outcomes. Monitoring concerns tracking inputs, processes, and outputs of interventions, as well as their impacts. This process is particularly important for transport because its contributions to poverty outcomes are *made in concert with other* targeted sectoral interventions, and its pervasive influences are often difficult to trace. Feedback of findings and lessons learned is key to improving decisionmaking on policy/project design and priority setting. Proper evaluation of the impact of transport interventions requires establishing baselines both within and outside intervention-affected areas and comparing them after the intervention is implemented.

1 Introduction

1.1 Structure

The objective of this chapter is to assist low-income countries establish how transport interventions are most appropriately integrated into poverty reduction programs. This is a major challenge because transport has a pervasive influence throughout a country's economy and social fabric. This pervasiveness makes it difficult to comprehend, measure, and shape the ultimate impacts of transport interventions on the welfare of poor households. To tackle these difficulties, the chapter adopts an approach that is heuristic and comprehensive.

A **heuristic** approach is called for because our knowledge about the linkages between changes in transport and changes in the welfare of poor households is limited but evolving. Therefore, this chapter cannot provide all the information and answers that would be desirable for robust policy formulation.

A **comprehensive** approach is essential because transport is a highly diverse sector that provides a complementary input to essentially all other socioeconomic activities. The transport sector comprises several sub sectors or modes (road, rail, maritime, inland waterway, aviation, and urban transport), each of which provides several types of products/services. These services can be identified by both geographic coverage (international, domestic, rural, urban, and community) and by users (passenger and freight). Each mode involves infrastructure (for example, roads, rail tracks, ports, airports, terminals, etc.) and services (such as trucking and shipping, typically supplied by vehicles or mobile equipment with different technologies, coverage, frequencies, quality, and prices).

The **technology** of transport also differs markedly between infrastructure and services. This has major implications for the respective roles of the public and private sectors in providing efficient and effective transport. Most transport infrastructure must be supplied in discrete "lumps" (such as a road section, rail link, bridge, port/berth, or airport runway) and by one agent—often the government as "asset owner." While transport infrastructure is increasingly supplied by the private sector under concession arrangements, competition in the infrastructure markets is limited, and to promote efficiency, some form of government oversight cum regulation is normally required. In contrast, many transport services (especially in the road sector) are typically supplied under conditions of free entry, and in high volume markets, by many competitive operators. As a result, both public and private sectors have a varying degree of participation in the ownership, provision, and operations of infrastructure and services. In addition to the commercial services, many transport needs are met by self-services that typically use individualized modes of transport—nonmotorized and motorized. Nonmotorized transport includes walking, head-loading, bicycling, and animal-powered vehicles. These modes are often the only modes affordable to the poor and thus are popularly used by them.

Transport is an **intermediate** service. Demand for transport is *derived* from activities of other sectors (health, education, farming, manufacturing, etc.). So, too, other sectors are affected by, and respond to, transport. For example, the reliability and speed of road transport will influence the location, scale, staffing, and effectiveness of hospitals, health clinics, and mobile health services.² Depending on the kinds of activities that it complements, transport affects the general welfare of the poor either directly or indirectly. **Direct effects** arise where transport is used as a

²Where appropriate, this chapter makes cross-references to other chapters of this Sourcebook.

complementary input with other interventions to **target specifically the poor**, for example, the provision of health clinics, schools, and extension services. Direct effects are more often those associated with equity-based interventions. **Indirect effects** stem from transport interventions that are designed to **improve efficiency** for both producers and consumers and contribute to economic growth. The impact of these interventions spread through the economic and social systems, and, under the appropriate circumstances, benefit all groups, including the poor..

The remainder of this introductory section provides a perspective on the role of transport at the macro and micro level—in supporting economic growth and in improving, in concert with other sectors, the well-being of the poorest individuals. It also strikes a note of caution in that transport activity, policies, and individual projects, if not appropriately designed, can actually harm the poor. (For a more detailed discussion and illustration of the linkages between transport and poverty alleviation, see **Technical Note 1.**)

1.2 Potential links between transport and poverty

How can the transport sector contribute more effectively to poverty reduction, and what does government need to do? This chapter attempts to assist policymakers in identifying answers to the above question at the country level. An essential foundation for framing an answer is a sound understanding of the **key linkages** between transport and poverty, both positive and negative, and where these linkages call for a government role. An overview of these key linkages is provided in **Technical Note 1.**

Poverty, while primarily related to very low-income and consumption, is also manifested in many dimensions, especially malnutrition, ill health, illiteracy, vulnerability, social isolation, and political exclusion. Each of these dimensions tends to reinforce the others. Most of these dimensions have something to do with transport. Without adequate access roads poor farmers will not produce cash crops to sell in a market; they may not be able to afford to send their children to school; and in emergencies; the ill may not be able to reach clinics in time. Without transport the poor living in remote rural areas, and in informal settlements on the outskirts of urban areas, will remain in isolation and “trapped in poverty.”

Poverty reduction requires economic growth, redistribution, and empowerment. Transport contributes to **economic growth** by mobilizing human and physical resources.³ Transport improvements lower transaction costs, allow economies of scale and specialization, widen opportunities, expand trade, integrate markets, strengthen effective competition, enhance social interaction, and eventually increase real income and welfare of a society. These effects will, in general, provide real benefits to most, if not all, socioeconomic groups, including the poor. Without efficient transport, economic growth is not possible, and without growth, poverty reduction cannot be sustained.

Transport also plays an important role in the **redistribution** process, especially public interventions targeted at meeting the specific basic needs of the poor (especially food, health care, and education). By enabling goods and services to be delivered to the poor, as well as enabling the poor to access social services, transport complements most targeted interventions. Moreover, well targeted interventions to meet the basic transport needs of the poor are a basic ingredient of direct policies to increase their well-being.

³Mounting evidence indicates that the poor benefit from economic growth proportionally in income terms as the non-poor. See Dollar and Kraay (2000). However, this evidence is at an aggregate level and there is considerable *variance* across countries. “Pro-poor” growth in a specific country requires a supporting environment (e.g., sustainable poverty policies, governance, etc.) in that country.

Empowerment involves the poor participating equally in community and wider political decision making. Effective participation requires overcoming social, cultural and physical barriers, including, geographical isolation. Adequate transport makes it possible for constituents to get to meeting places and town centers, facilitates the flow of information, and so facilitates political and social participation.

Adequate transport is necessary, but not sufficient, for poverty reduction. While poverty reduction would not be possible without adequate means to move people and goods, it is important to keep in mind that transport provides an intermediate service—it is a means to an end. **More transport does not necessarily lead to less poverty.** Transport interventions can have impact on the poor only if other sectoral interventions are also adequately in place. Alternatively, the effectiveness of direct targeted interventions in the health, education, and agricultural sectors depends on the adequacy of transport infrastructure and services. Good access to a hospital has little effect in improving the health of the poor if there is no qualified medical staff or supplies available.

It must also be recognized that inappropriately designed transport policies and programs can harm the poor and deny scarce resources for other poverty reduction activities. The adverse impact of a transport policy or investment program on the poor depends on the specific circumstances. However, the following types of harmful impacts are common in many countries, and warrant explicit attention, as they are typically regressive:

- Displacement of a transport mode that is popularly used by the poor to make way for another (displacement of nonmotorized by motorized modes is a prominent example);
- Disruption/partitioning of low-income neighborhoods due to road construction;
- Involuntary resettlement;
- Traffic accidents, especially for pedestrians;
- Environmental pollution emission concentrations and noise from vehicles;
- Labor redundancy caused by restructuring, commercialization, and privatization of state-owned transport enterprises;
- Transport tariff increases as a result of removal of a subsidy, for example, by commercialization.

Although the above impacts can affect all income groups, the hardest hit is likely to be the poor as they have few if any resources to adjust to the impact imposed (for example, by relocating or compensating household expenditures). A poverty reduction strategy should provide a policy framework for identifying and addressing the adverse impacts of transport actions on the poor both as potential users of transport and as nonusers.⁴

⁴ To learn more, see World Bank (1996) and Gannon and Liu (1997).

Box 2.1 Basic Policy Diagnostic Checklist

One of the first steps in gauging the transport system's effectiveness is to assess whether current policy is reducing poverty and alleviating transport-related constraints to pro-poor growth and sound macroeconomic management. Although there are typically many policies and programs that affect transport, the checklist of questions below highlights types of issues that should be scrutinized.

- Has a comparison been made of the distribution of public spending per capita on basic services—health, education, extension, and transport—across regions, including rural/urban with the level of poverty (headcount index) in each region—over the preceding five years?
- Has the effectiveness and efficiency of public spending on transport been assessed?
- Has the participation of the private sector and the priorities for its development been assessed?
- Are sectoral and structural policies and programs aimed at poverty reduction coordinated? Are donor poverty programs coordinated?
- Has a priority list of policies and expenditure programs that need to be coordinated been identified? How can these be effectively implemented?
- Do transport sector regulations and policies minimize opportunities for corruption?
- Are duties and taxes applied to the transport sector highly regressive?
- Are nonmotorized forms of transport (for example, bicycles) taxed excessively?
- Do government regulations support the means of transport used by the poor?
- 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?

