Sub–Saharan Africa Transport Policy Program

The World Bank and Economic Commission for Africa

SSATP Working Paper N° 20

Promoting Intermediate Means of Transport

Approach Paper

I.T. Transport Ltd

October 1996

Africa Region
The World Bank

FOREWORD

A transport system responsive to needs is recognized as a major prerequisite for the social and economic development of rural areas. In Sub-Saharan Africa, the rural transport system are, in general, in a very poor state. Accessibility in rural areas is low and fluctuates with the seasons, and transport costs are irregular but high. Transport needs claim a significant part of daily life for the rural population, especially for women of all ages.

The Rural Travel and Transport Program (RTTP) is a component of the Sub-Saharan Africa Transport Policy Program (SSATP) which is a collaborative effort between many bilateral and multilateral organizations aiming to assist governments to formulate and implement improved transport policies. The RTTP is supported by the Governments of Denmark, Norway, Sweden and Switzerland. It combines research with dissemination through country policy and strategy development, and lends support to pilot projects.

To enhance existing knowledge of local transport in rural Africa, village-level travel and transport surveys and related case studies were carried out under the RTTP. The findings were synthesized in the report "Transport and the Village"(World Bank Discussion Paper Number 344, 1996) and are the basis for an endeavor to formulate practical approaches to the design of projects and programs to improve rural transport in SSA. These endeavors are the subjects of our approach papers, of which the present paper is one. The other approach papers deal with institutional and financial issues, rural transport planning and furthering the use of labor-based methods in road works.

Common threads through these papers are a realization that program designs must respond to local conditions, and that no standard solution exists; that whatever actions are taken must be sustainable and increasingly rely on local resources; and that this points to a much increased influence by the stakeholders in planning, designing and operating the transport systems in rural SSA.

Peter Watson
Regional Technical Manager
Infrastructure
Africa Region

CONTENTS

TABLES AND FIGURES

BOXES

SUMMARY

CONTEXT AND RATIONALE

1. With relatively low population densities and diffused patterns of economic activity (usually with low returns), Sub-Saharan Africa (SSA) has a dearth of means of transport. Indeed, if the rural transport problem were less severe (if, for example, farmers could more easily carry agricultural inputs from market to farm and produce back), it could do much to stimulate growth in output and incomes. The World Bank has characterized transportation in SSA as suffering from a "missing middle," because there are so few intermediate means of transport (IMTs). Although China, for example, has about 270 bicycles per thousand people, Africa has only about 35 per thousand.

2. The response so far to the transport problem has concentrated on providing more physical infrastructure. This begs the question. It would be more appropriate to take a systems approach to the analysis and planning of transportation, treating appropriate means of transport and transport services as equal in importance to the infrastructure they require. A wide range of IMTs are used in developing countries, from pack animals and animal-drawn sledges to slow but relatively cheap motorized vehicles. In SSA the potential demand for IMTs is extensive. But owing to some type of market failure, this does not translate into an effective demand. Meanwhile, IMTs remain relatively expensive.

THE DECISION-MAKING MODEL

3. This paper puts forward a five-stage decision-making model for the designer/planner of projects or programs. It begins with a contextual analysis that gives attention to environmental factors; economic, industrial, and social factors; and nonproject issues such as institutional, policy, and regulatory. The results are filtered through a consideration of access issues, including national norms and targets as well as the possibility of nontransport solutions to what may appear to be transport problems. This leads to a diagnosis of the problem to be tackled and the objectives to be set in improving the rural transport system. A supply and demand analysis then provides a bridge between the definition of needs and the last stage, the planning of detailed action.

CONTEXTUAL ANALYSIS

4. Figure 2.1 begins with twelve contextual factors. The first three—topography, infrastructure stocks, and demography—are characterized as environmental because they determine which IMTs may be feasible. The next set of six covers economic, industrial, and social factors. The last three are termed nonproject factors because they include such issues as institutional strengths and weaknesses, the effect of regulatory frameworks on the use of IMTs, and policies that may affect supplies and prices.

Environmental Factors

5. Of the three factors forming the environment for IMTs, topography is an obviously important issue and one that is, in the short term, unchanging. Second, the stock and condition of transport infrastructure are related to the issue of topography, because they affect the types of IMTs that may be suitable. Third, demography is important, because the distribution of the rural population affects the distances to be negotiated to gain access to the marketing chain. Aggregate data on population density, however, can be misleading. The paper distinguishes among three types of distribution—dense, clustered, and sparse.

Economic, Industrial, and Social Factors

6. *Economic factors.* This is where the analysis must look into the dynamics of local economies, particularly any opportunities for more production and trade that may bypass local communities owing to a transport constraint. Two levels of analysis are suggested. The first is that of the potential for further growth and diversification of three types of local markets: relatively well developed, less well developed, and special cases (including the effects of labor migration and remittances on levels of living). The second involves household modeling to explore the benefits that IMTs may be expected to bring in financial terms.

7. *Technology.* Every country will have a "shelf" of IMTs, however poorly stocked, and skills and entrepreneurial capacity, however weak. This sets the framework for the manufacture or assembly of IMTs**,** including those that can be made at home and those that call for some manufacturing capacity.

8. *Financial factors.* Financial constraints may simultaneously affect promotion of IMTs on four different fronts. First, manufacturing or assembly plants may need financial assistance to develop or expand production capacity. Second, adequate repair and servicing facilities are essential to providing confidence among potential users of IMTs. Private entrepreneurs can be expected to respond rapidly: the key issue is to explore the numbers of similar IMTs required to trigger such a response. The third issue involves transport services—specifically to investigate the threshold of demand that would be necessary to justify provision of new services. Fourth is the need to examine IMT prices and operating costs to form conclusions about whether it may be possible for individuals or groups to acquire them.

9. *Cultural factors.* Cultural factors can have a profound effect on the acceptability of different IMTs. Something that is new or somehow different will rarely be regarded as an appropriate solution to a problem, which may itself not be well articulated. The paper identifies five categories of cultural influence that may vary in strength—aesthetics, misapprehensions, aspirations and attitudes, gender and labor allocation, and cultural restrictions on the role of women (in using IMTs). But culture is amenable to change—particularly when opportunities exist for growth and development through the use of IMTs.

10. *Community-based organizations.* Where suitable IMTs are and are likely to continue to be too expensive to be acquired by individual households, it may be helpful to investigate possibilities for shared ownership by groups of households. The starting point should be to examine the size, nature, and purpose of existing groupings of households to judge which may be most suitable for collective ownership of IMTs.

11. *Complementary initiatives.* The constraints to wider ownership and use of IMTs may sometimes be so extensive that they may prohibit all but the most comprehensive package of interventions. Where other initiatives or agencies are working to overcome some constraints, it may be cost-effective to collaborate. The paper identifies four relevant examples, including infrastructure development or rehabilitation projects, promotion of draft animals, provision of credit services, and mechanical engineering.

Non project Factors

12. The last set of three factors in the contextual analysis are termed nonproject in the sense that they may raise issues that may have to be tackled through policy dialogue and sector work. First, a wide range of institutional issues may affect the context for promoting IMTs, including national planning authorities and line agencies responsible for transport, industry, agriculture, and roads. At the design stage, it will usually be sufficient to note strengths and weaknesses among them. National regulatory frameworks may also affect the prospects for wider ownership and use of IMTs. Policies with respect to import duties and licenses can have equally profound effects on the prices of IMTs.

DEFINING NEEDS AND TARGETS

13. Many examples exist of development projects whose design has been based on wrong assumptions or erroneous definition of the problem. Care and attention spent in identifying the problems to be tackled, therefore, can have a useful payoff. Depending on the comprehensiveness of the contextual analysis, the paper suggests using the Logical Framework Approach to construct a "problem tree." The roots of such a tree can be an extensive set of causative problems—all feeding into a more generalized core problem. The branches of the tree represent the adverse effects of the problem structure on production, trade, levels of living, and the like. As part of the definition of targets and expectations, the paper urges caution in examining *(a)* the costs of project interventions, *(b)* the timescales over which change can be expected, and *(c)* consideration of the likely sustainability of improvements that may be achieved.

DEMAND AND SUPPLY ANALYSIS

14. Using a demand and supply analysis as a bridge—or check—between the contextual analysis and the detailed planning of action to be taken is worthwhile. The framework suggested for such an analysis is in the form of a triangle, with environmental factors forming the base and demand and supply the two sides. Completion of two slightly different statements is expected. The first has to do with the constraints on both the demand for and supply of IMTs. The second is more a prediction of how the demand for or supply of IMTs is expected to increase if certain action is taken. If the analysis shows that too many factors constrain demand and supply or that too many actions would have to be undertaken to overcome the constraints, it may be necessary to tackle these problems separately.

ACTION PLANNING

15. The detailed design of specific action—where justified by the preceding stages—is broken into three distinct categories—practical content, the management framework, and monitoring and evaluation.

Practical Content

16. *Adaptation and improvement of existing IMTs.* The most promising type of intervention is likely to be one that adapts, improves, or reduces the manufacturing cost of IMTs already in use and familiar. The intervention itself can be expected to have a single principal focus on manufacturing or assembly—the supply rather than the demand side. Action may be needed on four main fronts—training, the supply of materials or components, finance, and business development. In designing training assistance, it will be necessary to *(a)* undertake analytical profiles of the staff skills in existing enterprises, *(b)* review existing training facilities, *(c)* establish the ability and willingness of manufacturers to pay for training, and *(d)* consider how training can be delivered most cost-effectively. Where new production technologies or components are required, checks should be made on the likely sustainability of supply. On the financial front, the main issue will be to ensure that a project intervention will not lead to unacceptable distortions. Business development may cover financial and staff management, production planning, market research, and promotional work.

17. *Introduction of new IMTs.* The introduction of an IMT that is completely unfamiliar is likely to present the most formidable challenge in designing an intervention. In this respect, particular attention should be given to the results of the contextual and demand and supply analyses focusing on potential users. Three stages are recommended in the action phase—testing, going to scale, and regularization of access when the intervention is complete. The rationale for testing is to identify whether further adaptations may be necessary to suit prevailing conditions, user preference, and the nature of the transport functions to be performed. If testing is successful, the next stage is to go to scale. Here, special arrangements may be necessary to place sufficient numbers of an IMT in the hands of users to reach a critical visibility threshold to launch it. Options include *(a)* the loan of IMTs for a fixed period, *(b)* hire-purchase arrangements, *(c)* special credit, and, preferably, *(d)* outright sale. Finally, special attention should be given to anticipate the completion of an intervention but also to ensure that the IMT introduced will continue to be produced, serviced, and repaired.

18. *The role of credit.* Credit is likely to be one of the most powerful tools in achieving the wider use of existing familiar IMTs, let alone for those that are unknown. But the design of any service must be given the greatest possible clarity of purpose. The results of household modeling from the contextual analysis should be checked to gauge the prospects of credit recovery. The paper goes on to raise and comment on four main options for the supply of credit: *(a)* publicly owned services, *(b)* targeted commercial services, *(c)* use of NGOs or semiformal organizations as conduits and managers of credit, and *(d)* traditional credit mechanisms through traders and moneylenders. NGOs are the preferred conduits.

Management Framework

19. The paper assumes that the experienced designer/planner of development interventions will already be familiar with the criteria, sensitivities, and risks surrounding appropriate management frameworks. The focus instead is on questions of *(a)* integration versus self-containment in management and *(b)* national and international divisions of responsibility in management. It will rarely be appropriate to adopt an entirely self-contained approach, because to do so would be to increase the risk of change being driven by supply, not, as it should be, by demand. The preferred option is to integrate promotion of IMTs with broader rural development interventions. International inputs are also recommended in the management framework. These are unlikely to be justified by any technological issues because technologies will be simple; however, international specialists can bring experience of what does and does not work and why in different settings and what adaptations of different IMTs may be possible to suit the circumstances. National expertise is also important, particularly in interpreting the results of contextual analysis, judging what is likely to be sustainable, and providing post project continuity.

Monitoring and Evaluation

20. Monitoring and evaluation work is of critical importance—the more that is done, the more innovative and ambitious an IMT intervention will be. The weakness of such work so far seems to be attributable to the narrow perspectives and supply-led approaches adopted by those involved in the design and implementation of IMT interventions. Two types of monitoring feed into project or program management—progress monitoring, collection of information on outputs, and performance monitoring to investigate effects and diagnose problems.

1. CONTEXT AND RATIONALE

THE RURAL TRANSPORT PROBLEM

1.1 Poverty means isolation.[1] Isolation is not—or not only—an issue of remoteness. It is rather a problem of being cut off or stranded. The poor are often the last to benefit—if at all—from the development process. Even in a densely populated country, the poor tend to be cut off from opportunities, markets, services in agriculture, health, and education, and perhaps even ideas and innovations. As a result, poor rural communities and their economies tend to become involuted. They become caught in a self-perpetuating circle of low productivity, low returns to labor and, hence, lack of purchasing power and diversification, and chronic disempowerment. The more this happens, the less the poor are able to grasp new opportunities for social and economic development. Indeed, being at the margin, risk aversion becomes the more powerful influence in their decision-making processes. Improving access and mobility is one of several fronts on which poverty must be tackled.

1.2 The rural transport problem in SSA has many facets: lack of physical infrastructure, diffused patterns of human settlement and economic activity, a dearth of means of transport, relatively high costs in owning and operating the means of transport, and a range of other factors, as this paper will reveal. In some parts of the region (such as Makete District in southwest Tanzania and large parts of the Ethiopian Highlands), remoteness is probably the principal determinant of isolation. More generally, a shortage of transport infrastructure certainly exists—if not of well-engineered roads, then of reasonably negotiable tracks, trails, and the ancillary structures they need. The general paucity of IMTs is no doubt allied to this, perhaps directly following from it. Box 1 provides an overview of these facets.