2 Diagnostic Tools

A country's formulation of the transport sector inputs for a national poverty reduction strategy should start from a sound understanding of the country's existing national transport system and poverty conditions. In recent years, practical tools have been sharpened for assessing the status of an existing transport system. Tools for measuring and assessing existing poverty conditions in a country are set out in this Sourcebook, under the **Poverty Data and Measurement** chapter. Assessment of the transport sector should be linked to an assessment of poverty in the country and should

- (1) assess the overall adequacy and performance of the transport system;
- (2) examine the country's transport policies and performance with emphasis on needs and problems facing poor and low-income groups;
- (3) identify transport problems and issues most important for encouraging economic growth;
- (4) determine whether the policies of other sectors incorporate access or transport conditions; and
- (5) identify priority transport components to integrate into the country's PRSP, after consulting with all stakeholders.

This approach combines traditional top-down sectoral planning approaches with bottom-up consultation involving all stakeholders.

2.1 Sector-level performance indicators

Sector-level performance indicators provide a preliminary, quick, inexpensive assessment of a country's transport situation. Together with comparators from other countries and other benchmarks, these key indicators provide summary information of the national transport system's condition and performance—especially costs, bottlenecks, and barriers. Though highly stylized and partial in focus, these indicators are well suited for the PRSP's purpose. In addition, in-depth analysis of a country's transport sector, or at least some aspects of it, may be highly desirable for probing particular issues and exploring ways to address them, for example, the relative efficacy of the prevailing roles of the public and private sectors, in transport infrastructure and services. Such analysis could allow better interpretation of aggregate sector-level performance indicators; it also typically has implications for other sectors, including urban, rural, and regional development.

Performance characteristics need to be developed for each significant mode—rural and national road transport (covering both motorized and nonmotorized service), railways, inland water, maritime, urban public transport, and aviation—based on each mode's infrastructure and service components.⁵ Understanding sector performance also requires careful measurement because transport is a service activity and transport output is nonstorable: quantities **supplied** (for example, seat-kilometers) do not normally correspond to quantities **demanded** (for example, passenger-kilometers). Transport also produces pervasive and substantial “nonmarket spillover effects” (externalities), such as congestion, pollution, and accidents. This kind of complexity means that it is not possible to rely on only a few leading sector performance indicators. Rather, separate sets of indicators are needed for each mode, and their infrastructure and services components. These indicators and their role in diagnosis and monitoring are relatively well established and commonly used. At the same time, all indicators are *partial* measures and therefore *they have limitations and must be interpreted with care*.⁶ Indicators can give useful “signals”, but they should be viewed for what they provide: indications not conclusions.

Box 2.2 sets out the sector-level performance indicators relevant to judgments about efficiency and poverty. Depending on the availability of data, and the perceived importance in each country, one or two indicators can be used to signal potential problems for each category. A diagnostic profile and analysis can then be put together, most desirably at a sub-national/regional level, based on a selection from a menu of quantitative and qualitative indicators.

⁵The performance characteristics of transport are shaped especially by technology (for example, scale economies, lumpiness), cost structure (for example, joint, separable, fixed, and sunk costs), institutional arrangements (for example, private/public ownership and regulatory regimes), market structure (for example, contestability, competitiveness, and entry/exit conditions), extent of geographical impact (for example, land value and land use), and durability (long term for well-maintained infrastructure and short term for vehicle services).

⁶ See Gannon and Shalizi (1995).

Box 2.2 Sector-Level Descriptive and Performance Indicators

(1) Level of transport activity ^a

- Transport expenditure as percent of GDP;
- Value-added in transport as a percentage of total value-added;
- Employment in transport as a percentage of total employment;
- Total ton-kilometers performed per year by mode;
- Total passenger-km performed per year by mode;
- Capacity utilization by mode;
- Level of motorized traffic on primary and secondary roads (average annual vehicles per day);
- Level of motorization (registered vehicles per capita);
- Motorized mobility rate in rural areas (trips per person per year);
- Proportion of users of public transport (by mode) who are poor/low income.

(2) Market structure and regulatory regime

- Concentration ratio: proportion of total output/traffic carried by the single largest (or the five largest) operators/firms by mode;
- Ownership of public transport (government or private sector);
- Free entry/exit or not;
- Price control or not;
- Service obligations or not (routes, frequency, operating times).

(3) Infrastructure condition

- Proportion of national level roads in poor condition (including trends);
- Proportion of secondary and feeder roads in poor condition (including trends).

(4) Accessibility

- Road density (km/km² and km/thousand population);
- Share of rural population, by region, without all-season motorized transport access;
- Average distance and travel time by dominant mode, from a community of households to nearest primary school and health clinic;
- Low-income neighborhood populations in urban areas where walking access to public transport exceeds 15 minutes.

(5) Tariffs for basic transport services

- Average and range of domestic freight rates for basic consumer and producer goods, such as grain and fertilizer (U.S. cents/ton-kilometer);
- Rate to ship 20-foot-equivalent (teu) container from main port to foreign port associated with major exports destination (US\$);
- Average bus/motorized vehicle fare for a five- trip (US\$);
- Average nonmotorized vehicle (rickshaw or similar) fare for a five- trip (US\$);
- Proportion of taxes in services cost structure by mode.

^a Transport activity measures are descriptive indicators to place the transport sector in perspective with other sectors in the same country and as (crude) comparators across countries with similar geography and spatial distribution of population. In general, they are not prescriptive or performance measures. Whether more or less transport capacity and activity is “desirable” cannot be judged independent of country circumstances and the relative cost of transport.

Box 2.2 Sector-Level Descriptive and Performance Indicators (Contd..)

(6) Speed and reliability of services

- Average speed of buses/nonmotorized modes in urban areas (km per hour);
- Scheduled frequency of bus public transport (services per hour or day);
- Proportion of scheduled services not operated;
- Average and range of time for exports to reach and leave port for shipment (days).

(7) Safety^b

- Transport-related fatalities and injuries per capita (NMT and MT), by mode, urban and rural (number per annum);
- Road traffic fatalities and injuries per (registered) motor vehicle—pedestrians (adults/children) and vehicle occupants—poor/nonpoor (number per annum);
- Incidence of HIV/AIDS among transport sector workers (especially truck drivers);
- Health education campaigns.

(8) Financial sustainability

- Operating cost recovery ratio by mode;
- Total subsidy per passenger (passenger-km) by mode (U.S. cents and percentage of full fare);
- Total operating subsidy by government to all public transport as percentage of GDP, by mode;
- Ratio of actual to warranted expenditure on road maintenance.

(9) Environmental Impact

- Proportion of leaded gasoline in total gasoline consumption;
- Proportion of two-stroke vehicles in motorized vehicle fleet within urban areas;
- Unit emission levels in urban areas (for example, carbon monoxide)

^b Health risks to the poor associated with transport activity warrant specific diagnostics. Pedestrian and other NMT accidents can be expected to be higher among the poor as these modes are mainly used by the poor, and they are more vulnerable to harm from motorized vehicles. The spread of infectious diseases by transport-related activities (operators, construction workers, travelers), and especially the incidence of HIV/AIDS among transport sector operators such as truck drivers, is a major health risk, particularly in sub-Saharan Africa.

Accessibility is a key transport sector performance dimension and diagnostic indicator. As suggested by the indicators in Box 2.2, it may be measured in several ways: as travel distance or time to specific facilities, as “motorized passability”, and more technically as an aggregate property of a particular location.⁷ In rural areas, “basic accessibility” may be defined in the most practical way as simply motorized passability. Thus, the degree of *impassability* will normally be best 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. Setting an impassability threshold should draw heavily on community views about the consequences involved with being “cut-off” from the main

⁷ This aggregate measure is commonly recognized as a composite or sum of the individual “attractiveness” of all other relevant locations, by virtue of their “facilities”, weighted inversely by the total travel “impedance” (cost, time, effort, etc.) associated with reaching each one of them. For additional discussion on this measure see Technical Note 1.

transport network over different lengths of time. The severity of consequences will of course vary—depending, among other factors, on the availability and additional length of substitute routes/modes and the availability of alternative strategies (for example, storage) developed to cope with the impassability.

The costs users face for personal travel and freight—tariffs, time, and other service quality costs such as safety—are central to diagnosing performance. For example, road transport (supply) costs can vary substantially. An illustration is the sharp contrast between Africa and Southeast Asia, shown in table 2.1. Note that fixed vehicle costs from taxes, import duties, and insurance are a major source of the difference in freight costs passed on to consumers. Another diagnostic indicator is the retail cost of an NMT, such as bicycles. In many countries bicycles are subject to very high tariffs and/or taxes, making this otherwise low-cost mode unaffordable for the poor. The high costs of transport can be further examined by analyzing the market structure. Economic regulations that artificially restrict entry to transport service market are a potential source of low performance and high costs.

Table 2.1. Component Costs for a Tractor and Semitrailer (F FCA per km)

	Africa	Pakistan
Interest	35.2 (7.6%)	4.3 (4.2%)
Insurance	15.8 (3.4%)	0.1 (0.1%)
Crew	27.9 (6%)	11.0 (10.7%)
License and other taxes	7.8 (1.7%)	0.4 (0.4%)
Other fixed charges	42.1 (9.1%)	2.9 (3.0%)
Depreciation	66.1 (14.3%)	8.9 (8.7%)
Fuel	112.4 (24.3%)	43.7 (42.7%)
Maintenance	90.8 (19.5%)	17.2 (16.8%)
Tires	48.1 (10.4%)	6.0 (5.8%)
Road expenses	17.3 (3.7%)	7.9 (7.7%)
Fixed costs	128.8	18.7
Distance dependent costs	334.7	83.7
Total costs	463.5	102.4
Total costs per ton-km	21.7	4.5

Source: Hine and Rizet (1993)

To learn more on the selection of indicators, see Gannon and Shalizi (1995).