Transport and Access

1.3 In fact, a large part of the rural transport problem in SSA is not just due to a lack of infrastructure and means of transport but the downstream effect of a lack of access to basic needs and services. At the household level, much of the transport workload derives from pure subsistence—the need to carry food, fuelwood, and water, for example, often for long distances and usually on foot. In addition, many children have long journeys to school; health facilities are hard to reach in some areas; the nearest agricultural extension officer may be a two-day walk away or more; and so on. In this respect, access is not an absolute but a relative concept: it is a question of the degree of difficulty—the time, effort, and cost of gaining access to something, somewhere, or someone.

1.4 *Implications for the designer/planner.* The solution to access problems is not restricted to improved means of transport and better provisions of the infrastructure they may require. Access can be improved by *nontransport* solutions. One example would be to bring supplies of fuel and water closer to the users. Another would be and probably will be improving access to information by modern telecommunications. For the designer/planner of initiatives to promote IMTs, it is important first to examine national targets and policy norms for access to basic services, together with national and international investment resources for realizing them. Only then will it be possible to decide the extent to which improving access will depend on the wider promotion of IMTs. It will also help the designer/planner to understand the types of tasks that IMTs will be expected to perform by users in terms of payloads, distances, and means of traction.

Box 1: Dimensions of the Rural Transport Problem in SSA

Among the twenty-five low-income countries in SSA for which data were available in 1988, only 0.35 kilometers of paved road existed per thousand people, whereas, in low-income countries elsewhere, it was 20 percent greater.[2]

Ethiopia has only 3.5 kilometers of paved road per thousand square kilometers (seventh lowest in SSA) and less than 0.1 kilometers of paved road per thousand people (the third lowest in SSA). About 70 percent of the land area is more than 10 kilometers from any road at all. In 1989 the government estimated that 90 percent of the road network had deteriorated to the extent that it could not be restored by routine maintenance but required some form of rehabilitation.[3]

With a population about half that of India, SSA has only about one-twentieth as many animal carts—700,000 compared with 15 million.[4]

The World Bank has characterized transportation in SSA as suffering from a "missing middle"; few IMTs are available between motor vehicles and walking. With seven cars per thousand inhabitants, SSA still has more than South Korea (six cars per thousand) and twenty-three times more than Bangladesh (0.3 cars per thousand). In contrast, whereas China has about 270 bicycles per thousand people, Africa has only about thirty-five per thousand.[5]

In northern *Zambia*, the price of a bicycle typically equals about 40 percent of annual household income, whereas in parts of Burkina Faso, it can be as much as 1.8 times annual household income.[6]

In *Malawi*, the retail price of the least expensive bicycle in 1988 equaled 650 days of earnings at the rural minimum wage (and 1,000 days for one made in South Africa). Even a Taiwanese bicycle tire represented over 24 days of earnings. In 1996 the price of a cheap bicycle had fallen to the equivalent of only 160 days of earnings at the rural minimum wage—although still roughly double the number of days of earnings required to buy an inexpensive bicycle from casual wage employment in agriculture in Bangladesh.[7] (See also box 10.)

RESPONSES TO THE PROBLEM SO FAR

1.5 The importance of adequate transportation in the development process has long been recognized. Investments in the transport sector have typically accounted for 20–25 percent of public sector development expenditure in many developing countries. International development assistance has also given high priority to transport, including for rural development. A large proportion of this expenditure has been devoted to physical infrastructure.[8]

1.6 But the translation of the rural transport problem into that of a lack of roads and other physical infrastructure begs the question. Infrastructure only partially contributes to improving access and mobility. This presupposes that the traffic that might use it is already more or less queuing up to do so and rural economies are ready to respond. Experience has shown, however, that the provision of infrastructure does not automatically or rapidly lead to increased traffic nor even to shifts in the modal composition of traffic, both of which depend on a number of other conditions being met.[9] It is this that leads to the situation in which many rural roads that were engineered for motor vehicles are used principally by pedestrians with head loads. Real improvements in access and mobility can best be brought about by a systems approach, treating the appropriate means of transport and the development of appropriate transport services as equally important facets as correspondingly appropriate physical infrastructure.

INTERMEDIATE MEANS OF TRANSPORT

1.7 For the purposes of this paper, intermediate means of transport (IMTs) include a wide range of devices and vehicles occupying the middle ground between two extremes of technology, capacity, range, cost, and complexity. The lowest level of these extremes is walking (with loads carried on the head, shoulder, or back). The highest level is the modern four-wheeled motor vehicle. At lower levels in the technology spectrum of IMTs are pack animals and animal-drawn sledges. Progressing toward the middle ground are a wide range of non motorized wheeled vehicles—from the handcart through the bicycle (with or without adaptations) to the animal-drawn cart. At the upper level of the spectrum comes a range of motorized vehicles that are cheaper and smaller than the modern, mass-produced motor vehicle and may be possible to manufacture in whole or part at the local level. Appendix I contains an outline of the most common IMTs, including some that are currently hardly used in SSA but that may—or may become—appropriate.

CONUNDRUMS IN DEMAND AND SUPPLY

1.8 *Potential demand.* In theory, the potential demand for IMTs should be both strong and widespread throughout SSA. Yet, whether this is true or not, little evidence exists of it being translated into real effective demand. This is what leads to the puzzle of the "missing middle." Part of the answer seems to be a lack of perceived priority on the benefits of reducing the transport workload in terms of time and physical effort, especially where women do most of this work and when the opportunity costs of their time (in terms of hard cash as distinct from other subsistence activities) are low. Another part of the answer may lie in the apparent extreme conservatism and risk aversion of farm households in SSA.

1.9 *Effective demand.* In many parts of SSA the failure of potential to become effective demand for IMTs also seems to stem from an impasse in the development of manufacturing or assembly units—indeed, a self-perpetuating impasse. First, because IMTs are uncommon, entrepreneurs do not seem to respond to the potential demand for them by trying, testing, and probing the market. Second, again because so few IMTs are available, few repair services exist. The impasse comes from a lack of confidence in and lack of conviction about the role that IMTs could play in permitting greater economic efficiency and perhaps in promoting higher production both in agriculture and a range of different fields.

1.10 *Supply.* Lack of confidence, perhaps coupled with conservatism and lack of vision among manufacturers, may also help to explain the lack of diversity in IMTs in SSA. Ox carts, bicycles (including those adapted for trading, which are used only in some large towns and cities), and handcarts of one sort or another seem to account for the majority of IMTs in the region. But although donkeys, for example, are common at least in some countries, they are most often used only as pack animals in eastern and southern Africa. Donkeys can be found hitched to lightweight carts principally in West Africa. Going up the technology spectrum, little experimentation with or adaption of motorized vehicles seems to occur. These include the robust and flexible motorcycle sidecars so extensively used in the Philippines or the range of three-wheelers that are common in south and southeast Asia (see appendix I).

1.11 *The multidimensional market failure.* In crude terms, the relative lack of diversity and numbers of IMTs in SSA is due to some form of market failure—probably a multidimensional failure. IMTs are relatively expensive. A recent survey of animal traction specialists put the unaffordability of ox carts as the single biggest constraint to their wider ownership.[10] On the supply side, the high prices of IMTs have a lot to do with low sales volumes. Little competition exists among suppliers. Few manufacturers have sufficient confidence in the market to "jig and tool up" for large production runs, reducing manufacturing unit costs and, hence, prices. On the demand side, the relative lack of rural credit services in SSA means that even if owning IMTs makes sense to individuals or groups of farmers on economic grounds, they can remain firmly out of financial reach, at least from current income (as illustrated for Malawi and Zambia in box 1).

THE NEED FOR COMPLEMENTARY INTERVENTIONS

1.12 More and more, development planners are appreciating the fact that, if the effects and impact of transport infrastructure are to be accelerated and optimized, a need often exists for complementary interventions, usually on at least two fronts. First, measures may be needed to stimulate production (most commonly agriculture). This has long been recognized and part of the rationale for blending road components in agricultural and general rural development projects. But, second and less widely understood, the translation of the potential demand for travel and transport into real effective demand depends on adequate, appropriate, and affordable means of transport and transport services. It is on this second front and the need for proactive interventions that this approach paper focuses.

Promotion

1.13 The *concept* of promoting IMTs covers a range of different potential initiatives. In some cases, it may mean attempting to make existing IMTs more widely available and used. It can also include introducing adaptations to existing IMTs with the intention of making them better suited to the transportation needs of those who use them. The most ambitious form of intervention will usually be the introduction of IMTs in areas and among communities where they have not been previously used.

1.14 The *practice* of promoting IMTs will be surrounded by two main and interrelated risks: of being supply-driven and, hence, of introducing distortions to the "real" nonproject world. Indeed, these risks are common to most initiatives that are intended to stimulate, enhance, and accelerate the development process. The key issue is not to remove such risks, because to do so would probably mean no intervention at all. Rather, the designers/planners of projects or programs to promote IMTs should be conscious of the need to *(a)* withdraw distortions at the earliest possible stage and *(b)* postpone the judgment of effects and impact until a real, nonproject and demand-led environment is restored.

2. THE DECISION-MAKING MODEL

OVERVIEW

2.1 Experience shows that it is usually inappropriate to attempt to promote IMTs by means of superficial analyses and external prescriptions. A web of factors affects what is or is not appropriate in different physical, social, economic, institutional, and policy contexts. This means that the starting point for any intervention is to develop an adequate *understanding* of the context, including both potentials and constraints. Accordingly, the model presented in this paper is intended to help the designer/planner of projects or programs through a decision-making process. It does not indicate what the decisions in any setting should be. Rather, it provides a guide to the issues that should be taken into account, the options that may be available, the timescales that may be involved, the types of activities that may be required to achieve the wider use of IMTs, and the distortional pitfalls that may be encountered. In practice, conditions will vary widely; this is why the model attempts only to indicate *how* to approach the promotion of IMTs, not to specify precisely *what* will be appropriate in any particular situation.

Stages in the Model

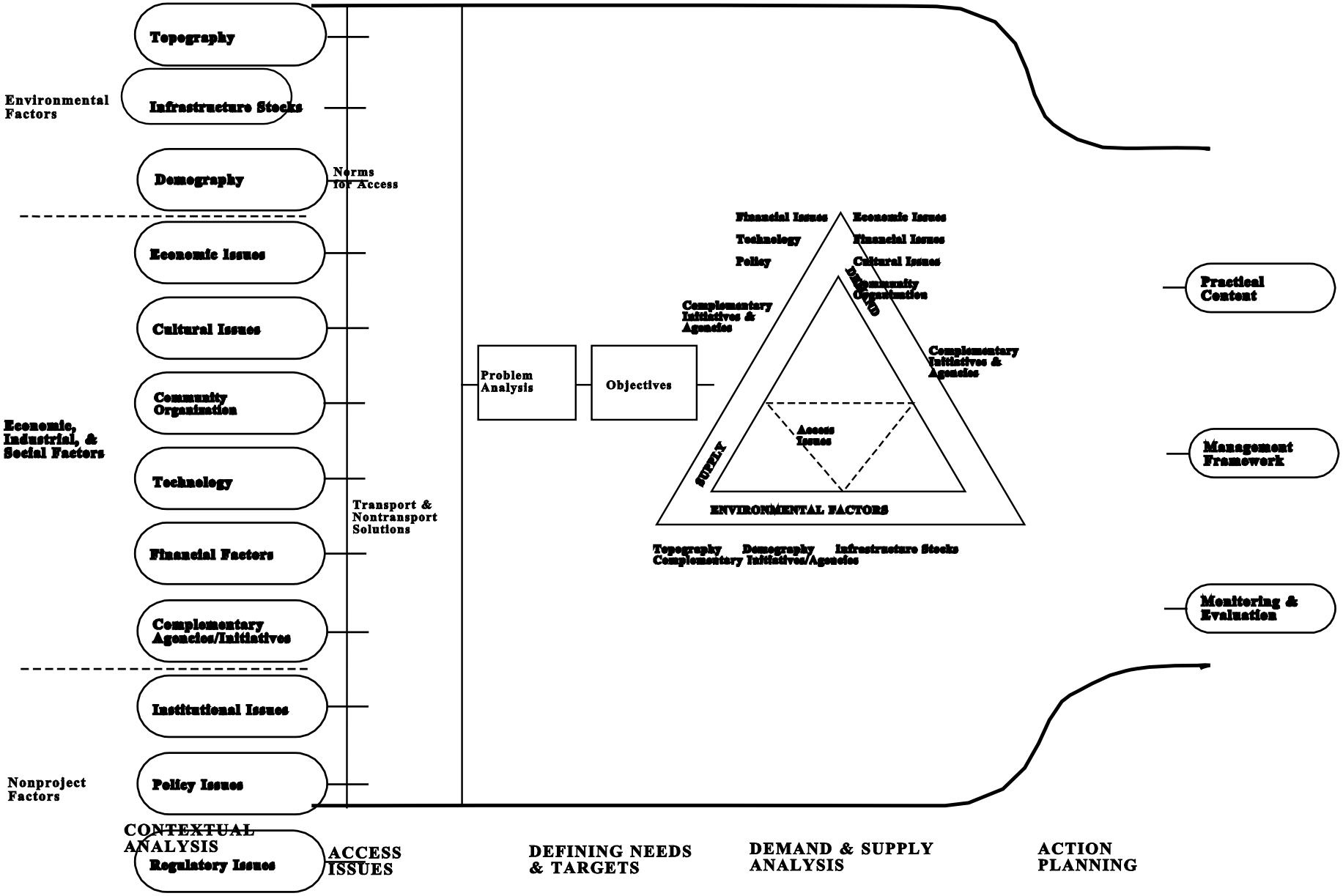
2.2 Figure 2.1 summarizes the decision-making model, which comprises five stages:

- *Contextual factors.* The model shows twelve discrete sets of factors determining the context within which IMTs may be promoted. Analysis of the substance and dynamics of these factors is necessary to develop a comprehensive understanding of what might be required and feasible; however, not all of the factors need to be investigated in equal depth or at the same time. Section 3 explains the ranking of priority among them.

- *Access issues.* The composite question that must be answered here is: who needs access (or better access) to what, for what purposes, with what frequency, and with what, if any, payloads? This question is important because faster, easier, cheaper, and more reliable transport is only one way to improve access. As noted in section 1, much of the transport workload at household level is to do with subsistence. But because it is not a productive or commercial activity, it is hard to see how the rural poor can bear a cash expenditure on even the simplest IMT without a clear opportunity cost of the time currently spent in head loading. Nontransport solutions—water, fuel, even schools and health facilities closer to the users—could do much to reduce the transport problem.

- *Defining needs and targets.* The combination of contextual analysis and setting targets and norms for access leads to a definition of needs and, in turn, what should be done. For the designer/planner this usually means defining the objectives of a project or program in relation to the problems to be overcome. It is at this stage in the decision-making model that the following should be made clear: the types of IMTs that should be promoted, the broad nature of the action required, and the cost of action in relation to the benefits that may be derived and the timescale over which they may be realized. Section 4 of the paper indicates the recommended approach.

Figure 2.1: Summary Illustration of the Decision-Making Model



- *Demand and supply analysis.* This is not a separate investigation but more a distillation of the results of the previous three stages. It should be used as a bridge between the definition of needs and targets and the planning of detailed action and its expected effects. The first of two substages should be to complete the statement: "the*(a)* demand for and *(b)* supply of IMTs is limited because . . ." The second substage is to complete the statement: "the*(a)* demand for and *(b)* supply of IMTs would increase (if possible, indicating by how much) if . . ." The answers are likely to have several dimensions (see section 5).

- *Action planning*. This final stage in the decision-making process involves detailed planning of the substantive activities to be done in promoting IMTs, how that work should be managed and financed, specification of any technical assistance or technology transfer requirements, and design of arrangements for monitoring and evaluating the effects and impact of promoting IMTs. Section 6 puts forward a range of issues and options.

3. CONTEXTUAL ANALYSIS

OVERVIEW OF CONTEXTUAL FACTORS

3.1 Figure 2.1 shows twelve contextual factors, which are listed below in a sequence reflecting their priority for investigation in contextual analysis:

- *Environmental factors*

    1. Topography
    2. Infrastructure Stocks
    3. Demography

- *Economic, industrial, and social factors*

    4. Economic factors
    5. Technology
    6. Financial factors
    7. Cultural factors
    8. Community organization
    9. Complementary agencies and initiatives

- *Nonproject issues*

    10. Institutional issues
    11. Regulatory issues
    12. Policy issues

3.2 Two of the twelve factors—topography and demography—are unchanging, either absolutely (topography) or in relation to the timescale being consideration (demographic patterns do change, but only gradually). The rest are amenable to faster change, although over widely different time horizons.

ENVIRONMENTAL FACTORS

3.3 The first three of the twelve factors are of primary importance, because they narrow the range of appropriate IMTs most sharply. Even among them, topography and infrastructure are together the starting point, because they set the physical conditions for IMTs and, hence, the boundaries for decisions about what to do.

Topography

3.4 Terrain is obviously a fixed factor relative to the types of IMTs that might be feasible. Nonmotorized means of transport become less feasible in hilly terrain. Examples exist of relatively low-cost (usually slow) motorized IMTs (mainly in Asia) capable of negotiating hilly terrain with significant payloads (see appendix).

Physical Infrastructure

3.5 The stock and condition of transport infrastructure are closely related to the issue of topography, affecting the types of IMTs that may be suited to different transport functions. Different IMTs require different types and standards of physical infrastructure in terms of the quality and widths of running surfaces and ancillary structures. A key issue at this stage of the analysis is whether the design of activities to promote IMTs might also include infrastructure development or could at least be coordinated with other initiatives that do; however, this does not—or does not necessarily—mean that roads, for example, should be the only choice. Many are beginning to appreciate that many developing countries cannot sustain continuing increases in their networks of standard road categories. In turn, ensuring correspondence between provision of infrastructure and the use to which it will be put is becoming more important. Box 2 shows how project design can incorporate low-cost improvements in transport infrastructure suited to access needs and the most likely means of transport. Figure 3.1 shows how topography and infrastructure affect the choice of feasible IMTs before any consideration of demographic, economic, cultural, and other factors.

Box 2: Infrastructure Development Suited to the Means of Transport

IMTs usually require less sophisticated and less costly physical infrastructure than cars and trucks. This is an important dimension of the systems approach to rural transport suggested in section 1.

In *Malawi*, for example, the U.N. Development Programme (UNDP) and the U.N. Capital Development Fund (UNCDF) have been supporting a Village Access Roads and Bridges Assistance Unit (VARBAU) project, which has incorporated both community participation in decision-making as well as community contributions to infrastructure development. In some cases, village priorities have been expressed in terms of pedestrian and hand cart bridges over creeks and small rivers, giving improved and safer access to cultivated areas. In others, low-cost tracks have linked villages to the district or main road network. Bridges have been built with restricted width, preventing their use by vehicles (and payloads) larger than pickups. In all cases, beneficiary communities have contributed voluntarily to the collection of building materials and to earthworks for access tracks. VARBAU has contributed steel, cement, construction timber, engineering designs, and skilled staff.

In *Ethiopia*, UNCDF is financing a local-level civil works project in North Gondar Zone, including improving tracks, trails, and the markets they reach. Few wheeled vehicles exist in rural Ethiopia, but pack animals are common. Accordingly, an important output will be small bridges and other structures to provide better all-weather access. Similar projects have been planned in Tanzania and Malawi.

Demography

3.6 The distribution of rural populations is another characteristic that must be taken as a fixed determinant of the context for promoting the use of IMTs, at least in the medium term; however, it is rarely sufficient to use aggregate data on population density, especially in countries with relatively low aggregate population densities with often densely populated settlement clusters.

3.7 *Settlement patterns.* Topography, soil fertility, access to water, and distribution of productive activities (and, hence, employment opportunities) all affect the distribution of human settlements—especially in countries with low aggregate population density. These factors can affect the distances to be traveled (and

Figure 3.1: Decision-Making Based on Topography and Infrastructure

TOPOGRAPHY	INFRASTRUCTURE	MEANS OF TRANSPORT		LOAD CAPACITY (kg)	COST INDEX	COMMENTS
Hilly	Few rough tracks	Walking	Back basket	30–40	1–2	Head strap not recommended; baskets suited to loose nonbulky material
			Shoulder pole	30–40 (S) 60–70 (D)	1–2	Single-person pole (S) not suitable in rough terrain; two-person pole (D) is better
			Back frame	40–50	3–5	Good for awkward and bulky loads
		Pack animals and panniers		50–80	2–4 (pannier only)	Best solution for medium-long journeys in hilly, rough terrain; veterinary services required
	Extensive all-weather tracks (>1.5 meters wide)	Bicycles and carriers, panniers, baskets		40–50	100–150	Pushing bicycle only; good for nonbulky loads; repair services needed
		Hand carts		50–100	40–70	Short to medium journeys; single operator
		Animal sledges		150–250	2–5 (sledge only)	Veterinary services needed
		Animal carts		300–500	100–150 (cart only)	Suitable for large, bulky loads; veterinary and repair services needed
		Pack animals and panniers		50–100	2–4 (pannier only)	Veterinary services needed
		Wheelbarrows		100	30–50	Tiring for medium to long journeys
		Hand carts		100	40–70	More stable than wheelbarrow
	Narrow rough tracks (<1 meter wide)	Bicycles and carriers, panniers, and baskets		50–60	100–150	Known as “land helicopter” in Bangladesh because it is a flexible, go-anywhere IMT
Rolling or flat	Medium smooth tracks (1–1.5 meter wide)	Hand carts		<200 up to 1,000	40–70 300–500	Single operator Team of operators required
		Bicycles and trailers		150	60–90 (trailer only)	Trailer can be used as hand cart also
		Animal sledges		250	2–5	Veterinary services required
		Animal carts		<300 up to 1,000	100–150 300–400	Suitable for large bulky loads; veterinary and repair services required
	Wide smooth tracks (>1.5 meter wide)	Motorcycles	Sidecars	250	350	Less adaptable than trailer
			Trailers	300	300	Detachable for use as hand cart
		3-wheelers, locally made		up to 1,000	>4,000	Cost index based on price in India
		4-wheeled vehicles, locally made		1,000–2,000	4,500–5,500	Cost index on ITAEN price in Thailand

the loads to be carried) for different purposes and, hence, the types of IMTs that might be appropriate. They also affect the options that may be available for different IMTs. Three broad types of settlement pattern are outlined below, together with their implications for the use of IMTs:

- *Dense.* In SSA, uniformly dense settlement patterns over an extensive area suggest a relatively strong production base. In turn, good potential should exist for IMTs to make a broad contribution to the transport system.

  Although population density is low in SSA as a whole, historical concentrations of population have arisen in areas with good potential for subsistence, such as the Ethiopian Highlands, central and southern Nigeria, Uganda, Rwanda, southern Malawi, the Webi Shebeele/Jubba basin in Somalia, and many others.

- *Clustered.* Clustered settlements in an otherwise thinly populated geographical area suggest a node of production (mainly agriculture, but also mining, forestry, or other natural resource). Here scope may exist for new or adapted IMTs for internal, local-level transportation—depending on economic conditions, as outlined below. Larger, more expensive vehicles may be required for external trade with the remainder of the national economy.

  Population clusters may take a variety of forms. In the Sudan, clusters are small and scattered, owing to the poor agricultural resource base. But the vital need for water and the distances it must often be carried have led to extensive use of donkey carts. Elsewhere, clusters of high population density have grown around centers of mining and industrial activity, as in the Ghanaian gold fields and the Zambian Copperbelt.

- *Sparse.* Areas that are only thinly settled are likely to be the poorest and least well developed and rely on subsistence production. Irrespective of the nature and magnitude of the transport workload, little scope is likely to exist for introducing and adapting IMTs, with the possible exception of pack animals.

  Sparse settlement patterns and subsistence production predominate throughout most of SSA. Incomes are low and the transport workload devolves mainly onto women. Only in such countries as Botswana, Ethiopia, Somalia, and Zimbabwe (where livestock are an integral part of farming systems) and the nomadic areas of the Sahel, the Ogaden, and most of Somalia do animals and animal carts figure in rural transport.

3.8 In densely populated areas or places with a clustered settlement pattern, however, particular care should be given when considering the potential for the use of animals in rural transport and in the farming system as a whole. Primary soil cultivation probably accounts for 90 percent of animal power usage in Africa. Fewer than 10 percent of animal owners have carts. (Because these can be used throughout the year, however, their importance may be greater than absolute numbers imply.) Depending on population pressure and the spatial and seasonal availability of rough grazing, farmers may have to take special measures to conserve crop residues, notably groundnut straw and maize stover, as animal food supplements. This leads to an association between the use of animals and the adoption of carts to carry bulky residues, as in Senegal, The Gambia, and Mali. In Ethiopia and throughout much of West Africa, where animal transport has become an important source of income (especially serving towns), specialized markets supply feed, again, using pack animals or animal-drawn carts.[11]

ECONOMIC, INDUSTRIAL, AND SOCIAL FACTORS

Economic Factors

3.9 The economic status of an area or community is not a fixed characteristic but has its own dynamics, including the contribution that better transport can make to faster economic development. Indeed, economic opportunity is often the best stimulus for the spontaneous development of solutions to transport constraints. The prospects for wider use of IMTs should be analyzed at two levels in sequence: at the level of local markets and in more detail at the level of the individual or small groups of rural producers.

3.10 *Market analysis.* The first requirement in analyzing the economic context for IMTs is to understand both the prevailing level of development of local markets for production, services, and labor and the potential for further growth and diversification. The process will differ principally according to the actual level of development, as outlined below.

- *Relatively well developed.* Areas whose productive base and performance are relatively strong are those in which IMTs might already be expected to be in use or in which IMTs have the strongest potential for promotion. In such circumstances, examining the design of the devices currently in use and the materials and components in their manufacture is generally useful. It may sometimes be possible to introduce wholly "new" (to the area) IMTs, which may be more efficient in terms of payloads, range, motive power, and operating costs—although usually with a trade-off against purchase price. More often, it may be possible to introduce improvements or adaptations to increase the efficiency of existing vehicle types (to reduce operating costs) or to reduce their price (to put them within reach of a wider cross-section of people) or both. In the promotion of IMTs, as in so many dimensions of development, it is usually easier to build on what already exists rather than trying to introduce wholly new technologies and systems.

- *Less well developed.* In contrast, a low productive base (and the involution that is likely to be associated with it) will be demonstrated in low incomes, lack of diversification, and restricted markets for goods, services, and employment. In the extreme, whatever may be the technical or mechanical capability for IMTs to make local transportation easier and more efficient, if purchasing power is low, little opportunity may exist for translating potential to real, effective demand, even for low-cost IMTs. But the analysis does not end with characterizing prevailing conditions. It is also necessary to explore the scope for more broadly based development and the nature and magnitude of investments needed to fuel growth in production, incomes, and economic diversification. Thereafter, it will be important to predict the timescales over which growth may take place, and, hence, the timing of supplementary initiatives to promote appropriate IMTs.