To learn more on the design of regulatory policy for the informal sector in urban areas, see World Bank (2000c).

2.2 Assessing the roles of the public and private sectors

A core task for governments is to get the best use of a country's public resources. (See the chapter on **Public Spending** in this Sourcebook.) To achieve a sustainable budget, inter sectoral and intra sectoral budget allocations must be evaluated. This assessment involves recognizing the comparative advantages and obligations of the public and private sectors. Most transport services are, or can be, provided more efficiently by the private sector than by government – provided that effective competition can be developed *in or for the market*, and “deliverables”, accountability, regulation, and enforcement are well established . Even some

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.

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. Moreover, the management and some planning of many national road systems have been placed on a more “commercial” and secure basis through the legislative establishment of road boards and road funds (Heggie and Vickers, 1998). Against this background, it is useful to explicitly identify how involved the private sector is in transport, 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 (or inefficiency) are the degrees of financial autonomy, commercialization, and tariffs each mode has, including trends relative to benchmarks of international “good practice.”

The core roles of government include developing and administering policy, planning development of the sector, dealing with issues that transcend private action (notably externalities/market failures such as traffic accidents, congestion, and pollution), and monitoring performance. The allocation of public expenditure across functional transport areas should be assessed. Key questions include: Are public expenditures for the sector adequate for addressing the sector issues? Does the budget allocation tend to focus on funding 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, including responsive to user demand?

With multilevel governments, how do the current intergovernmental fiscal relations affect transport investment and maintenance at the national, state, and local levels? Are these efficient and responsive to the needs of the poor? What is the local fiscal capacity if some transport responsibilities (for example, road maintenance) are to be decentralized? Are state-owned enterprises’ financial obligations/deficits on budget?

The issues noted above can establish a perspective on the transport system’s performance. Many of these issues are clearly of an important policy nature and are addressed below under **Policy Tools** in section 4.

2.3 What do we know about the transport needs of the poor?

2.3.1 Transport problems that face the poor

Knowledge of the transport conditions of the poor, and especially how these interact with other factors (for example, housing locations and income earning prospects), is modest and especially weak for urban areas. So, too, is an understanding of how the poor perceive their transport problems. However, some “working generalizations” may be noted.

In rural areas:

- The majority of journeys are short and for reproductive or subsistence needs (e.g., collecting water and fuel; crop production and harvesting).
- Less-frequent journeys may be essential to livelihood strategies, such as visiting hospitals or clinics, marketing produce, or labor.
- Nonmotorized transport, especially head-loading and/or other physical portage, predominates.

- The poor don't own or can't get access to motorized transport.
- Meeting transport needs of subsistence activities exhausts poor people's time and energy.
- Women carry out almost all the transport burden in many countries.
- Poor people are worst located to access services.⁸

In urban areas:

- Poor settlements are often located away from job opportunities and services, often in marginalized areas chosen for their low/zero site costs. This means the poor are often badly served by transport services, necessitating interchange, lengthy waits, and walking times. The poor travel long distances, relying on public services where it is too far to walk or cycle. The urban poor's journeys are both expensive and time consuming.
- The high cost of transport relative to cash income limits mobility. Small changes in public transport prices and service levels can make a large difference to the mobility of the poor.
- Increased dominance of private motorized vehicles in urban transport systems, which the poor are largely unable to use, marginalizes or displaces NMT and public transport, upon which the poor depend heavily. Moreover, 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.
- Poorest groups rely heavily on NMT, including walking, but conditions for the more affordable, accessible, and safer use of NMT are often neglected.
- Poor are especially vulnerable to consequences of motorized traffic, such as danger from accidents, partly because they are the primary users of non-motorized transport, especially walking, and there is poor road use behavior, especially on the part of the drivers of motor vehicles. The poor also incur the highest exposure to motor vehicle emissions pollution where they locate close to major roads.⁹

Household surveys should establish how much time, effort, and expense, as well as other problems, the poor face in using transport. This can be done by incorporating a transport module on a rotating basis within regular poverty assessments, social assessment, 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 and gender. An example of such data for rural households from sub-Saharan Africa countries, shown in table 2.2, highlights the activities with which transport times are associated.

⁸ To learn more, see Howe (1997).

⁹ To learn more, see Allport (2000).

Table 2.2. Average Time Spent by Rural Households on Transport for Different Purposes: Sub-Saharan Africa

Purpose	% distribution
Food production	25
Fuel	15
Water	30
Grinding	5
Local market	10
External crop market	5
Other	10

Source: Dawson and Barwell (1993)

While rural and urban poor people face very different transport problems, these can differ substantially across urban areas in different countries as suggested by studies in Ghana and India, shown in table 2.3.

Table 2.3. Problems Perceived by Urban Public Transport Users: Ghana and India (Importance by Percentage)

Problems with public transport	Accra, Ghana		Pune, India	
	Male	Female	Male	Female
Overcrowding	6	9	28	41
Too expensive	8	10	1	3
Inadequate frequency/not enough buses	35	36	54	45
Old/dangerous vehicles	14	14	0	0
Rude staff	10	8	5	6
Other	27	23	12	5

Source: Fouracre, Astrop, and Maunder (1999)

In most developing countries substantial differences in the transport burdens, and access to transport services, exist by gender (see the chapter in this Sourcebook on **Gender**). The transport problems facing women and their needs can be identified from household surveys in terms of effort (kilogram-km per day) and time spent (percentage) (see table 2.4). (Gender issues in transport are discussed in detail in section 4.3.3.)

Table 2.4. Comparison of Female-Male Transport Burdens (ton-kms per Person per Year)

	Kasama (Zambia I)	Lusaka Rural (Zambia II)	Mbale (Uganda)	Kaya (Burkina Faso I)	Dedougou (Burkina Faso II)
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)

2.3.2 Transport-poverty profile at local and household level

To reach a view on how the transport sector can best help reduce poverty, one must establish an appreciation of not only the transport needs of the poor, but also their other needs.¹⁰ This is not an easy task, as the poor are themselves a diverse group within a country and even within a community, and their specific needs vary substantially. Local needs and priorities can be established by consultation with poor communities; this information can be used in developing approaches.

A transport-poverty profile (TPP) reflects the quality, quantity, and prices of transport infrastructure and services available to different socioeconomic groups. In urban areas, commuting costs (including travel time and out-of-pocket money cost) are to a limited degree endogenous for both job and residential locations. Often the large share of income that the poor spend on long commutes is a consequence of their very limited choice of places to live. Low-cost housing is often available only in peripheral squatter settlements on vacant marginal land typically without any form of title. Therefore, an urban TPP should include information on **both** commuting and housing costs for viable sites. A TPP helps in understanding the transport needs of the poor, in sharpening the transport strategy component for poverty reduction, and in implementing transport strategy through specific project objectives and components. Even a simple accounting of the TPP used when identifying projects can prove very helpful in treating transport-related (and nontransport-related) poverty issues later in designing and implementing a project.

2.3.3 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 the poor are located (as a percentage of the total population in a region) and what level of basic services they need (on “merit”/social justice grounds). This knowledge can be gained by overlaying a spatial poverty map with a map that indicates the availability of transport infrastructure and services. Data must be collected at the lowest jurisdiction possible to map poverty and transport conditions (see **Poverty Data and Measurement** chapter).

¹⁰The integration of transport dimensions within an overall country poverty reduction strategy needs to be based upon a comprehensive definition of poverty itself. Such definitions are discussed in the **Poverty Data and Measurement** chapter of this Sourcebook.

While lack of reliable data is a common problem, it is important to establish and formalize the process of collecting and assembling data, with the purpose, costs, and benefits of the data to be collected clearly identified. Some countries already have detailed socioeconomic statistics at the local level. With relatively low costs, these statistics can be used to construct poverty-transport maps.

2.4 A checklist of basic policies

One of the first steps in gauging the transport sector's prevailing effectiveness is to assess whether current policy is reducing poverty and relieving transport-related constraints to growth and macroeconomic management. Although many policies and programs affect transport, a checklist of questions can highlight the types of issues that should be scrutinized (see box 2.3).

Box 2.3 A Basic Policy Checklist

- Has a comparison been made of the distribution of public spending per capita on basic services—health, education, extension, and transport—across regions, including rural/urban with the level of poverty (headcount index) in each region—over the preceding five years?
- Has the effectiveness and efficiency of public spending on transport been assessed?
- Has the participation of the private sector and the priorities for its development been assessed?
- Are sectoral and structural policies and programs aimed at poverty reduction coordinated? Are donor poverty programs coordinated?
- Has a priority list of policies and expenditure programs that need to be coordinated been identified and how can these be effectively implemented?
- Do transport sector regulations and policies minimize opportunities for corruption?
- Are duties and taxes applied to the transport sector highly regressive?
- Are nonmotorized forms of transport (for example, bicycles) taxed excessively?
- Do government regulations support the means of transport used by the poor?
- 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 ?