- *Special cases.* The boundaries for analyzing rural economies are set by their own localities. Some countries may have special cases, such as migration of males in search of employment. If links between the mean and their households are intact, remittances in cash or kind can be a significant supplement to what would otherwise be poor conditions. One example is Zimbabwe, where both formal and informal employment is concentrated in and around Harare and Bulawayo. This has adverse consequences for agriculture owing to the difficulties faced by women left at home in ploughing (with oxen and steel ploughs) and harvesting. But the cash and consumer goods that men can send home more than compensates. Another example is the area around Kaya in Burkina Faso, where table 3.1 shows that a bicycle costs nearly 1.8 times (local) annual household income. Yet, nearly 70 percent of households do in fact own one. Although Kaya is a poor area, it lies only about 100 kilometers to the northeast of Ouagadougou, where many men find well-paid employment. Because Burkina Faso is one of the few SSA countries in which bicycles (and mopeds) have been firmly adopted, a bicycle may be one of the first items sent back home. The popularity and social desirability of bicycles is a key factor explaining the high rates of ownership.

3.11 *Household modeling.* Apart from analyzing the characteristics of local markets, digging deeper to understand household models and potentials—with and without IMTs— is also important. It is not sufficient for the project planner to note the amount of household labor time devoted to carrying fuel and water, for example, and to estimate the time savings that might be possible with an IMT. A payoff must be demonstrated. Yet, a social payoff (such as more time for child care) is unlikely to be sufficient. Are there

Table 3.1: Bicycle Ownership in Relation to Household Income

Country (District)	Bicycle Cost as Share of Annual Household Income (%)	Extent of Bicycle Ownership (% of Household)
Zambia (Kasama)	39	28
Zambia (Lusaka rural)	22	26
Uganda (Mbale)	72	15
Burkina Faso (Kaya)	178	68
Burkina Faso (Dedougou)	24	90

Source: IBRD: SSATP, Rural Travel and Transport Project, 1993.

potentials for relatively high-value cash crops, noncrop agriculture, or other forms of production that cannot be or are not being exploited owing either to the household transport workload to meet subsistence needs or transport constraints in gaining access to markets? If so, in relation to land holdings, production costs, likely yields, crop shelf life, and the market value of the products, how much can be afforded to make transport more efficient while still generating a viable overall return to land and labor? If the price of the most appropriate IMT is prohibitive out of current household income, are cheaper alternatives possible? If not, can groups of farmers collaborate, sharing the financial cost of owning and operating an IMT to carry bulked output to local markets and bring necessary inputs back?

Technology Issues

3.12 Every country has an existing "shelf" of IMTs, however poorly stocked. On the supply side will also be production, distribution, and repair capacity, however slim. Together, these two factors represent the foundation on which any efforts intending to extend the use of existing IMTs or to provide a richer stock of IMTs or both must build. Box 5 illustrates how familiarity with the use of animal power in South Africa provides rich potential for the further development and refinement of IMTs.

3.13 *Homemade IMTs.* At the lowest levels in the technology spectrum, the animal-drawn sledge is something that most users make for themselves. Most designs are truncated triangles with two main poles bearing on the draft animal and their ends trailing on the ground. As long as adequate supplies of timber and the means to make joints exist, the quality and durability of a sledge are hardly at issue because it can be replaced so easily and cheaply. The need for external intervention may, therefore, be limited to the introduction of the sledge as an option in areas where it is not yet used. In some cases, this may need to be complemented by advice (but preferably by practical examples) on best practice in manufacture. Although low on the cost scale, sledges are equally low on the mechanical efficiency scale. Moreover, if they are used on roads designed for motor vehicles they can cause considerable damage. For this reason, some countries have banned them on public roads, although policing such bans is not easy.

Box 5: The Potential for IMT Development in South Africa

South Africa has long used animal power in agriculture and transport. A recent survey has estimated that in the deeply rural areas 40–80 percent of agricultural households make some use of animal power. But problems have existed in the ex-"homelands"—shortages of grazing lands, pasture degradation on communal land, and drought. Oxen are used in teams of up to eight to draw carts with two or four wheels, most of which are locally made and strong but rather heavy. Meanwhile, donkeys have become considerably more popular for cultivation, owing to their survivability, longevity, low cost, and low management requirements, among other reasons; however, donkeys are so far rarely used for transport, because experience in making sufficiently lightweight carts (as used in parts of West Africa) is minimal. Only modest assistance would be needed to familiarize local artisans with proven designs and to ensure a supply of reliable but cheap axle and wheel sets.[12]

3.14 Even among the range of types of wheeled vehicles, the simplest and cheapest are usually those that are made by users themselves—principally hand carts with one or two (manufactured) wheels. In Zimbabwe, the manufactured wheelbarrow is a common farm implement, whereas homemade hand carts are less common. It is important to look for indications of *(a)* preference, *(b)* acceptability, and *(c)* purchasing power.

3.15 *Manufacture and assembly of IMTs.* At higher levels in the technology spectrum, the paucity of small- and medium-scale manufacturing and assembly enterprises has been one of the chief barriers to promoting IMTs in SSA.[13] Medium-scale enterprises are usually required when the manufacture of IMTs calls for relatively complex technologies (such as bicycle frames and components). But small-scale operations can undertake a potentially wide range of work—from the assembly of bicycles and even simple motorized vehicles down to the manufacture of accessories (such as load-carrying racks and platforms for bicycles) and carrying out modifications to existing vehicles. But it is not unusual, for example, for a farming area in northern or western Zambia, southwestern Tanzania, or almost anywhere in Ethiopia to be 100 kilometers or more from the nearest commercial metal-working workshop.

3.16 Interventions can be made. But they must be carefully judged to avoid and ultimately not rely on too many distortions. The steps required in the contextual analysis can be summarized as follows:

- Identify which existing, modified, or wholly new (to an area) type of IMT is best suited to the transport needs and the socioeconomic profile of a particular area.

- Estimate the likely numbers of IMTs needed to meet transport needs.

- Identify existing entrepreneurs with the skills and capacities to manufacture or assemble the required IMTs.

- Assess what, if any, additional training entrepreneurs may need to produce new or modified IMTs and explore from what sources and by what means training services could be supplied.

- Explore with entrepreneurs the minimum production and assembly run that would make it worthwhile for them to "jig and tool up."

- Devise a financing scheme to place the necessary minimum orders with entrepreneurs and permit potential users to acquire them.

Financial Factors

3.17 The main issue to be investigated is the availability of financial services, their applicability to different dimensions of the promotion process for IMTs (including manufacture, stocking, and distribution of IMTs as well as their purchase and use), and the terms and conditions surrounding them. Investigations should not be restricted to mainstream national banking and credit services. They should also include *(a)* traditional financial systems, *(b)* NGOs, and *(c)* internationally financed rural development projects with credit or hire-purchase services that can be tapped into, possibly with some revision of focus and targets.

3.18 Four main categories of financing the promotion of IMTs are explored in contextual analysis. These are *(a)* financing the manufacture and assembly of IMTs, *(b)* development of repair and servicing enterprises, *(c)* financing of entrepreneurial transport services, and *(d)* acquisition of IMTs by individuals or groups for their own purposes. Guidelines for the investigations are outlined below.

- *Manufacture and assembly.* Several levels of financing exist, depending on the type of IMT under consideration and specifically the level of technology required. At the highest level of technology, medium- or large-scale enterprises may be required. Ideally, such enterprises should grow within the private sector. In turn, it would be unlikely that international development assistance would be an appropriate source of finance (except directly or indirectly through such agencies as the International Finance Corporation and the Commonwealth Development Corporation). At the country level, domestic financing may be possible through industrial development banks or their equivalent. The little spontaneous private sector investment in the development and manufacture and assembly of IMTs in SSA so far, however, suggests that some form of intervention will be required. During the past ten years or more, the Bank as well as a number of bilateral development assistance agencies have developed considerable experience in providing credit facilities to small- and medium-scale private manufacturers.

- *Repair and servicing.* Providing external financing for the development of repair and servicing facilities is unlikely to be necessary. For most IMTs, the capital investments required are small and private entrepreneurs can be expected to respond to demand rapidly. The key issue is the number of similar IMTs required to trigger such a response—not just in absolute terms but in terms of density of similar IMTs within a particular radius or "catchment" for repair and servicing operations.

- *Transport services.* Here again, it is preferable to rely on private sector initiatives to set up transport services, once appropriate IMTs have become available. One of the most likely patterns of development of services using IMTs will be first in and around small- and medium-sized towns, followed by gradual extension into rural areas with sufficient population density to generate the required demand for commercial viability. Investigation and demonstration of the requirements for viability would principally justify project-based initiatives.

- *Acquisition by individuals or groups.* It will not just be cultural acceptability or the capacity, range, and simplicity of IMTs that will determine their appropriateness for individuals and groups. Equally important will be the cost to acquire as well as to operate them. Box 6 shows an example from The Gambia of spontaneous adaptation in the use of animals in agriculture and transport in which questions of cost, security, and sustenance (as well as cultural perceptions) played a major role. At the lowest level of the technology spectrum—IMTs that can be made at home by users—little may be necessary beyond the introduction of new ideas (or, more probably, borrowed ideas from other countries) and perhaps some advice and information on best practice in making them. Rather, it is in the acquisition of larger or more expensive IMTs, including those that are industrially manufactured or assembled, that potential users may need help. Depending on rural purchasing power, the list may start with the industrially manufactured wheelbarrow and go on to include bicycles, animal carts, and even more costly vehicles. In most countries already, a wide range of sources of finance could be used to support the acquisition of IMTs—from local traders and informal moneylenders through NGO and public sector agricultural and rural credit schemes to formal banking services. Guidelines are provided in section 6.

Box 6: Spontaneous Adaptation in Adoption of Animal Power

The Gambia began to adopt draft animal power in agriculture and transport only about fifty years ago. Today, more than 60 percent of rural households use animals for work. Promotional work began in 1955 with the establishment of ox-ploughing schools, of which twenty-four were in operation by 1965. In 1977 training became part of the extension service to reach more farmers. This work hinged on the promotion of the N'Dama work oxen. Starting in the mid-1960s, however, farmers spontaneously began to shift from oxen to donkeys—so much so that by the mid-1980s, donkeys had become dominant. There were several reasons for the shift. First, because its meat is not eaten, the price of a donkey was only 10–20 percent that of an ox. By implication—and because they are less docile than oxen—donkeys are less likely to be stolen. Third, they require less grazing than oxen and, hobbled, can be allowed to wander unsupervised. Fourth, a cultural (but erroneous) perception existed that several people are required to work with oxen, whereas only one person is required to supervise a donkey.[14]

Cultural Factors

3.19 Cultural factors must always be taken into account in assessing both the need for and the likely response to IMTs, especially as poverty induces conservatism and risk aversion. Something that is different or perhaps wholly new will rarely be rapidly regarded as an appropriate solution to a problem, which itself may not be well articulated. Against this background, cultural inhibitions or restrictions on the use of new or the more widespread use of existing IMTs may even seem to belong with topography and demography as unchanging factors within a specific setting. They can appear—at least initially—to be intractable, because they are generally rooted in tradition, among other reasons; however, experience has confirmed what common sense suggests, namely that culture is flexible, its dynamics strongly affected by economic changes and by opportunities for growth and development. Two main cultural factors should be taken into account:

- *Aesthetics*. In some countries—particularly in Asia—the appearance of IMTs can be judged against aesthetic standards that are part of national cultures.[15] Owing to a paucity of experience, little understanding exists in Africa of how different IMTs may be judged by their appearance.

- *Misapprehensions*. Great scope exists for misapprehension about the use of draft animals. It is widely believed that cross-bred dairy cattle cannot or should not be used for ploughing, although it is feasible to do so without loss of milk production if they are given adequate food supplements. Donkeys, although popular in some countries, are mistrusted or given low status in others.

- *Aspirations and attitudes.* Some SSA countries have experienced significant economic decline over the past twenty to thirty years. But aspirations (for "modern" probably motorized transport) and attitudes (toward simple IMTs) can take a long time to change. One example is Zambia, whose wealth from copper and zinc led not only to a high rate of urbanization but also high aspirations with respect to housing and means of transport. Bicycles are still regarded as somehow inferior.

- *Gender and labor allocation.* A man may well use a wheelbarrow or some other means of transport to carry water for building a house, because construction is a male task. But he may not do the same work carrying water for household consumption, if that is a traditionally female task.

- *Restrictions on the role of women.* In much of SSA, women's role in transport is most circumscribed by culture. This is just one specific manifestation of a significantly more complex set of attitudes affecting male-female roles, relationships, and divisions of responsibilities. Box 7 gives a number of examples, including situations in which attitudes have in fact changed.

Overcoming Cultural Restrictions

3.20 Cultural restrictions on women are rarely imposed exclusively by "dominant" men on "timid" women. They are restrictions in which women themselves often collude for reasons of long-established traditions and values. Work to overcome them has to be undertaken on two fronts—male and female. Indeed, women perhaps represent the more important of the two for once they can see, grasp, and value new opportunities, they may contribute to overcoming male conservatism.

3.21 As indicated in the example from Ethiopia in box 7, practical even economic arguments are often of little value in trying to overcome the attitudes and perceptions on which cultural restrictions are based. Demonstration is far more powerful. Of course, at the project or program design stage, it is neither appropriate nor feasible to undertake wide-scale demonstration and promotional work. The best that may be possible may be films and photographs even on a limited scale attempting to draw out attitudes and, hence, understanding how much further promotional work may be necessary during implementation. But expectations should be modest. Even films and photographs can be less than convincing—perhaps because they have been taken in a different, unknown context so that what they portray is regarded as hypothetical.

3.22 Where restrictions have been overcome, they have been shown to be little more than myth. This is important, especially given descriptions of their apparent intractability. One example of a broken restriction is not sufficient to assume rapid and widespread change. It does show that change is possible; the examples from Zimbabwe, Malawi, and Bangladesh in box 7 confirm what can actually happen.

Community-Based Organizations

3.23 *Potential.* The nature and strength of intracommunity relationships, linkages, and cooperative mechanisms can have a decisive effect in determining what types of IMTs may be most appropriate, but also in making their procurement more feasible. Where cooperative mechanisms are strong and well-established, it may be possible for groups to procure relatively more expensive IMTs on a shared basis. This may make the financial burden more manageable for individuals. But the viability of such an arrangement will depend on group solidarity and clearly understood rules concerning entitlements and responsibilities.

3.24 Informal groups in some countries run saving systems in which members make regular contributions to a central fund and then take turns in gaining access to the "pot." The *iqub* in the Amhara Highlands of Ethiopia mentioned in box 8 is just one example. Depending on group size and the value of contributions, these mechanisms may raise sufficient capital for an individual member to buy an IMT.

3.25 *Variety and role.* Different communities show widely different forms and degrees of community linkages and cooperation, as illustrated in box 8. Some community organizations may be appropriate frameworks for collaboration in the acquisition of IMTs. But care must be taken to minimize conflict on access to a shared IMT, especially during periods of peak demand. One test is to look at the rationale for community groupings and its applicability or adaptability to collaboration in transport. Another is the depth of tradition surrounding them, because groups with a narrow rationale may understandably be reluctant to expand their role into "risky" territory. If they are willing to do so, they may earnestly try to make cooperation for some new purpose work if failure may undermine the main purpose of the group.

Box 7: Examples of Cultural Restrictions on Women and of Change

In *Zimbabwe*, women are rarely seen driving ox-drawn scotch carts.[16] One reason is that they are not regarded as being capable of managing work animals. Yet, owing to extensive male migration, many women do in fact perform "male" tasks, including land cultivation with teams of oxen and steel ploughs.[17]

In *Malawi*, most men say that bicycles are "inappropriate" for women. Yet, in some parts of the country, women do ride bicycles as well as simply pushing them as load carriers. They say that they could also dismount when traveling through a village and generally try to minimize the number of people who see them in the saddle. Second, they add that they would use a bicycle more if more women's models were available.[18]

In *Ethiopia*, a discussion with a peasant farmer about the means of transport may well be interpreted as a conversation about his wife—unless he has a donkey. Such issues as the time and effort involved in bearing loads on the head or back tend to be dismissed on three grounds: *(a)* the general discount applied by men to the time and effort of women, *(b)* compounded by the lack of alternative productive opportunities for women, and *(c)* the lack of cash in the household economy for the purchase of even the simplest, cheapest IMT.

In *Bangladesh*—a Moslem country with correspondingly severe limits on the role and freedom of women—it was always assumed that cultural restrictions on their mobility would make it impossible to use female agricultural extension or health workers in rural areas. Today, after some bold experiments in the southeast of the country, most women extension workers put a motorcycle (in fact, a moped or scooter with a platform for the feet) at the top of their list of priorities. They even joke that, although being a woman extension worker is risky, with a motorcycle you can get out of trouble more quickly!

3.26 *Group size.* Experience has shown that groups of five to a maximum of about twelve households can collaborate closely with a convergence of interest, identity, and responsibility. Above this number, the risk of loss of cohesion and responsibility rises disproportionately. This must be taken into account in relation to *(a)* household income levels and *(b)* the load, range, and cost of any IMT considered for shared ownership. The starting point should be to look for whatever traditional groupings may exist, explore their motivation, and judge whether the purpose and strength of cohesion may be sufficient to justify their adaptation to the acquisition of IMTs. Close consultation with the groups themselves is critically important.

3.27 *Nature of IMTs for group ownership.* The feasibility and ground rules for group ownership are likely to be affected by the complexity and value of the IMT in question. The more complex or costly the IMT, the more difficult it is likely to be to set up a management system for its use, including how to deal with breakages and abuse. This is illustrated by practical experience in pooling resources in agriculture. Most commonly, when farmers are willing to make their oxen available for work on the fields of other farmers, they usually insist on handling the oxen themselves, because they do not want to run the risk of abuse.

Complementary Agencies and Initiatives

3.28 Contextual analysis should pay attention to existing agencies and initiatives that may have a role in promoting IMTs. Four areas of focus for other agencies or projects should be given priority, as outlined below.

Box 8: Examples of Community-Based Organizations

In the Amhara Highlands of Ethiopia, social groupings generally hinge around specific purposes: the parish (usually comprising a number of villages), *mahabbars* for communal worship, *kires* or *iders* as funeral associations, *iqubs* whose members make regular payments to a central fund that is periodically distributed, and so on. For the purposes of collaboration for the acquisition of IMTs, the most promising grouping is probably the *debu*. This is usually a small group of households that agrees to pool both labor and oxen during peak agricultural periods. Equivalent groups exist in most countries.

In *Malawi,* prior to the collapse of rural credit, formal village-based organizations of farmers' clubs existed. These were neither traditional nor spontaneously formed. Rather, they had been "engineered" as groups for the receipt of agricultural credit through the Ministry of Agriculture. An element of joint liability existed because failure to meet a specified standard of credit discipline and repayment jeopardized the future entitlement of the club as a whole. For this reason members were carefully screened and selected to exclude people regarded as being "risky or undesirable" to ensure that those accepted were ready and able to cooperate.

3.29 *Infrastructure projects.* Staff of projects that have been designed to construct or rehabilitate rural roads and other transport infrastructure often realize a need exists to promote wider use of IMTs. Indeed, promotion of the wider use of IMTs adjacent to road projects that have used labor-based methods may be most appropriate because the roads should be in reasonable condition; the employment generated, however, can also be expected to have lifted purchasing power. Projects of this type can, therefore, be receptive "hosts" to separately financed but complementary initiatives.

3.30 *Work on draft animals.* Agencies and projects focusing on the more widespread use of draft animals correctly focus on their role in agriculture. But they sometimes ignore the additional and year-round—potential of animals in transport. Complementary work on, for example, frames for the efficient use of pack animals or the introduction of new or improved carts can therefore be welcomed.

3.31 *Credit.* As noted and covered in more detail in section 6, credit services are likely to be of critical importance in the more widespread promotion of IMTs in many SSA countries. Two main reasons justify exploring existing credit schemes. First, they may offer the prospect of being extended to include credit for IMTs (if they are not already doing so). Second, if some new credit service is required, it will be important to learn from the experience of existing services in management, supervision, costs, and interest rates. In addition, existing credit services may be useful sources of information about community-based organizations and groupings, including their strengths and weaknesses.

3.32 *Mechanical engineering.* Projects and agencies providing technical assistance in small-scale mechanical engineering and production may already be working on IMTs or may be receptive to new designs and ideas as a means of widening the potential product range of their client enterprises. Box 9 illustrates two such agencies in Zimbabwe.

NONPROJECT FACTORS

3.33 The last three of the twelve groups of issues—institutional, policy, and regulatory factors—are likely to be the least appropriate to tackle in the design of specific projects or programs. Rather, they should be included in policy review agendas at the national level, including sector work and policy dialogue

Box 9: Building on Existing Efforts in Zimbabwe

In Zimbabwe in the late 1980s, the Intermediate Technology Development Group (ITDG), an international NGO, mounted an exploratory mission to identify the scope for work on IMTs. Problems concerning the dwindling availability of scrap axles from motor vehicles, which are widely used in the manufacture of scotch carts, were rapidly identified. The Driefontein Mission was found already to be trying to develop a split-rim wheel that could be made by local blacksmithing techniques, whereas the Institute for Agricultural Engineering (IAE) was beginning to draw up its own program of work in this area. Through its association with consultants I. T. Transport, ITDG had already developed a number of low-cost wheel designs including a split-rim wheel design for ox carts that offered a number of advantages over the Driefontein approach and was readily adopted by that mission. In addition, IAE readily agreed to serve as the host for a technical assistance project funded by UNDP to disseminate the technology through demonstrations and training services for some fifty local small-scale engineering workshops, of which about half are continuing to use the technology.[19]

on the part of international development assistance agencies. For the purposes of this paper, the three issues—all of which are closely related—are discussed in summary only.

Institutional Issues

3.34 Many national institutions and agencies may potentially affect the context for promoting IMTs. They range from National Planning Commissions (or the equivalent) through such line ministries as transport, industry and commerce, agriculture and livestock, departments of roads, cooperatives, and customs at the national level down to local government units responsible for such functions as the maintenance of rural roads and licensing of transport services. At the design stage for projects or programs, it will usually be sufficient to note strengths and weaknesses among them, identify gaps or hurdles that they impose, and send the appropriate signals upward for the attention of sector work.[20]

Regulatory Issues

3.35 Regulatory frameworks can present difficulties. One of the main concerns of regulatory authorities is safety, including the roadworthiness of vehicles and, hence, the safety of their passengers as well as other road users. New or adapted IMTs can raise questions on whether to relax regulations (risking ever less safe vehicles coming into use) or to leave them in place to provide a yardstick of responsibility (yet with judicious application of regulations to curb only the most potentially dangerous violations).

3.36 One example is provided by the *itaen* in Thailand. As noted in appendix I, *itaens* are officially categorized as "agricultural work vehicles" and should not carry passengers; however, often other farmers want to carry their produce to nearby markets and bring other things back. Local police understand the role they play. Indeed, without *itaens,* not only would the passengers be in a difficult position but even those with the cash to buy the vehicles may not have found it viable without being able to earn some extra income through such informal passenger and freight transport services. It is for this reason that the authorities generally adopt a policy of benign connivance.

Policy Issues

3.37 Rarely do formal policy statements cover rural transport in as much detail as the mainstream areas of strategic road, rail, air, sea, or even inland water transport. But several dimensions of policy can directly or indirectly affect promotion of IMTs. Direct influence includes policies regarding importation of complete IMTs, kits for local assembly, or components. National policy with respect to import licenses, for example, can have major effects, as illustrated in box 10.

Box 10: Bicycles in Malawi: The Effect of Prices on Demand

Bicycle imports to Malawi in 1965 were just short of 23,000. This rose to more than 38,800 during the next five years—an annual growth rate of 11 percent (about four times that of the population). If this had continued, the level of imports by 1984 would have been nearly 170,000; however, restrictions on the number of import licenses issued led to a cartel of suppliers and the rise of prices, as reflected in box 1. The effect was a decline in sales to as low as 2,300 in 1984. Not until 1991–92 was the Transport Planning Unit able to bring about a policy shift to increase the number of licenses issued to stimulate competition. It was this that led to the real decrease in bicycle prices mentioned in box 1. Almost immediately, sales of bicycles again rose.[21]

3.38 What often seems to be missing in policy decisions about import duties and licenses is an analysis of net benefits. IMTs, in complete or knocked-down form, or components such as bearings and axles around which IMTs can be locally manufactured, are not sizeable imports. High prices owing to import duties, licensing restrictions, or any other reason can have a crushing effect on sales owing to the slim purchasing power of the rural poor. Yet, as sales stay low, high import duties will generate little revenue and save little foreign exchange. The more important issue is to analyze more comprehensively the role of IMTs in stimulating growth in production and economic activity in relation to what they cost in foreign exchange.

3.39 Indirect influence includes policies affecting the development of industries that are or might become involved in the manufacture of IMTs. It can also include policies on the distribution and marketing of agricultural inputs and outputs. Most inputs can be carried the last small part of their journey to the farm by IMTs, as can most farm outputs that begin their journey into the marketing system.

ACCESS ISSUES

3.40 Before going on to define needs and set targets, the designer/planner should pause and take stock of access problems, referring back to the outline of the decision-making model in section 2 and taking stock of the possibilities of nontransport solutions as mentioned in the next section.

4. DEFINING NEEDS AND TARGETS

DEFINING THE PROBLEMS

4.1 At this stage, the decision-making model brings together the contextual analysis and consideration of access issues and norms to narrow down the problems to be tackled. The definition of the problems will permit specification of objectives and targets for work to promote IMTs. More than one approach can be taken. One is the Logical Framework Approach (LFA), which is extensively used by international development assistance agencies,[22] which involves constructing a "problem tree." The roots of the tree are the causative problems, which, like roots, may run to several different levels. These feed into the trunk of the tree, representing the core problem. The tree has a number of branches, the effects of the problem structure on, for example, production and levels of living. Figure 4.1 illustrates a problem tree covering the wide field of inadequacy of rural transport systems in SSA.[23]

FROM PROBLEM TREE TO OBJECTIVES

4.2 The solution to the core problem becomes the long-term development objective of a project or program. This is usually regarded as something to which an individual intervention can contribute but cannot wholly achieve on its own. This gives room for a more modest immediate objective that is expected to be achieved if the various outputs are produced according to design.