3 How to Formulate Transport Interventions in a Poverty Reduction Strategy Framework

This section provides practical guidelines for formulating transport interventions within a poverty reduction strategy framework. In other words, it is about how to develop a transport component for a poverty reduction strategy. Obviously, it is not the same as developing a stand-alone transport sector strategy. However, the core task — strategic formulation — will be similar.

Developing a transport strategy is not an uncommon exercise for many developing countries. From time to time, governments formulate and modify their transport policies and public investment programs to serve the defined national goals. In most countries, transport strategy is developed mainly to serve economic growth or, more broadly, economic development. The strategic guidelines described below are proposed with the national goal of poverty reduction in mind. These guidelines need to be tested and refined, but they should be treated as a starting point for emphasizing poverty reduction outcomes in the way a transport strategy is developed and implemented.

There is no universally applicable transport strategy. A transport strategy for poverty reduction must be developed on the basis of country-specific factors, including the size of population, geographic extent of the country, location or proximity to the world markets, stage of economic development, level of urbanization, regional income disparity, extent and conditions of transport assets, institutional capacity, regulatory status, and potential for private sector development.

For a landlocked country that seeks an export-led growth as a major means for poverty reduction, its transport strategy would have to focus on the role of transport in trade facilitation, especially physical access to the sea via adjacent and coastal neighboring countries. For low-income countries where the majority of the population is rural, providing basic accessibility to market and social services will be a major concern. For a large country with geographically diversified resources but limited domestic markets, a key component in its transport strategy is the development of inter-city transport for facilitating regional trade and widening markets.

While different countries will have different transport strategies to reduce poverty, the differences are very much in the form these strategies take. The essence should be the same, that is, a strategy should determine a policy framework and a range of public actions that would have the best, long-lasting impact on poor people's welfare. In other words, the strategies should be oriented toward real poverty impacts and outcomes. If investment in a national highway that removes critical bottlenecks lowers the prices of commodities, benefiting the rural poor, highway investment should be given as much attention as investment in rural access road improvement. Section 4 provides a range of policy tools for addressing specific issues that are commonly seen in low-income countries and are highly relevant to poverty.

3.1 How to develop a strategic approach for transport policy?

A strategic approach looks across the linkages of poverty and transport comprehensively, builds synergies among all sectors and within all transport sub sectors, and identifies effective and feasible public actions that would balance the needs of the poor with the needs for long-term sustainable economic growth. Strategic choices make trade-offs in the way resources are allocated for long-term structural changes for economic growth and to meet urgent basic needs of the poor.

Three crucial features should characterize a transport strategy oriented toward poverty reduction:

- Full participation of all stakeholders, especially the poor. Too often, transport strategy has been merely an exercise for government economic planners and technical specialists. An effective transport strategy for poverty reduction must involve full and effective participation of all stakeholders throughout the process. Section 3.2.5 of this chapter provides more discussion on a participatory approach, and chapter 2 of this Sourcebook is devoted to participation.
- Solid technical inputs from the transport sector and all other sectors. Transport plays a crucial complementary role in almost all socioeconomic activities, including poverty-targeted interventions other sectors initiate. While developing a transport component for a poverty reduction strategy is a task for transport sector specialists and policymakers, it requires close collaboration and coordination from specialists and policymakers from all other major sectors, especially including education, public health, rural and urban development, and private sector development.
- The proposed approach attempts to make public actions clearly accountable to poverty outcomes. In the past, the success of public actions has been typically measured by some sector outputs, such as kilometers of rural roads paved and number of buses put in service. Policymakers placed little emphasis on the real poverty impacts or outcomes. While this tendency was partly attributed to the nature of transport as an intermediate service, it often led to ineffective or even wasteful interventions. In recent years, there has been growing recognition that clearly defining poverty outcomes up front is important for the design and justification of effective interventions to fight poverty. Linking public actions to outputs and further to poverty outcomes thus becomes an important step in the strategic exercise.

Poverty outcomes as a concept are different from sector outputs (see chapter on **Monitoring and Evaluation**). Poverty outcomes are measured not only by the level of household income and calorie intakes, but also by several other dimensions of welfare, such as education, health, access to services, and political inclusion. Transport sector outputs are often measured by units such as the number of kilometers of all-weather passable roads, traffic volumes, vehicle operating costs, travel times, and so forth.

Transport provides intermediate services—it is not an end by itself, but a means to an end. Transport sector outputs can be translated into poverty outcomes only if transport outputs are used directly or indirectly to improve quality of life. Therefore, it is important for the transport sector to ensure the benefits of transport services reach the poor. To do this, it is necessary to understand the linkages between sector outputs and the likely poverty outcomes, and the conditions under which the outputs are likely translated into poverty outcomes.

The key to defining poverty outcomes is to understand how transport outputs are linked to four major dimensions of poverty, namely, economic opportunities, capabilities, empowerment, and security against economic shocks and natural disasters. An example of the linkages is provided in table 3.1. An expanded discussion of linkages is given in Technical Note 1.

Table 3.1. Poverty Outcomes, Sector Outputs, and Public Actions: An Example

Poverty outcomes	Sector outputs	Public actions
Economic opportunities from reduced barriers to access <ul style="list-style-type: none"> higher incomes from more economic opportunities 	<ul style="list-style-type: none"> Reduced transport costs (better road condition, lower vehicle operating costs, shorter travel time) Improved transport services (coverage, frequency, quality, reliability, prices, connectivity to markets, and jobs) Improved traffic safety 	<ul style="list-style-type: none"> Public and private investments for improving efficiency Maintenance policies Transport agency reforms Financing reforms Regulatory reform
Capabilities improved because of access to essential services <ul style="list-style-type: none"> improved literacy reduced mortality 	<ul style="list-style-type: none"> Reduced transport costs to services Improved transport services (access to health, education, and social services) Improved traffic safety 	<ul style="list-style-type: none"> Investments linking communities to services Efficient maintenance and management of links Nontransport solutions (for example, bringing services to communities)
Empowerment through participation in decision-making <ul style="list-style-type: none"> overcoming sense of isolation 	<ul style="list-style-type: none"> Consultative processes in program preparation Mechanisms for participation in planning and priority setting Public reporting of outcomes against budgets 	<ul style="list-style-type: none"> Local consultation and participation including vulnerable groups Transport user associations Decentralization of budgets, resources, and accountability
Security against economic shocks and natural disasters <ul style="list-style-type: none"> timely delivery of food and medical aid during emergencies access to outside jobs and social services 	<ul style="list-style-type: none"> Reduced transport costs Availability and reliability of transport services Participation of poor in marketing and logistics services 	<ul style="list-style-type: none"> Investments in improving reliability Maintenance reforms Venture capital and advice for poor in logistic companies and marketing services Service improvements in marketing and logistics services

It should be recognized that poverty outcomes have a time dimension. Outcomes can be linked to the phased sector outputs. This is especially important for the transport sector as many types of transport infrastructure investments are “lumpy” and durable and are expected to yield a flow of benefits over a long period of time.

3.2 Strategic principles

Strategic principles can serve as a basic quality assurance mechanism. Five strategic principles are proposed below.

1: The integration of transport into a country's poverty reduction strategy must reflect transport's dual role in promoting market-based economic growth and in supporting poverty-targeted interventions.

This principle arises from a recognition that transport's dual role in growth and redistribution can involve trade-offs at the program or project level. Inasmuch as transport policies and investment

programs can address the transport needs of the poor directly or indirectly, there is a need to make choices and strike a balance between the two approaches.

2: Economic efficiency is, and should remain, the primary objective of most transport policies and investment programs in supporting economic growth.

Economic efficiency is very important for most transport investments because they tend to involve large capital investment. For interventions directed at contributing to economic growth, it is normally possible to estimate a robust measure of the intervention's economic worth in terms of its net present value or economic rate of return. These economic efficiency measures should guide the design, prioritization, and selection of feasible interventions. For interventions targeted directly at the poor to improve social equity, economic efficiency can be emphasized through least-cost design (see principle 3).

It should be noted that the emphasis on economic efficiency of growth-oriented transport interventions should be complemented with an emphasis on the distributive impact of these interventions. The market structure of transport services, including any associated regulatory regime, is important for attempting to assess which groups are likely to *ultimately* retain the benefits from transport projects. In a transport market with ineffective competition or weak contestability, up to one-half of the benefits 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. 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 relatively regressive.

Perhaps a more important issue is how to deal appropriately with the impact of an *efficiency-driven intervention that makes poor groups worse off* (i.e., is regressive). In operational terms, the net final incidence of efficiency-driven interventions on the poor should be adequately identified by analyzing the likely distributive impacts. The results of the analysis may reveal that the affected poor should be *directly compensated*, that the intervention should be modified, or a different intervention chosen.

3: Transport needs of the very poor should be recognized and, to the extent possible, addressed through a combination of least-cost or cost-effective transport and nontransport interventions.