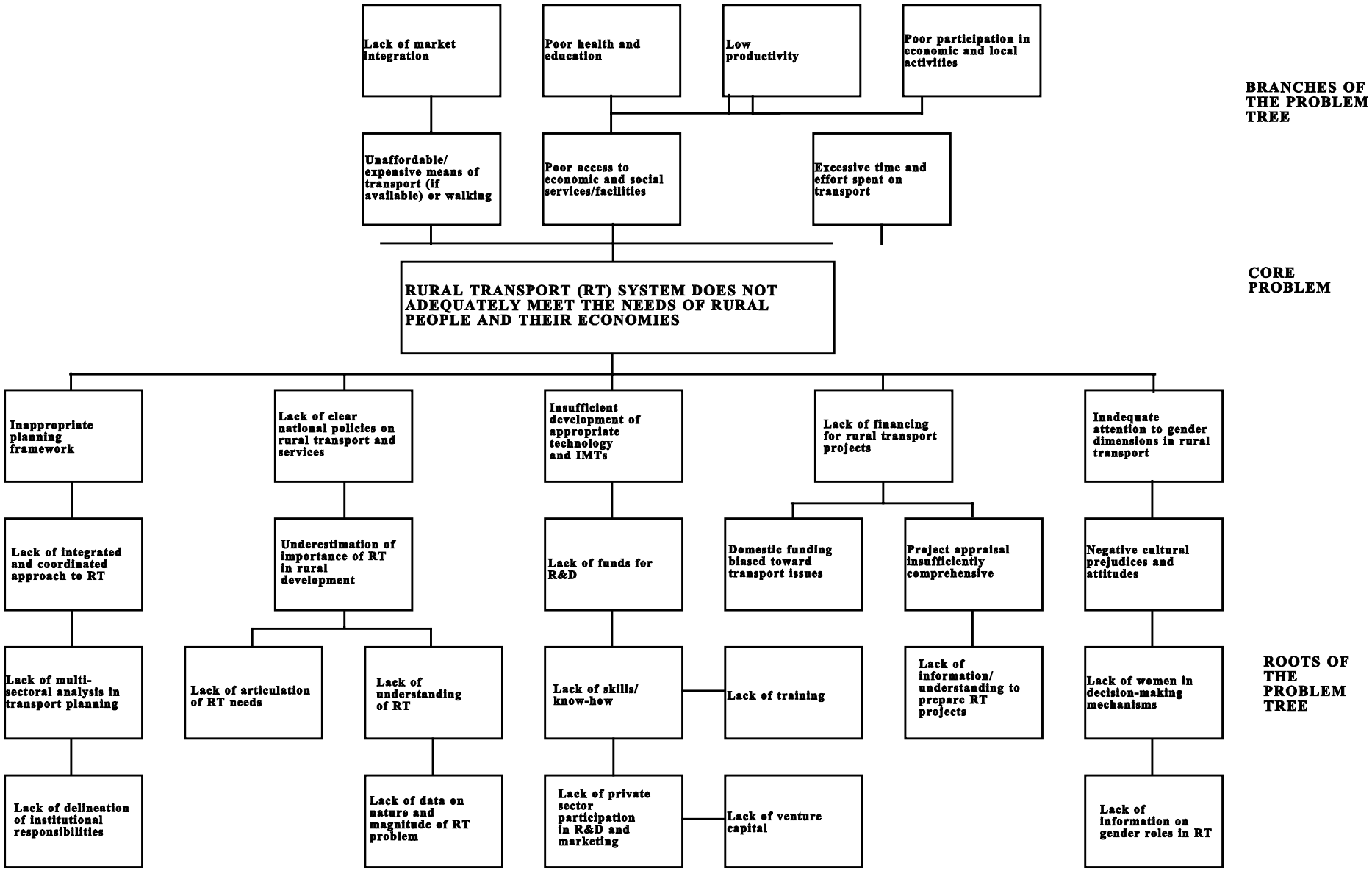
4.3 As a relatively new field of intervention, efforts so far to promote IMTs have usually been on a relatively small scale—often as components of "mainstream" development projects. Indeed, until more experience has been gained, this is advisable. As a component of broadly based rural development, the problem tree for IMTs and rural transport must usually be integrated with that for the project as a whole. The specific objective relating to the promotion of IMTs will then probably take the form of a component output contributing to the achievement of the overall immediate objective. If, on the other hand, work on IMTs does not substantively contribute to that of the project as a whole (such as an IMT component as a pilot exercise attached to a major road construction or rehabilitation project), the designer/planner will have more liberty to specify a discrete problem tree and, hence, discrete objectives, outputs, and activities.

TRANSPORT AND NON TRANSPORT SOLUTIONS

4.4 Interventions to promote IMTs must be based on what is possible in each project or program area. It would be inappropriate to conclude, for example, that the solution to problems of access to schools, health facilities, markets, water and fuel supplies, and so on should be to bring these facilities and services closer to those who need them. Such a conclusion would be hollow if the prospects of achieving the solution were slim. Much will depend on the breadth and scope of intervention possible in the project or program in question and the range of other initiatives that may operate in the same geographical area.

4.5 If the promotion of IMTs is to be pursued as a component of a highway project, for example, few prospects are likely to exist for improving access by means of new or relocated services and supplies. On the other hand, if work on IMTs is contemplated as part of a broader rural development intervention with components for health, education, agricultural marketing, and the like, a more integrated approach may be possible. In either case, it will be important to *(a)* understand the nature and effects of access problems, *(b)* if possible, measure them, and *(c)* take stock of other non transport opportunities to tackle them.

Figure 4.1: Illustration of a Generic Rural Transport Problem Tree[24]



Source: International Forum for Rural Transport and Development

COSTS AND PREDICTION OF BENEFITS

4.6 *Costs.* A common trap in the design of innovative pilot exercises is that of allowing the motivation to succeed to take precedence over keeping in touch with reality. Providing generous budgets may well increase the prospects for success. Certainly, startup costs can be expected to be relatively high. The two key issues are *(a)* to ensure that this does not lead to major distortions and *(b)* to see how success at the pilot stage may be replicated cost-effectively. Costs can be justified only by the benefits likely to be derived (for the individual household as well as for a project). Contextual analysis must, therefore, feed into predicting the nature and magnitude of benefits. Beyond this, the confidence with which benefits can be predicted will affect the intensity of effort required in performance monitoring (see section 6).

4.7 *Distribution of benefits.* The distribution of poverty among poor communities is never uniform. This is likely to mean that the benefits derived from development projects will also not be evenly distributed. In extreme cases, it may be necessary to design different types of intervention—including possibly different types of IMTs—targeted on different strata among beneficiaries to avoid sharpening polarities in income distribution. Again, this is something that the designer/planner must expect the contextual analysis to reveal.

Timescales

4.8 Several categories of factors and issues in the contextual analysis will affect the speed with which people will respond to initiatives to promote IMTs. But in the absence of any previous location-specific experience, judgments about the timescales for the response to IMTs and, hence, the realization of full benefit streams are likely to be among the most difficult to make. Indeed, this is another reason that efforts to promote IMTs are best contained as components within larger projects or programs. It will only be with more experience that it will be possible to predict benefit streams with some confidence and, hence, to undertake financial and economic analyses of rates of return.

4.9 *Timescale of response to IMTs.* Efforts to reduce the timescales of response to unfamiliar IMTs often hinge on reaching a minimum critical threshold of credibility and confidence. In fact, it is only when that threshold has been achieved that it becomes possible to gauge the real effective demand for IMTs. Box 11 summarizes experience in introducing cycle trailers in Sri Lanka.

4.10 *Timescale on technology and supply.* The most common types of intervention for IMTs are *(a)* modifying the design, components, or manufacturing process for a familiar means of transport in the interests of quality, cost, or performance and *(b)* introduction of some means of transport that is new to a particular country or area. In the first case, the justification will probably rest on the proven strength of demand for the IMT in question. As such, the principal intervention should focus on providing the minimum necessary assistance—in substance and in time—for manufacturers and assemblers to make the necessary adjustments. In the latter case, the project designer/planner must be clear about targets and timescales. Specifically, (as box 11 has illustrated) the demand for any new or different IMT is not likely to emerge overnight. It is therefore legitimate to intervene in the technology and manufacturing arena to produce physical examples—even to subsidize workshops and train their staff—to such an extent and for such time as may be necessary until growth in effective demand can take off.

4.11 *Timescale on cultural constraints.* The time—even the type of work—required to overcome cultural barriers is difficult to predict. Rarely can cultural barriers even be addressed as directly as, for example, technological, economic, or even policy issues. The reason has to do with the principles, beliefs, and value

Box 11: Toward the Threshold for "Takeoff" of Cycle Trailers in Sri Lanka

Bicycles have long been popular in Sri Lanka, both as personal transport and for carrying loads. On this basis, efforts began in about 1990 to introduce cycle trailers for the first time for higher load capacities for journeys of up to about 15 miles. The cycle trailer has three main uses. First, it is used commercially as a mobile shop or for transporting goods to and from local markets. Second, at the household level, the trailer reduces the workload in carrying fuel and water (in the process somewhat shifting the division of labor in such tasks from women to men). Third, it is used as an ambulance, carrying sick people directly to health facilities or at least to a main road in search of a motorized vehicle.

The effort had two dimensions: *(a)* to test the appropriateness of the cycle trailer to meet user needs and *(b)* to prepare for their domestic manufacture by small-scale rural workshops. Both efforts had constraints. First, the cycle trailer was unfamiliar. Second, workshop owners were reluctant to gear up to produce a device for with no proven demand. For approximately the first two years, only a handful of cycle trailers were in use. By early 1994, forty were in use. By mid-1995, the number of cycle trailers in common use had reached 152. The original designers of the intervention point to three factors contributing to this growth of demand: *(a)* growing familiarity with the device among potential users, *(b)* adaptation of manufacturing techniques among small workshops, and *(c)* incorporation of lending for trailer purchase in the credit services of donor-financed rural development projects. It remains to be seen what the continuing growth of demand for trailers will be, first in the limited geographical areas in which they were introduced and second, from these examples of practical experience, how awareness and demand might spread more widely.

systems that lie at the heart of cultural practices and, as shown in section 3, often cannot be changed simply by means of demonstrable physical or economic benefits. Cultural constraints can usually be overcome only when people reach their own conclusions that it is in their best interests to change. Here again, the concept of reaching a minimum critical threshold comes into play.

PROJECTIONS OF SUSTAINABILITY

4.12 Costs, benefits, and timescales must be considered jointly in defining needs and setting targets to assess the inherent sustainability of any intervention and the time required and the conditions that must be met to achieve sustainability. Uncertainties surrounding some aspects of both the contextual analysis and the setting of targets may often preclude a definitive judgment of sustainability. If so, it is advisable to use "soft system" analysis to identify strengths, weaknesses, opportunities, risks, and threats in what is being planned. This can be translated into key issues to include in the performance monitoring.

5. DEMAND AND SUPPLY ANALYSIS

THE FRAMEWORK FOR ANALYSIS

Overview of the Triangular Framework

5.1 Figure 2.1 shows how the various factors and issues taken into account in the contextual analysis can be rearranged in a triangular analytical framework. Environmental factors form the base of the triangle, which is consistent with their being the first to be considered in the contextual analysis. Supply and demand issues then form the two sides. Complementary initiatives are shown along each side of the triangle because they may affect any or all of the three sides of the analytical framework.

5.2 Access is shown in the center of the triangle. Answers to questions raised in section 2 about who needs access to what, for what purposes, with what frequency, and with what payloads will affect the demand for IMTs. The environment will affect the identification of the most appropriate types of IMTs. Together, these factors set the market boundaries for the supply of the "right" IMTs and, hence, technological and production parameters.

Limitations in Demand and Supply

5.3 *Demand.* As noted in section 2, the statement to be completed here is: "the*(a)* demand for and *(b)* supply of IMTs is limited because . . ." The contextual analysis can be expected to identify the range of factors constraining demand. The more that exist, the more difficult it will be to translate potential into effective demand. In the case of a country (or region), for example, with a poor resource base, deep and extensive poverty, few prospects of increasing rural production, weak traditions for community groupings for collaboration, and deep cultural prejudices against IMTs the analysis may conclude that so much must be overcome that no immediate work on promoting IMTs can be justified. Instead, intervention on other fronts entirely may be necessary to reduce the gap between potential and effective demand.

5.4 *Supply.* Only if a reasonable prospect of translating potential into effective demand exists will it be worthwhile to complete the second statement relating to the supply side. Here again, if too many constraints (lack of entrepreneurial flair, local-level workshops, skills, materials, essential imported components, and the like) exist, overcoming these may be necessary before design of an intervention geared specifically to the promotion of IMTs is possible.

Releasing Demand and Supply

5.5 *Demand.* If the limitations on demand or supply are not too great, the next step is to complete the following statement: "*(a)* the demand for and *(b)* the supply of IMTs would increase (if possible, indicating by how much) if . . ." This amounts to a sensitivity or elasticity analysis that can most easily be illustrated in regard to prices and costs on the demand side. The magnitude of effective demand for a given IMT will obviously be affected by its price to the purchaser and its operating costs in use. The effect of prices on sales of bicycles in Malawi is clear from box 10. The results of household modeling outlined in section 3 should also be taken into account. If changes in cropping or other production patterns hinge on the acquisition of an IMT, the analysis and a possible intervention may become more complicated.

5.6 *Supply.* Again, only if constraints on the supply of IMTs are not too numerous or fundamental, will it be worthwhile exploring how to release them. The issue here is not so much a matter of sensitivity or elasticity analysis but rather the identification of critical constraints that might possibly be tackled. If good prospects on the demand side exist for a particular IMT, if local workshops exist with the potential for making or assembling them but the critical constraint is the availability or financing of, for example, welding equipment, the intervention necessary becomes clear and simple. Another example may be the supply of working capital to small workshop enterprises. Alternatively, in a country with medium-scale manufacturing capacity, the issue may be establishing sufficient confidence in the magnitude of likely demand to justify jigging and tooling up to meet a sales price target. Here, it may be sufficient for the intervention itself to guarantee a minimum order (e.g., for distribution in a demonstration project), especially if the analysis of demand suggests a clear price threshold at which demand will take off.

6. ACTION PLANNING

OVERVIEW

6.1 Once the targets for a new intervention have been set, the final stage is the detailed planning of action. Using the LFA, this means specifying *(a)* the outputs expected (such as numbers of manufacturers and assemblers trained and IMTs produced, acquired, and in use) and *(b)* the activities required to produce those outputs. Action planning will also include consideration of how and by whom the required activities can best be undertaken. In addition—depending on the degrees of uncertainty generated by the contextual analysis, the consideration of accessibility norms, and the setting of targets—action planning must also include measures to track progress and effects during implementation so that corrective action can be taken where necessary. In sum, the three main dimensions of action planning are as follows:

- *Practical content.* This involves specification of outputs and activities for a planned intervention for wider promotion of IMTs. The majority of cases will provide a choice of two broad thrusts: *(a)* adaptation (for improvement or cost reduction or both) of existing (more or less familiar) IMTs and *(b)* introduction of new (different or unfamiliar) IMTs.

- *Management framework.* The design of an appropriate management framework will depend on three principal factors: *(a)* the nature of the intervention (as summarized above), *(b)* the possibilities of adopting an integrated approach, learning from wider deeper experience about what might be appropriate, and *(c)* the experience, expertise, and institutional capabilities that may exist in the country or region concerned.

- *Monitoring and evaluation* (M&E). M&E work is critically important on three main fronts but has generally been among the weakest aspects of efforts so far. The first most direct role of M&E is as a management tool. The second is to generate information that will facilitate replication of success on a wider scale. The third is to feed into the issues outlined in the contextual analysis with respect to policy, institutional responsibilities, and regulation.

ADAPTATION AND IMPROVEMENT OF EXISTING IMTS

6.2 When the purpose of an intervention is principally to adapt or improve an IMT that is already familiar by being in widespread use, the decision-making model can be applied more easily because *(a)* only a restricted number of factors need to be considered in the contextual analysis and *(b)* action planning will focus principally on the manufacture and assembly of the IMT in question.

Priorities in Contextual Analysis

6.3 In the contextual analysis outlined in sections 2 and 3, only two of the four primary factors need to be considered. The first is infrastructure stocks (in case the provision of more or more appropriate infrastructure might encourage more widespread use of an existing IMT). The second is economic, specifically the analysis of local market conditions affecting demand for IMTs and economic factors at the level of individual and groups of households. Among the six economic, industrial, and social factors, cultural factors are less likely to be relevant for IMTs that are already familiar. Of the remaining five factors, emphasis should be placed first on technology and supply issues and financial factors (particularly the financing of any new production technologies or components. In addition, consideration of community organization issues (for the acquisition of IMTs by potentially larger numbers of people) and the potential role of complementary agencies and initiatives in contributing to or supporting a new intervention may be relevant.

6.4 The specificity with which projects or programs for promoting IMTs can be designed hinges on the issues set out in section 5, that is, the conditions under which the potential can become effective both on the supply and demand sides. Only when a real demand for different IMTs seems probable will confidence exist in planning assistance.

Action Planning for Manufacture and Assembly

6.5 Action may be needed on four main fronts to help existing enterprises adapt and improve IMTs: training, materials and components supply, finance, and business development, as summarized below.

6.6 *Training.* The introduction of new production technologies and components may call for specific training in their use. In addition, an intervention of this type may also be an opportunity to provide training not just on new production technologies and processes but on a wider front, including upgrading staff skills even in the technologies already being used. The key requirements of the designer/planner are as follows:

- *Analytical profiles* of existing manufacturers and assemblers and their staff skills to reveal the nature and extent of any training required

- *Review* of existing training facilities, including their capacity, quality, and cost to explore the relative cost-effectiveness of direct training assistance to targeted enterprises or indirect assistance by means of upgrading existing training services

- *Financial analysis* of the ability and willingness of manufacturers to pay for training services

- *Modalities for the delivery of training,* with preference given to industry associations (where they exist) as the providers of training services in the long-term interests of sustainability.

6.7 *Materials and components supply.* The designer/planner must ensure that the introduction of new production technologies and components will be sustainable in regard to continuing supplies of materials and components. For example, the substitution of modern axles with ball or roller bearings for wooden or otherwise inferior bearings is eminently feasible in a project context. The key issue is whether demand will be healthy and continuing for such innovations beyond the project and manufacturers will be able to procure them easily without project-led assistance. More generally, introducing new materials in the manufacture of IMTs—whatever their merits—is pointless unless adequate continuing supplies of such materials at reasonable prices to meet demand exist or are likely.

6.8 *Finance.* Section 3 has mentioned the broad options of project financing or the introduction of subsidies. It has also urged caution in choosing either to avoid creating distortions. In the case of adaptations and improvements to existing IMTs the need for financial assistance is likely to be modest and limited to two main areas. First, assistance may be called for in the initial procurement of the materials, components, machinery, and equipment that may be needed for adaptations and improvements. Second, assistance may be needed in market testing, including provision of financial support and backing to targeted enterprises until such time that the adapted and improved IMT has gained market approval.

6.9 *Business development.* This category of potential assistance is similar to the wider training mentioned earlier. Intervening with manufacturers and assemblers on some specific front may also provide an opportunity to explore what scope may exist to help enterprises develop their businesses more generally, including internal financial and staff management, work planning, external market research, and promotional work. Section 3 of this paper has already pointed to the apparent impasse between the relatively low levels of IMTs used in SSA on the one hand and the lack of marketing initiatives for IMTs on the other. A project or program setting may provide an appropriate opportunity for such work, with the intention of not only actively promoting effective demand but also demonstrating to manufacturers and assemblers what can be done.

INTRODUCTION OF NEW IMTS

6.10 Introducing completely unfamiliar IMTs will present the designer/planner with the most formidable range of issues to address. Notwithstanding the rigor with which any contextual analysis can be undertaken, new IMTs will be circumscribed by uncertainties and speculation. Accordingly, both the scope and expectations of any intervention should be correspondingly cautious. This is why it will be most appropriate to design interventions as pilot exercises in the majority of cases.

Priorities in Contextual Analysis

6.11 For the introduction of new IMTs, the priority for intervention should be potential users. Only later, if the appropriateness of an IMT can be demonstrated and if better estimates can be made of the conditions under which effective demand might develop, will exploring possibilities for the local manufacture and assembly of the IMT in question be appropriate. Similarly, if adjustments in policy, institutional, and regulatory frameworks are required to stimulate demand, these can be tackled later (as nonproject issues) when sufficient practical experience exists on which to base specific proposals.

6.12 On this basis, the contextual analysis should pay equal attention to all three of the environmental factors mentioned in sections 2 and 3 of this paper, namely topography, infrastructure stocks, demography and the analysis of local economic issues. Among the six economic, industrial, and social factors, technology and supply issues are unlikely to be relevant until after the successful completion of a pilot exercise; however, all of the other five factors must be given thorough attention in the contextual analysis. Cultural issues, for example, may well apply to new IMTs: how do they fit? who will use them? for what purposes? and so on. Community organization issues may also apply, depending on the type of IMT to be introduced and how well it can share the IMT as an investment. Financial factors will almost certainly be important; the potential role of complementary agencies and initiatives should always be taken into consideration.

Action Planning for New IMTs

6.13 As noted in section 3, however appropriate—apparently or actually—a new IMT may be to alleviating transport problems, practical experience has confirmed that effective demand will not rapidly or easily manifest itself. Rather, the three main stages in the process—testing, going to scale, and regularization of access (or handover)—are summarized below. Throughout, the process should be punctuated by the question of whether there is or is likely to be a genuine demand for the IMT being introduced.

6.14 *Testing.* The first stage for a new IMT is to introduce a limited number of samples for the purpose of testing their appropriateness to a particular physical, social, and economic context. This stage may show that some minor adaptations should be made to suit prevailing conditions, user preference, and the nature of the transport role to be performed. The first batch of such IMTs do not have to be manufactured or assembled locally; they can simply be shipped in from elsewhere.

6.15 *Going to scale.* Once sufficient confidence exists that a particular IMT is appropriate in a particular setting, the next stage is to aim for the minimum threshold for credibility and confidence illustrated in box 11. Gauging the precise numbers of IMTs needed to reach that threshold is a matter of judgment on the part of the designer/planner and will depend on *(a)* the geographical area to be covered, *(b)* population density and, hence, *(c)* the visibility of the IMT in question. In pursuit of the threshold target, special arrangements may be necessary to place IMTs in the hands of users. Four main options are available, as summarized below, the choice depending on the judgment of the designer/planner.

- *Loan.* Where poverty is deep and extensive and serious hurdles must be overcome to reach some critical threshold, IMTs can simply be loaned to users for a free trial for a fixed period. In return, users may be asked to record their reactions to the IMT in question in terms of carrying capacity, ease of use, reliability, and the like.

- *Hire/purchase.* If potential users react well to some new IMT and want to acquire it permanently, it may be possible to arrange a form of hire-purchase by which they would make regular (and affordable) payments. This is different from credit arrangements and will usually mean that the project or program in question should carry both the financial responsibility for the numbers of IMTs distributed as well as supervision of hire-purchase payments. Questions of the application of interest charges on outstanding capital will mainly depend on the circumstances of the project, the targets set for minimum threshold and the rate at which the promotion process should remove any distortions surrounding intervention measures.

- *Credit.* At this stage, setting up any project-based credit service specifically linked to the distribution of IMTs is usually unrealistic. Nevertheless, if credit services are already being offered from some other source and if they can be adapted to accommodate lending for IMTs, they become an option for the acquisition of IMTs by the target group (see also below.)

- *Sale.* The outright sale of new IMTs in a pilot setting will usually be the least likely arrangement for people who are both poor and unfamiliar with the device in question. Nevertheless, the contextual analysis should be expected to reveal the likely feasibility of this option in relation to needs and disposable incomes.

6.16 *Regularization of access to IMTs.* As noted earlier in this paper, the designer/planner should appreciate that any external intervention runs the risk of introducing some form of distortion in local conditions. For testing and going to scale, it is not only acceptable but probably inevitable that some form of distortion will be necessary. The key questions are the extent of those project-induced distortions (as distinct from more widespread policies with respect to prices and subsidies affecting manufacturers or assemblers, users, and potential users of IMTs) together with how and at what rate they can be removed. The acid test of the appropriateness of any IMT is the growth of genuine demand under real conditions once the minimum threshold of credibility and confidence has been reached.

CREDIT AS A TOOL IN THE PROMOTION OF IMTS

6.17 This paper makes several references to the probable need for credit services linked to the promotion of IMTs; however, the design and management of rural credit services is a technical subject in its own right and for this reason credit is given separate treatment here.

Clarity on Credit

6.18 Clarity about the role of credit in helping people to acquire IMTs is of primary importance. The financial viability of a credit service hinges on this clarity of purpose. If, for example, some form of credit service is established but is subverted by some high-order goal (such as simply the sheer numbers of IMTs distributed), loans can rapidly be written off as grants and the viability of the service placed immediately at risk. In this context and as noted above, the test of appropriateness of an IMT is not just its engineering and technical performance but its affordability, with or without viable credit services, under real conditions. The risks of assigning lower priority to the viability of credit services are illustrated in box 12.

Box 12: Credit Subversion in World Bank Projects

A review of Bank-funded agricultural projects supported by credit services undertaken by the Operations Evaluation Department in 1986 identified five projects with ex post internal rates of return in excess of their appraisal estimates (all in excess of 15 percent); however, four of these projects had loan default rates in excess of 40 percent in their credit components. That is, in terms of the activities that were being funded through credit, all five projects were highly successful. But in terms of the viability and sustainability of their credit components, four of the projects were failures. Nevertheless, the projects were all judged on their primary (agricultural) objectives and not on the sustainability of their credit components.[25]

6.19 *Benefits justifying credit for IMTs.* The question for the designer/planner is whether the value of benefits derived from investments in IMTs are likely to outweigh the opportunity costs of the funds involved (in terms of capital funds from credit services as well as repayment obligations in the perception of borrowers). For example, if high rates of return can be projected for investments in transportation infrastructure, they may justify providing funds to relieve second-order obstacles to the wider use of IMTs, such as low purchasing power precluding spontaneous "off the shelf" purchases. In other words, if the infrastructure is there, if production and marketing opportunities exist to be exploited, but if the residual problem is the unaffordability of IMTs from current income, credit support may be a legitimate way of lubricating the system to realize the full range of potential benefits. On the other hand, expecting rural households to incur cash expenditures on IMTs—albeit through credit—purely, for example, to relieve the drudgery of women's workload may be unrealistic. Some financial payoff will have to come from IMT use by devoting the time and effort saved to some more productive activity. This is where the household modeling work outlined in section 3 will come into play.

Options in the Provision of Credit

6.20 The two cost categories that have most often been underestimated in the design of credit services for extensive but small loans are commercial risk and administration. Indeed, given the riskiness of extensive lending to an untested clientele, the high transaction costs in small-scale lending to spatially dispersed borrowers, the lack of collateral among borrowers, and sometimes interest rate restrictions driven by policy, it is not surprising that mainstream commercial financial services rarely venture into this territory. These issues need rigorous attention in credit service design. Four broad options are reviewed below.

6.21 *Publicly owned credit services.* This option is *not* recommended. Such services tend to suffer all of the problems that have dogged other state-owned commercial enterprises, including high civil service employment costs, overstaffing, lack of commercial discipline, rent-seeking and "queuing" costs owing to credit subsidies, and high costs associated with the monitoring and supervision of small loans. Beyond these problems, experience has shown that negative peer group pressure can actually occur among borrowers who fail to see any individual or collective responsibility to repay loans issued by the government.

6.22 *Commercial targeted credit services.* Experience in using commercial financial institutions to serve a target clientele have shown mixed results but on balance are also generally *not* recommended. Although their staff costs have been lower, their earnings have generally not covered loan appraisal costs. They cannot usually apply their collateral and business plan requirements in appraising loan applications; even when collateral has been provided, it has sometimes been politically unacceptable to foreclose on bad debts.

6.23 *NGOs and semiformal organizations.* Credit services provided by NGOs and semiformal organizations have kept administrative costs in check, some relying on low paid or semivoluntary field workers to maintain their presence at the village level. Nevertheless, startup costs can be high and the contradiction between welfare objectives and commercial viability in providing credit can lead to loan loss problems. To minimize the need for a staff-intensive system of credit supervision, many NGOs have adopted the joint liability group lending approach. This relies on peer pressure to maintain credit discipline. It works best, however, only when borrowers rely on continuing access to new credit (for example, on an annual basis), hence, the need to maintain repayment performance throughout the group to preserve collective entitlement for future loans. These mechanisms may be difficult to apply to "one-off" lending for the acquisition of IMTs requiring sizeable investments for which repayment periods will be correspondingly longer.