While it is generally accepted that economic growth resulting from efficiency-oriented transport investments brings benefits to the poor, in many cases the basic transport needs of the poor, as motivated by equity and social justice, may be more effectively addressed through direct targeting. Valuable opportunities for direct targeting exist in most low-income countries, and these warrant systematic assessment. If justified on social and economical grounds, direct interventions should be made a coordinated part of overall government policies to assist the poor. Cost-effectiveness is the key to successful targeted interventions. To be cost-effective, a realistic minimum technical standard should be clearly set for basic services targeted to the poor, and emphasis be given to the least-cost solutions including any nontransport solutions.

4: Adverse effects of transport programs on the poor should be addressed at the program level under a national transport policy framework.

Inappropriately designed transport policies and programs can harm the poor. A poverty reduction strategy should provide a policy framework for identifying and addressing the adverse impacts of transport actions on the poor both as potential users of transport and as nonusers.

The adverse impacts of a transport policy or investment program on the poor depend on the specific circumstances. However, as noted earlier, various harmful regressive impacts are common. These regressive impacts should be addressed at the program level. To ensure that they are appropriately addressed throughout the country, a national policy stance and policy framework are required.

5: Transport interventions should be developed through wide consultation of all stakeholders and full participation of the poor in the decisionmaking process.

Stakeholder participation is a main topic throughout this Sourcebook. It is no exception for the transport sector. Mechanisms for the poor to voice their needs are typically weak at the local level, and the poor have little political power to influence decisionmaking. As a result, decisions on transport investment and policy can easily overlook poor people's transport needs (e.g., nonmotorized transport need) and the costs imposed on the poor (e.g., pedestrians falling victim to motor vehicle traffic accidents). Experience demonstrates that broadly based participation by affected groups/stakeholders in decisionmaking can improve the development impact of public actions on the poor. Empowerment of local communities, especially in poor rural areas—through consultation, participation, and local ownership—is also crucial for the social and financial sustainability of transport programs.

3.3 How to set priorities?

A major challenge for a low-income country in fighting poverty is that the wish list of things to do is long but resources available are limited. Economic efficiency and social equity objectives may not always be compatible at the program or project level, even though these are mutually reinforcing in the longer term. Decisions about priorities are political and should be made on the basis of participation of, and consultation with, all stakeholders, especially the poor. A list of public actions that deserve serious consideration in the priority list are listed in box 3.1.

Box 3.1. Examples of Priority Interventions

Growth-oriented

- Removing critical infrastructure bottlenecks (port expansion, highway upgrading, etc.)
- Encouraging production and trade (logistics improvements, facilitation, corridor improvement)
- Improving sector efficiency through commercialization, private sector development and regulatory reform

Poverty-targeted

- Providing all-season motorized passability in rural areas
- Enabling entry of affordable services for the urban poor (for example, through well-designed liberalization)
- Protecting NMT (for example, through physical investment and microcredit)
- Promoting road safety

Even within each category of priority public actions, there is a long list of proposed investment programs. Most of the growth-oriented public actions 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, economic criteria such as net present value (NPV) and economic rate of return (ERR) should be used, through cost-benefit analysis.

On the other hand, the criteria for choosing poverty-targeted public actions differ. Such interventions should not be prioritized along with efficiency-oriented public actions on the basis of conventional efficiency measures such as NPV or ERR. In fact, most poverty-targeted public actions 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 the poor do not use transport services because affordability is low or service is unavailable, the applicability of their WTP is limited, although still relevant.

For poverty-targeted public actions, an appropriate measure is the cost-effectiveness of the resources allocated to reduce poverty. Given limited knowledge of the relationships between separate specific inputs to reduce poverty (e.g., improved travel time to a local health clinic) and poverty outcomes (e.g., the local infant mortality rate), it is necessary to develop cost-effectiveness indicators for intermediate indicators. For example, in allocating resources in the transport sector to reduce poverty, an intermediate outcome of “provision of basic access” — to health clinics — can be adopted on the working assumption that this will improve the health outcomes 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 cost-effectiveness. This dollar cost can then be compared with dollar costs of providing other intermediate outcomes related to poverty reduction.¹¹ Government can consider the information these indicators provide in determining how to allocate limited resources across different instruments and sectors for poverty reduction. (There are disadvantages of cost-effectiveness as a criterion to judge public spending options and these are outlined in the **Public Spending** chapter).

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 5: Improving rural access road passability in Andhra Pradesh, India.

3.4 How to establish a national transport policy framework?

Strategic vision, in the form of a national transport policy framework, is an important element of a national transport strategy. It ensures that national transport development stays on a healthy long-term track. In the context of poverty reduction strategy, a national transport policy framework should detail the conditions to ensure the benefits of national transport development reach the poor. Although the strategic vision will vary country by country, depending on factors such as the stage of national economic development, geographical conditions, and natural endowments, it should be pro-growth and pro-poor. Specifically, transport policy and development should respond efficiently to demand, and should ensure all income groups can satisfy their demand for basic accessibility and can choose transport services that are efficiently provided, where possible, competitively .

¹¹Alternatively, comparison of indicators may be made easier by using specific “unit cost” effectiveness indicators, such as the number of poor persons served with basic access to a health clinic per thousand dollars spent.

A national transport policy framework should clarify the roles of the public and private sectors, delegating responsibilities to relevant government agencies at the national and subnational levels, and shaping an economic, safety, and environmental regulatory framework.

In considering a policy framework, an important distinction is between the provision of transport services and the provision of transport infrastructure. In most countries, transport services are largely provided by the private sector. Notable exceptions can be found in intercity rail freight and passenger services and urban rail passenger services. Most governments also assume a predominant role as providers of transport infrastructure. However, increasing private sector participation in the provision of transport infrastructure during the last two decades or so has shown that the private sector can play an important role in improving the efficiency of transport infrastructure.

The transport sector throughout the world typically has long been subject to substantial government regulation. This is because certain types of transport infrastructure and services involve economies of scale and thus can be natural monopolies or have significant monopoly power. Believing that competition in such markets is likely to be wasteful or not possible, most regulations in the transport sector limit multiple providers and competition *in, and also for*, the market. However, the emergence of new modes and new technologies in the last several decades have significantly reduced scale economies and eliminated or weakened concerns about the monopoly power of actual and potential providers of transport infrastructure and services. While many governments have responded to the changes and reduced the range and severity of regulation (especially by allowing competition, via open tendering, *for* market franchises), some governments remain far behind in reforming their regulatory frameworks.

Another important distinction is between investment and maintenance of transport infrastructure assets. In many low-income countries, governments manage transport infrastructure in a bureaucratic way. Under strong political influence, transport investment decisions often do not respond to demand. And worse yet, investments are often made at the costs of necessary maintenance, leaving existing transport assets rapidly deteriorating.

When the transport sector performs badly, all groups in society pay a high cost. A national transport policy framework should set out the objectives and directions for sector reforms. International experience suggests that sector reforms should aim to achieve the following:

- Manage transport infrastructure 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.

Governments will have a continuing role in transport infrastructure. They will need to develop and continually improve legal and regulatory frameworks to support private sector provision of transport infrastructure and services, and to address negative externalities such as traffic accidents, pollution, and congestion. Even with the private sector (and markets) playing a significant role, governments still must create and maintain policy and regulatory frameworks that safeguard the interests of the poor and coordinate cross-sectoral interactions.

4 Policy Tools

This section suggests a set of policy tools for the transport sector that will guide sound inputs to a country's overall poverty reduction strategy. It focuses on the policy areas where direct interventions are most effective in meeting the basic needs of rural and urban poor.

4.1 Rural transport

4.1.1 How should basic transport accessibility be improved?

Transport conditions for the rural poor in many developing countries are far from adequate. Weak access and even lack of basic access can seriously limit the ability of the rural poor to take advantage of jobs and other opportunities available beyond their immediate settlement. Lack of basic access roads, for example, can be a cause of chronic poverty. It is an important contributing factor to the existence of **spatial poverty traps**—geographic areas where quality of life has long remained at extremely low levels because they lack location-specific resources and infrastructure assets.

The scope for using direct transport interventions to assist the poor is likely to be the greatest in poor rural areas, especially in what are identified to be spatial poverty traps, for two major reasons:

- Targeting can be effective if the rural poor are geographically isolated, are concentrated in particular areas, and are a relatively more homogenous group than the urban poor.
- Road work (basic construction and maintenance) based on labor-intensive techniques may provide the rural poor with income-earning opportunities.

Direct transport interventions to improve accessibility of the poor in rural areas may include, but is not be limited to, the following options:

- Provision or improvement of rural access roads to a standard that provides for basic, all-season passability by motorized vehicles.
- Provision for the use of intermediate means of transport, through technical assistance and microcredit programs and, where appropriate, accommodation in the design of new/upgraded transport infrastructure.
- Integration (or coordination) of improvements in physical access with other rural interventions such as those involving schools, health clinics, and agricultural extension programs.
- Incorporation of community consultation and participation in decisionmaking for local transport investments and maintenance, and the establishment of extension services to provide the necessary technical advice and training, with support for the development of rural community funds.

It should be recognized that lack of basic road access is often a result of inadequate road maintenance and inappropriate institutional arrangements, responsibilities, and financing. This may be caused by political influence that favors network expansion and upgrading over maintenance of existing core networks. In such a case, it is important to establish a rural road policy and strategy framework that ensures the financial sustainability for access road maintenance (see **case study 3** and **case study 5**). Sustainability of transport improvements

for the poor should be set as a common objective for all rural transport interventions. Attempts to achieve this objective include:

- Developing financial discipline by implementation of feasible, sector-based, financial and cost recovery policies;
- Establishing a rural road maintenance funding mechanism that is insulated from political influence (for example, a road fund managed by an independent road board);
- Strengthening of institutional, technical, and management capacity at the local level; and
- Developing small and medium-size enterprises to manage and execute maintenance and minor upgrading of rural roads.

In many developing countries there is also a tendency to set the standards for basic access too high. This practice curtails the extent to which basic access can be provided nationwide and leaves a large proportion of the poor unserved. Basic access typically is an issue in *low volume* circumstances and policy emphasis should be placed on the minimum-cost engineering solution that ensures all-weather motorized passability rather than overly high standards of performance. In most rural areas, basic access can be ensured by making cross-drainage facilities (bridges and culverts) durable to withstand heavy rains. By emphasizing a least-cost approach, basic access can be made more cost-effective and its benefit can be extended to a greater number of households given the budget available.

4.1.2 Nontransport solutions

Some transport or access problems facing the rural poor are actually local service delivery problems and can be tackled more cost-effectively by nontransport solutions. A classic example is bringing teachers into remote villages. This may sometimes be more cost-effective than providing transport service for children to get to school, although the willingness of teachers to go to remote locations needs to be taken into account. When feasible nontransport solutions exist, they should be evaluated along with transport solutions.

There are two major categories of non-transport solutions for rural transport problems:

- Providing on-site or near-site services to reduce travel requirements (see **Health and Education** chapters of the Sourcebook) and
- Introducing microcredit programs to enable the poor to acquire necessary transport means, such as vehicles, and especially nonmotorized vehicles.

4.1.3 Integrated rural infrastructure development

Inadequate transport access is typically just one of many infrastructure problems facing the poorest rural communities. Integrated rural infrastructure development programs can build synergies across sectors. Because they are more comprehensive, these programs can have greater impact on the incomes and quality of life of poor communities (see box 4.1). Multi sector approaches, combined with stakeholder participation, can let rural communities set priorities according to their own needs. However, these programs sometimes can be more costly than the single-sector programs and thus call for selectivity in geographic targeting.

Diagnostic tools such as spatial poverty/transport mapping, as set out in section 2.3, can guide selection of targeted areas. In general, the following criteria should be considered in selecting targeted areas:

- Household incomes and other poverty indicators of the community among the lowest quintile;
- Population large enough for a certain level of cost-effectiveness; and
- Adequate natural resources available for sustained local economic production.

Box 4.1. Infrastructure Development and Rural Incomes in Bangladesh

A study of 16 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 divided the villages into those that 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. Income from nonfarm businesses increased by 17 percent; this largely benefited the nonpoor.

Roads, electricity, and other economic services encourage the production of new farm products (including perishable commodities) and higher output in transport, construction, services, and small-scale industries. All this had a substantial effect on the pattern of labor demand. Although households worked roughly as many days a year in developed as in undeveloped villages, in the developed ones they spent less time on farming labor, which had low implicit returns, and much more wage labor, especially in the relatively high-paying nonfarm sector. Poor households with few physical assets, including landless households, gained substantially.

Source: World Bank (1990).

To learn more, see Narayan et al. (2000), World Bank (2000b), and Malmberg Calvo (1997).

4.2 Urban transport

4.2.1 Urban transport problems: Symptoms vs. causes

The urban poor face basic access problems as do the poor in rural areas, but their nature and solutions are different. Access problems can be more serious in larger cities where on average people commute to work over longer distances. In large developing cities, the poor can find it difficult to obtain jobs partly because they live in squatter locations on the outskirts. The poor who have jobs often have to commute a long distance with very long travel time by modes of low quality. A large number of urban poor in the informal sector take several part-time, low-wage jobs at different locations. Their income-earning ability is tightly constrained by commuting time, out-of-pocket costs, and the (walking) access to available public transport services.

Knowing what transport problems the urban poor are facing is important, but it is not sufficient as a basis for public policy to address the problems. Transport is a derived demand; its patterns and characteristics in urban areas have much to do with other markets, especially for labor, land, and housing. Many urban transport problems are symptoms of poverty, not fundamental causes of poverty. For example, the urban poor may have chosen less accessible locations to reside precisely because these are the locations where their total interests (in terms of availability of shelter, access to activities, etc.) are best served with the meager income they have. In those circumstances the heavy burden of transport costs is then 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 the poor at a cost they can afford, high transport cost *contributes* to their poverty. Other contributing causes include excessive government regulations on land and housing markets that curtail the residential location choices of the poor.

A distinction between symptoms and causes suggests the 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 are a contributory cause of urban poverty, what is the nature of those inefficiencies, and what should be done about them?

4.2.2 Treating the symptoms: the case of public transit fare control

A common political response to the heavy burden of transport costs the poor bear is to control public transit fares. Typically governments control fares on the grounds that prices above some threshold level would be unacceptably burdensome on the poor.

A number of problems are associated with fare controls. If governments control fares without making any accompanying fiscal provision for subsidies, operators are forced to cross-subsidize unremunerative services from remunerative services and cross-subsidy the poor by the rich. In practice, however, there may be no such basis for cross-subsidy, because the rich do not use public transport in many cases and there are no profitable services from which to squeeze cross-subsidy finance.

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 the poor consider themselves hurt more low availability of transport than by its price and are indeed willing to pay more than the existing regulated fares to get better service.

Even where there is a fiscal basis for subsidies to lower fares, is it an appropriate use of funds? The answer to that question turns 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 impediments argue against using a general subsidy. First, targeting is very imprecise because a group of modal users may have wide variations of income. Second, substantial evidence indicates a large proportion of subsidy to public transport “leaks” through deficit financing of public sector monopoly operators, either through inefficient operations or through operators and organized labor in the supply industry capturing the subsidy as rents.

Sometimes the adverse effects caused by formal policies are lessened by the development, legally or illegally, of informal-sector services, usually provided with smaller and cheaper vehicles, frequently at fares above the controlled formal-sector fares. 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.”

In the transport sector, customer surveys can establish the relationship between the average income of the users of specific modes and the overall average income. If the sources of public finance are known, then the net effect of distribution of general fare subsidies can be assessed.

4.2.3 Reducing the adverse effects of transport policies on the poor

Inappropriately designed transport policies and investment programs can harm the poor. Wherever urban public transport is provided at higher cost than necessary, or cannot be provided to best serve the interests of the poor, those arrangements can contribute to poverty. As already noted, general public transport fare controls, particularly in the absence of secure subsidy mechanisms, can actually harm the poor.

Regulations that constrain supply and limit alternative are generally regressive; for example, barriers to entry by the informal transport sector generally harm the poor. There are two elements in this. On the one hand, informal-sector transport is often transport “by the poor,” as the provision of services with nonmotorized or cheap motorized vehicles may be open to poor groups, including new rural-to-urban migrants. On the other hand, informal-sector transport is often transport “for the poor.” There are some problems—pollution and congestion—produced by the informal sector.¹² But to the extent that the informal sector provides a lower quality of service at a lower price than the formal sector can achieve, it may result in a more realistic matching of supply to demand.

Policies for the informal transport sector must take into account their impacts on the poor. Where there are environmental or congestion impacts, policy measures can include limitations of access to particular locations, or enforcement of relevant environmental regulations and not by global prohibitions. The existence of informal sector may be traced to excessive government regulations, which make formality too costly.

Absence of competition in, or for, public transport markets may both increase costs and reduce supply to the poor. 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.

Finally, attention needs to be given to financing support mechanisms. 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 oversight has two effects. First, as discussed above, it means that some passengers are paying more, or receiving poorer service than would otherwise be the case to secure cross-subsidy. As choice of transport mode is highly income segregated, this means, at best, subsidy of the poor by the poor. Second, nontransport line agencies (health, education, police) may then have a vested interest in maintaining such mechanisms, which they might not support if they had to finance them from their own budgets. The lesson here is that, in the interests of the poor, 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.

¹²In some circumstances competition in the informal sector can lead to undesirable behavior by individual operators, including criminal acts.

4.2.4 Multi sector interventions

Single sector interventions designed to address the basic accessibility needs of the urban poor may be more difficult to implement and less effective than those targeted to the rural poor. The urban population typically is highly heterogeneous and spatially mixed, and benefits of targeted interventions are likely to be vulnerable to capture by the nonpoor. For example, the benefits of improvements in street conditions and public transport services for poor neighborhoods can be captured by absentee owners of housing properties in the form of higher rents, which in turn may force the poor out of the improved communities.

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** in this Sourcebook.)

To learn more, see World Bank (1996) and World Bank (1999b).

4.3 Other policy tools

4.3.1 Employment generation

Transport is a major potential source of employment. The poverty diagnostics can reveal the extent to which the poor are working as construction workers, drivers, movers, maintenance workers, repairers, retailers, and NMT operators. Government programs that offer food or cash to the poor in exchange for transport construction civil work should also be examined.

A range of production methods, with varying labor-capital combinations, are available for road construction, rehabilitation, paving, and maintenance. How efficient these methods are depends on the relative prices and productivity of inputs, especially labor and capital. Although some tasks cannot be done adequately by hand, for many other tasks labor-based methods can be cheaper and more reliable than equipment-intensive methods. Efficient labor-based methods can offer income-earning opportunities for the poor. According to the findings from comparative studies carried out in Ghana, Lesotho, Madagascar, Rwanda, Zimbabwe, Cambodia, Laos, and Thailand, labor-based methods were in financial terms about 10 percent to 30 percent less costly than the more equipment-intensive methods. Potential savings can be greater in economic terms, taking into account the shadow prices of labor and foreign exchange. Whenever economically warranted, labor-based methods for road work should be promoted as one important means of supplementing rural employment in developing countries.

4.3.2 Traffic safety

Worldwide, road accidents alone 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. 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 world's third leading cause of death if current trends continue. Although the rate of road accidents differs among countries, it is a serious public health problem in almost all developing countries. The annual cost of road accidents is estimated to average between 1 and 3 percent of GNP in a number of countries.

Road accidents are also closely associated with poverty. In developing countries, where many people do not have access to motorized vehicles, the majority of road accident victims (injuries and fatalities) is not the motorized vehicle occupants, but rather pedestrians, motorcyclists, bicyclists, and non-motorized vehicles (NMV) occupants. Hence, the poor are among the most vulnerable road users.

A high percentage of accidents involve working males. Often without insurance, the poor disproportionately suffer economically from traffic accidents. A non-poor family can become a poor family almost overnight if the breadwinner is killed or disabled. The situation can be much worse for a poor household.

A strategic approach to road safety can tackle the sources of road accidents and to reduce the severity and consequences of accidents. Most traffic accidents are due to a combination of factors. Human failings, such as speeding, inattention, wrong positioning, and improper overtaking are a major contributing factor in high-income countries. While this is also true in many developing countries, infrastructure deficiencies, vehicle defects, and lack of attention to NMT are also significant factors as lower design standards and lack of maintenance often prevail.

A road safety strategy for low-income countries could include, but not be limited to, the following elements:

- Raising public awareness through public campaign and education programs;
- Reforming the institutional setup, with clear legislative guidelines on responsibilities, especially among police, transport, public works, and insurance agencies for coordination of safety programs;
- Protecting the most vulnerable road users, through proper design of physical separation of NMT traffic, including pedestrians, from motor vehicle traffic;
- 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;
- Identifying champions in the public and private sectors to advocate, and marshal resources for, transport safety in general and road safety in particular.

4.3.3 Gender issues

In many low-income countries, and particularly in Africa, cultural traditions mean women have the major burden for carrying fuel, water, and agricultural produce, often by head-loading. However, women have less access than men to “formal transport” -- private vehicles and public transport, and even to non-motorized transport equipment. As a result, women not only take almost exclusive responsibility for household and child-rearing tasks, but also spend long hours carrying out transport burdens, leaving little time for more productive activities. Because they lack access to means of transport, women tend to benefit less than men directly from most transport infrastructure–improvement programs. The 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.

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 (see box 4.2).

Options to address gender issues both transport and nontransport 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 nonmotorized mechanical equipment (for example, wheelbarrows and animal carts) available for women to buy in areas where there is no affordable alternative to head-loading, if possible through microcredit schemes;
- Extending safe, affordable, and culturally acceptable transport services for women users, where the demand justifies it;
- Where economically justified, 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;
- Encouraging women to participate in road work for earning income and developing work skills by extending eligibility conditions to women and also training women to take supervisory positions.

It is important that a national transport policy include an explicit component to address gender inequality in transport.

Box 4.2. Helping Rural Women Acquire NMT Vehicles in Ghana

In Ghana, rural women carried produce from farm to market mainly by head-loading, which took a long time and caused excessive wastage. An investment project successfully introduced bicycles and bicycle trailers to the rural population, and women in particular, as attractive alternatives to head-loading. The intermediate modes of transport were made available to the rural population through a hire-purchase program financed by channeling part of the wage earnings from labor-based road work.

A comprehensive policy guide to gender issues and poverty is set out in the **Gender** chapter of this Sourcebook.

To learn more, see Bamberger and Lebo (1999).

4.3.4 Nonmotorized transport

The poor often cannot afford motorized transport, especially in low-density rural areas where vehicle utilization is limited and the costs of wear and tear are high. Different forms of nonmotorized transport (NMT) are heavily used by the poor in rural areas, but also in urban areas. However, government policy in many developing countries tends to favor transport investment programs that accommodate motorized transport at the cost of sacrificing NMT. This tendency should be reformed by adopting a strong balanced policy stance to protect NMT.

Engineering solutions such as physical separation/protection of NMT traffic from motorized vehicle traffic can address the conflict between NMT and growing motorization. However, in terms of underpinning poverty reduction in the transport sector, the establishment of a clear and

balanced policy stance that recognizes the role of NMT for the poor is likely to be more important.

In rural areas, NMT is a viable mode of transport for many productive (and social) activities. However, the cash required to acquire NMT vehicles can be prohibitively high for poor households. Therefore, microcredit schemes provide one way to enable poor households to purchase NMT vehicles and to increase substantially their mobility and access to income-earning opportunities and social services.

Finally, some countries impose high sales taxes and import duties on NMT. For example, bicycles often are treated as “luxuries” and are made prohibitively expensive by high taxes and duties. Since bicycles offer a low-cost means of transport and mobility for the poor—in both rural and urban areas—such taxes are highly regressive. Their elimination represents a low-cost public action that could improve the welfare of the poor.

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

5 Monitoring Outcomes and Feedback to Policy Design

5.1 Monitoring and evaluation for transport

To assess transport impacts, transport outputs need to be linked to poverty outcome–related indicators and to *changes* in these indicators. To make this connection, baseline studies must be conducted and control groups used. Because of the inherent spatial context of transport interventions and because transport interventions are normally targeted at poor groups based on where they live (for example, district or province), a basic way to monitor and evaluate impact involves comparing the changes in the targeted area and changes in a similar control area. Changes are compared by using a “difference of differences” (statistical) methodology.

Evaluating transport sector inputs can be complex, because, as noted, it is difficult to isolate the impact of a specific individual intervention from the numerous other factors that also directly and indirectly change the poverty outcomes. Adopting multi sectoral approaches can strengthen the overall cost-effectiveness, but it also makes tracking the net effect of individual components more difficult.

Indicators must be selected *and* interpreted carefully. Monitoring and evaluation are costly, and increasing the number of indicators may not have commensurate returns. The expected value of each indicator should be balanced against the cost of its collection, reliability, and sustainability. Indicators for evaluation should be selected according to the nature of the intervention, its objectives, and the feasibility of the data collection. A wide range of poverty outcome dimensions should be explored as interventions can have unanticipated effects. The menu of indicators will be closely related to the diagnostic indicators discussed above. A suggested list of monitoring indicators for transport includes:

- Level of traffic (for roads: number of motorized and nonmotorized vehicles);
- Number of accidents (pedestrians and others, by age and gender);
- Income of poor in project area (lowest/second-lowest quintile);
- Average trip distance and travel time by trip purpose (market, school, hospital);
- Frequency of trips outside village or neighborhood;
- Number of days per year roads are impassable (in project area);
- Time spent on transport tasks by men and women;
- Average share of household expenditure on transport by poor/nonpoor, rural/ urban;
- Availability of public transport to major centers;
- Tariffs for freight and personal travel (domestic, urban/rural);
- Usage of public transport by poor/low-income groups;
- Level of subsidy to public transport;
- Level of total public expenditure on transport (by mode, capital, and maintenance);
- Condition of transport infrastructure, by mode;
- Level of local finance for road maintenance; and
- Cost to load/unload a container (20-foot equivalent unit/teu) at the most used international port (US\$ and time).

Monitoring can be undertaken in a number of ways. A common approach is a combination of external collection and participatory methods. (General guidelines are provided in the chapter on **Monitoring and Evaluation** in this Sourcebook.)

5.2 How to establish poverty impact indicators for transport

Impact indicators are used to measure the consequences of a specific policy or an investment program on the welfare of individuals in affected groups, relative to what would be expected to happen in the absence of the policy or program. A small set of impact indicators that relate to changes in poverty outcome measures can be effective and adequate in most cases. Poverty and transport outcome impact indicators should be included in the sector performance indicators, as appropriate, depending on the level of disaggregation required. In some cases it will be difficult to confirm the separate impact of transport outputs (for example, improved motorized passability) and/or transport outcomes (lower travel times) on poverty outcomes (for example, literacy rates), and only intermediate poverty impact indicators may be available (for example, increased school attendance attributable to improved passability). Establishing systematic monitoring of transport outcomes and poverty outcomes should, over time, provide insights and evidence into the separate relationship between these key variables.

The selection of impact indicators will differ among programs. In general, the transport outcome indicators should provide information relating to travel time and “out-of-pocket” (or freight shipment) cost for different trip purposes by different modes. For rural access road projects, transport outcome impact indicators may include share of village population with all-season motorized access to the main road network, average travel time to market by affordable modes, and days of impassability of a road section over one year. Where possible, policy or program outcomes, for example, cash crops produced, community labor participation, by gender, in road work, school attendance, teacher availability, and the usage of health clinics should be assessed together with attributable changes in poverty outcomes, for example, rural household incomes and literacy rates.

For targeted direct interventions where the initial and final incidence may be closely connected, identification of the ultimate beneficiaries may be fairly straightforward. For more indirect general interventions (such as national highway improvements, rail system privatization, and port-sector reforms), tracing the ultimate beneficiaries is much more complex. Nevertheless, we can substantially improve our knowledge about the distributive impacts and final incidence of benefits caused by transport interventions, especially those that are directly targeted at the poor. For transport interventions, this often means investments or subsidies targeted at geographical areas where the resident population is poor.

5.3 How to evaluate poverty outcomes of transport interventions

Transport interventions directly targeted at poor groups should be evaluated in terms of their impact on the intervention’s objectives, which will typically include a mix of transport outcomes and poverty outcomes, as outlined above. The evaluation of changes in impact indicators attributable to a particular transport intervention may be approached in several ways, including household surveys and focus group discussions. In most situations it is valuable to use a mix of consultative and external approaches.

A central part of evaluation is to understand the impact of the transport input on the various stakeholders. Involving all stakeholders is therefore an integral part of the evaluation. There are different levels of participation: information sharing, consultation, active involvement, assuming responsibility, and self-management. For good results, participatory evaluations

require well-trained staff with the appropriate facilitation skills. (See the chapter on **Organizing Participatory Processes** in this Sourcebook.)

A major part of evaluation is to identify the distribution of the benefits and any “uncompensated” costs flowing from a transport intervention. This calls for assessing who gains and who loses, by how much and when. Evaluation should explicitly address impacts by gender (income, production, and transport burden) and on social networks. It is often useful to collate impact indicators regarding different dimensions of poverty: economic opportunity, security, and empowerment. This collating is done in the (partial) menu of evaluation impact indicators set out in table 5.1. Of course, as stressed earlier, in many situations it will be difficult to separate the impact of transport per se, and evidence of this relationship will need to be built up by systematic monitoring of potential influences, including transport, and the evaluation indicators listed in table 5.1. The difficulties in tracking the final incidence impacts of transport interventions heightens the need and value of consultative and participatory inputs in the evaluation process. (See also table 3 in the **Overview of Private Sector Development and Infrastructure** in this Sourcebook.)

Table 5.1. A Partial Menu of Evaluation Indicators for Transport Interventions

Poverty Attribute	Evaluation indicator
Empowerment	<p>Local government</p> <ul style="list-style-type: none"> • Number of people voting • Visits to the village by local government officials • Trips to local government offices (for example, to ask for extension services) • Participation in public meetings • Knowledge of local representatives (for example, names, responsibilities, contact details) • Membership of community or political organizations <p>National government</p> <ul style="list-style-type: none"> • Number of people voting in national elections • Knowledge of politicians and political party policies • Knowledge of policies • Visits of member of parliament to constituency • User representation in transport decisionmaking <p>NGOs</p> <ul style="list-style-type: none"> • Dissemination of information • Extension services • Support of microcredit <p>Local social organizations</p> <ul style="list-style-type: none"> • Credit and savings groups • Women’s support groups

Security	<p>Health risks</p> <ul style="list-style-type: none"> • Road accidents (pedestrians/others)—fatalities/injuries • Air pollution • Incidence of HIV/AIDS • Infant mortality rate • Days of work lost due to illness • Number of visits unable to be made to health clinic/hospital <p>Income</p> <ul style="list-style-type: none"> • Ratio of high/low monthly income over year • Regional differences in average retail price of basic food • Response time for aid to emergencies (for example, drought) • Remittances from urban/rural source
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Poverty attributes are based upon World Bank (2000a); indicators are drawn in part from ODI (2000).

Economic opportunity	<p>Income</p> <ul style="list-style-type: none"> • Cash crop sales in local market per month • Farm-gate price for traded crops • Money income from confirm work per month • Number by gender of local community members employed in road maintenance • Days engaged in paid work per month <p>Costs for basic activities</p> <ul style="list-style-type: none"> • Urban daily commuting money cost and time • Time spent daily in subsistence activity by gender <p>Education</p> <ul style="list-style-type: none"> • School attendance by gender • Days teacher absent from school per year • Literacy rate <p>Information</p> <ul style="list-style-type: none"> • Market prices for crops • Available work able to be accessed
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Source: ODI (2000)

In evaluating interventions, it is highly desirable to clearly articulate at the beginning what the evaluation will involve, and especially its purposes, scope, and conduct. A checklist to assist evaluations is set out in box 5.1.

Box 5.1. Checklist for Good Evaluation Practice

- Is the purpose of the evaluation clearly specified?
- Have the issues been identified in a comprehensive manner ? Were stakeholders involved ? Are the issues well-defined?
- Are a set working hypotheses enunciated for testing? How will they be tested ?
- Is there a open set of operationally defined evaluation impact indicators ?
- Is the total of evaluation process clear and easily understandable?
- Is there an adequate level of participation in the evaluation? Will major/all stakeholders be involved? (including travelers, shippers, carriers, community groups, business organizations, nonusers, unserved groups, each level of government, civil society and NGOs, and donors). Will professional facilitators be employed ?
- How has the timing of the evaluation been determined ? To what extent is it expected that the full impacts have been registered ?
- Is there a gender dimension to the evaluation?
- Will stakeholders be given copies of draft reports (wherever possible) for comments which should then be assessed/included ?
- Is the evaluation team made up of a representative group of people, e.g., is there a mix of gender on the evaluation team?
- Will the evaluation team be contracted by competitive tender?
- How will the findings and lessons learned be fed back into the policy and program decision making process ? How will this be confirmed ?

Drawn in part from ODI (2000).

A selection of case studies is provided as an annex to this Sourcebook. The case studies of rural road improvement projects in Morocco, Vietnam, and China (**case studies 1, 4, and 5**) illustrate different approaches to impact evaluation, as well as how evaluation can reveal new insights into the less-immediate and transparent linkages from transport to poverty reduction.

5.4 How to use feedback across transport sub sectors

Transport interventions designed to contribute to economic growth will generally be selected on conventional efficiency grounds. For physical investments, their internal economic rate of return and net present value, established by economic cost-benefit analysis, provides commensurable evaluation measures of how they contribute to economic growth in efficiency terms. For these types of transport investment (for example, upgrading of national highways), evaluation normally focuses on ex-post rate of return and how it compares with the ex-ante estimated rate of return. However, as far as is practicable, an attempt should be made to estimate the distributive impact attributable to these interventions. In many cases tracking the “full and final” changes in the welfare of various groups will be very difficult. However, there are some guidelines that can help in identifying “dominant” impact linkages, for example, knowing the role of market structure. Also, as more systematic case studies are conducted insights and evidence of the important intersectoral linkages will be accumulated. In this the main focus should be on estimating the impact on poor groups, with primary attention to adverse impacts, and, where these can be expected to occur, *incorporating explicit compensation for the poor that are affected*. (See section 4.)

For transport interventions explicitly and directly targeted at poor groups, evaluation of the impact on the poor can provide valuable information for improving the design of future interventions. 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. For example, the cost of providing basic access by a rural road (in dollars per poor person served per annum) 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 various combinations (alternative levels of intervention expenditure) of the related sub sectors. In all these situations, stakeholders should be consulted on their opinions about the objective cost-effectiveness measures—and the implications about which intervention is more effective given the limited budget.

The main point here is that it is possible and desirable to build up information about how various interventions affect poverty outcomes. This information will always be incomplete, but a well-designed evaluation process can contribute insights, lessons, trade-off information, and stakeholder views into policy decisionmaking.

5.5 How to use transport feedback for assessment across sectors

The feedback from monitoring and evaluating a country's overall poverty policy is very important as little knowledge exists about how interventions and poverty reduction outcomes are linked, and the process is a long-term one. To be most effective, feedback should be obtained in a way that can incorporate lessons learned into further work. Equally important, feedback must be captured in a way that generates an incentive for its incorporation into the policymaking process. In particular, a comparison of the cost-effectiveness and poverty impact different sectoral interventions cause could help policymakers decide on trade-offs and budget priorities.

To obtain information about cost-effectiveness, the strength of various separate interventions, such as transport, need to be measured, but these must take into account the status/level of complementary inputs.¹³ For example, evaluating the impact and cost-effectiveness of a rural road's improved passability (a transport output) with improved travel times to a hospital (a transport outcome) is geared to the level of health inputs available at the hospital, such as medical supplies, equipment, and staff. Both transport and health inputs affect health outcomes. Put simply, getting to a hospital faster will have no separate effect on the infant mortality rate if the hospital has no qualified staff. Thus, the cost-effectiveness of a transport intervention, for example, the dollar expenditure to change a health outcome (such as infant mortality rate), must be explicitly associated with the level of the other inputs that are important in affecting the health outcome.

Recognizing there are multiple interactions of inputs can increase the effectiveness of resources allocated to improve poverty outcomes (such as health). Over time, knowledge can be built up about how these interactions operate. 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, a reduction in the infant mortality rate). Some substitution among inputs is typically possible at the margin with little sacrifice of outcome (for example, nursing staff for qualified

¹³Technically, 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 indeed multivariate and furthermore not simply separably additive; the "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.

doctors and travel time for more specialist care), but these are limited. Thus, coordination across sectors can raise substantially the productivity of individual inputs, especially transport, which enters as an input into several sectors, especially health, education, and income-earning opportunities.

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