6.24 *Traditional credit mechanisms.* Reliance on existing informal credit mechanisms through local moneylenders, traders, and the like has so far been more studied and discussed than implemented. Providing additional funds to these entrepreneurs would entail virtually no administrative costs. Moreover, because borrowers often depend fundamentally on moneylenders and traders, such traditional services are likely to show healthy rates of recovery. Two main potential drawbacks to such an approach exist. First, in view of the often high interest rates demanded (up to 20 percent per month in South Asia, for example), endorsing what may be seen as the usurious practices of those who are already regarded as having too much economic power at the local level by giving them access to additional external funds that make them still better off risks political unacceptability. Second, it may be difficult to monitor the end use of loan funds to ensure that they go toward the desired end of promoting the use of IMTs. Box 13 gives one illustration of this approach, albeit from South Asia.

Box 13: Formal Credit through Informal Moneylenders

In *Sri Lanka,* the publicly owned Bank of Ceylon (BOC) has a program to increase the availability of loans to small rural enterprises through existing informal sources. This program makes a Rs.200,000 (US$3,900) line of credit available to moneylenders who *(a)* have a good track record with the bank, *(b)* have facilities for securing cash, *(c)* are able to provide collateral to the bank, and *(d)* are of proven integrity and exemplary character. An Rs.50,000 (US$1,000) line of credit is available to agents who are recommended by a local NGO that commands respect in the area and has some experience in informal lending. Security is provided by mortgage or other collateral acceptable to the bank; personal guarantees of two local persons of some good reputation are also required. The credit is available to the disbursing agents at 18 percent a year accruing against daily balances. The agents in turn lend these funds at not more than 35 percent a year. By the end of 1992, BOC had 3,589 agents and an outstanding loan portfolio of just over Rs.300 million (US$5.8 million).

Lessons Learned

6.25 From the long and broadly based history of credit in support of development—and notwithstanding the rationale and justification for such services—two fundamental lessons learned are that *(a)* they need careful design and *(b)* they are often more expensive to administer than ex ante appraisal estimates. It has proved especially difficult to reconcile the twin objectives of high (project-determined) lending targets on the one hand and viability and sustainability on the other. The designer/planner of credit services for IMTs must ensure that the pressure to lend does not take precedence over rigor in the management, supervision, and, hence, viability of credit. Other lessons learned are summarized in Box 14.

Box 14: Lessons Learned from Experience in Rural Financial Markets

1. Work directly within the community and, to the greatest extent practical, use local resources to fund the effort. Giving the beneficiaries a stake in project sustainability by putting local resources at risk has a number of positive incentive effects for the long-term success of credit projects.

2. Provide credit access in a timely manner and with a minimum of fuss to the borrower. Excessive application of project effort to monitoring the use of loan funds tends to create distractions and, given the inherent fungibility of money, seldom ensures that project resources actually buy what they are intended to buy. If targeted investments are not the best ones available to borrowers, then loan funds will be used in some other manner, regardless of project regulations.

3. Attempt to recover the variable costs of lending by charging interest rates that cover lending costs. Subsidized interest rates undermine the commercial viability of credit projects and motivate rent-seeking behavior that makes the use of loan funds for their intended purposes less—not more—likely.

4. Maintain repayment discipline and use innovative lending methodologies that assess and reduce risk in cost-effective ways. Such innovations include:

    a. Transparent use of local resources at risk (by employing locally generated savings in the loan fund)

    b. A graduated approach in which initial loans to each borrower are small and larger loans are made available only after borrowers have shown their ability to repay loans

    c. Peer pressure to ensure repayment by either explicit joint liability or by publicizing defaulters

    d. Local knowledge in the appraisal process by requiring the cosignature of important local persons who know or can vouch for the borrower

    e. Retention of ownership of goods purchased by the loan until it is paid off (i.e., lease/purchase).

Key Questions in the Design of Credit for IMTs

6.26 The choice between small-scale loans channeled through informal and semiformal institutions compared with larger loans through commercial institutions should be predicated on existing conditions in the area and the specific goals of the project or program in question. Key questions to take into consideration include:

- *How expensive is the IMT technology that is being encouraged, relative to savings and income levels among the target group?* If the cost of an IMT requires loans larger than the average annual income of the target group, longer loan terms are implied. But longer loan terms correlate with higher loan default rates. Project design should, therefore, seek alternatives to individual loans. Leasing is one such option. Group lending is another.

- *How well developed is the market channel for IMT technologies in the target area?* Are there competing suppliers of the technology being promoted? If so, commercial credit to suppliers may be a feasible option. Financing existing traders can yield economies on information costs, because traders in rural areas typically know the cash flow characteristics of their buyers. Competing suppliers have an incentive to provide goods on credit because this helps to expand their market.

- *What are the characteristics of formal, informal, and semiformal credit arrangements?* What types of loan programs exist and how successful have they been in terms of outreach and sustainability? What are their costs and what is the likelihood that they would have an interest in participating in a loan program for IMTs?

6.27 Box 15 illustrates credit operations for IMTs, including a cautionary example of a highly prescriptive and ill-judged initiative as well as two more successful examples building on experience and track record.

Box 15: Examples of Credit for IMTs in Sub-Saharan Africa

In *Ghana*, the Bank-financed Northern Regional Pilot Scheme illustrates the dangers of a supply-driven, prescriptive approach as distinct from responding to effective demand. The pilot sought to promote the use of bicycle trailers and improved farm carts among rural women. It provided wage employment to women in a feeder roads project. Two local NGOs were engaged to mobilize women workers, promote and sell the vehicles, and manage an obligatory savings scheme. Some 5 percent of women's wages were assigned to a public savings fund (scheduled to buy trailers and carts for local credit purchases by end users) and a further 20 percent to a personal savings fund in the name of each worker. But the workers objected to the obligatory deductions from their wages (notwithstanding the protection this offered to expropriation by their husbands). The personal saving scheme was rapidly abandoned, whereas the smaller public fund was reserved exclusively for the workers themselves for the purchase of trailers and carts. But many of the women did not even own a bicycle (making a trailer effectively only a hand cart). Moreover, the two NGOs—with little experience in financial management—had difficulty in maintaining accounts, leading to distrust among the workers.

In *Zimbabwe*, the Agricultural Finance Corporation (AFC) provides credit for a wide range of farming-related activities. Farmers seeking animal carts must pay 25 percent of the purchase price themselves, with the balance available from AFC at 21 percent a year for three to five years. AFC retains the title to the cart until the loan is repaid. This successful service is available principally in relatively prosperous areas.

In *Malawi*, a UNDP/International Labour Office (ILO) Pilot Integrated Rural Transport Project (PIRTP) is drawing on an existing government-sponsored program, the Smallholder Agricultural Credit Administration (SACA) as an avenue for improving access to IMT finance for its target group. SACA has a history of successful lending to village-based Farmers' Clubs, relying on group lending and peer pressure in the context of a recurrent need for annual credit and, hence, high rates of recovery. PIRTP and SACA staff work closely together in identifying potential borrowers for relatively sizeable investments in IMTs, evaluating them for creditworthiness, helping them fill out loan applications, and enforcing requirements for either group membership or endorsements by prominent local people. Loan terms and conditions are adjusted to take account of borrowers' ability to repay, although always at an interest rate that maintains the real value of the loan fund.

MANAGEMENT FRAMEWORK

6.28 This paper cannot purport to cover all aspects of the management of rural development projects or programs. Rather, it is assumed that the experienced designer/planner will already be aware of the criteria, sensitivities, and risks surrounding appropriate frameworks for managing different interventions in different settings. The purpose here, therefore, is to discuss the specific requirements for the management of discrete or component interventions aimed at promoting IMTs.

Integration Compared with Self-Containment

6.29 It will rarely be appropriate—or even possible—to adopt an entirely self-contained approach in the design of interventions for the wider promotion of IMTs. Experience has shown that narrowly restricting the approach to the role that IMTs might play risks a supply-driven (rather than demand-led) approach based on bold assumptions about the cultural, financial, economic, and production response of the target group. As this paper has stressed, however severe rural transport problems may appear to the outsider, they may not be so high on the list of priorities among marginal farmers and chronically poor people. This is why section 3, which deals with contextual analysis, is the longest single section of this report. Developing the fullest possible understanding of people and their production systems, local economies, priorities, and capacities to respond to new opportunities is vitally important.

6.30 The ideal arrangement, as noted earlier, will usually be for work on the promotion of IMTs to be incorporated into a wider rural development project or program. However thorough the contextual analysis at the design stage, this will provide a continuing opportunity to learn about prevailing conditions on a broad front during implementation. Where work on IMTs is attached as a component of a mainstream highway engineering project or program, seeking alternative sources of understanding and experience of rural communities and their economies will usually be necessary. Box 15 has already pointed to the example of what was originally a self-contained rural transport project in Malawi that soon established a close working relationship with a well-established and successful government-sponsored credit program. The relationship helped not only on the credit front itself but also in the sharing of experience and insights.

National and International Responsibilities

6.31 Work on rural transport as a *system*—as distinct from rural roads alone—has only begun to be a feature of international development assistance over the past ten years, approximately. Prior to that, not only was appreciation and understanding of the isolation associated with poverty and of the severity of rural transport constraints limited among the international community but among policy planners in developing countries too. In sum, a still small but growing body of professional expertise exists in this field.

6.32 Against this background, the ideal management framework in most cases will incorporate a blend of international and national expertise. The justification for international inputs has little to do with the technologies themselves, because most are relatively unsophisticated. Rather, international specialists can bring experience of what works and fails to work (and why) in different settings, what adaptations have been made to different IMTs to suit specific transport tasks, and the need to integrate promotion of IMTs with simultaneous work to ensure that the right type of physical infrastructure can be provided and maintained.

6.33 National expertise is also important to *(a)* ensure that external interventions really are adapted to local conditions, *(b)* provide a well-informed perspective on what is likely to be sustainable, and *(c)* provide some continuity where necessary when projects or programs come to an end.

MONITORING AND EVALUATION

6.34 Monitoring and evaluation work is of critical importance the more innovative and ambitious an IMT intervention may be. The weakness of such work so far seems to be attributable to the narrow perspectives and supply-led approaches adopted by those involved in the design and implementation of IMT interventions.

Monitoring as a Management Tool

6.35 Two types of monitoring feed into project or program management. First, *progress monitoring* is the straightforward collection of data and information about adherence to the design schedule for activities and outputs. It provides the basis on which progress reports can be prepared.

6.36 Second, *performance monitoring* is rather different, because it focuses on the effects of the project or program, relating outputs to objectives. Outputs, for example, may be expressed in terms of numbers of IMTs in use. Objectives, however, may have to do with reduced time and effort in existing transport workloads, wider access to markets (hence, increases in production and incomes), changes in gender roles in transport or other targets. Performance monitoring is required precisely to track such effects. But what happens if outputs are produced, yet the effects show little or no progress toward these objectives? Here, performance monitoring can undertake diagnostic studies, questioning the assumptions assigned during project or program design. Even when an intervention may be unequivocally successful, exploring whether this is purely a reflection of first-class contextual analysis at the design stage or if exogenous beneficial factors or trends may have existed in parallel with implementation is important. This can be highly specialized work and calls for socioeconomic, statistical, and analytical skills beyond the realm of engineering and other technical aspects of work on IMTs themselves.

Monitoring Feeding into Replication

6.37 Few individual IMT interventions will be able to aim for success in more than a limited geographical area—especially at these still early stages in experience. It, therefore, becomes important to take stock of the results of monitoring and evaluation (M&E) work, explore the possible diversity of conditions in a wider geographical area, and begin to draw conclusions about how successful project experience can be replicated with or without adaptations in design. This is rarely done in any type of M&E work and must be included in the terms of reference of M&E teams.

Monitoring Feeding into Nonproject Issues

6.38 Policy, institutional, and regulatory issues have been characterized as being beyond the likely framework for project-based action. Nevertheless, as box 10 has shown for Malawi, policy can have a profound effect on demand for IMTs even when their popularity has been amply demonstrated. It will often be the specific on-the-ground experience of projects or programs that will generate the most practical insights on how to promote change. On the institutional front, practical efforts to promote IMTs may point to the need for revisions in the responsibilities or budgets for maintaining the transport infrastructure on which they rely. Regulations, as noted, are frequently motivated by legitimate concerns for the safety of those who use IMTs as well as the public at large. Again, project-based data on speeds, availability of repair and servicing facilities, willingness of operators to maintain IMTs to adequate standards, and actual safety records can provide the necessary substantiation for proposals to modify regulations.

APPENDIX:

THE RANGE OF INTERMEDIATE MEANS OF TRANSPORT

Examples of IMTs Found in Sub-Saharan Africa and Elsewhere

FOUND IN SUB-SAHARAN AFRICA

Wheelbarrows. These are single wheeled, allowing heavier loads to be carried for short distances than is possible by head loading. Depending on the position of the wheel (usually at the extreme front), the operator lifts part of the load and must also balance the barrow. They are usually industrially manufactured, but experiments with all-wooden wheelbarrows have been undertaken in southwest Tanzania. They are not suitable for hilly terrain. They are used spontaneously in parts of Zimbabwe for field and backyard transport.

Hand carts. These have two or four wheels, giving greater stability and better balance than wheelbarrows, hence, permitting heavier loads. They are best in flat terrain and on smooth running surfaces. They have wooden or steel frame construction and can be made at home by users (usually with manufactured wheels) or in small workshops. In SSA, they are usually found in urban areas on a for-hire basis.

Pack donkeys. They are used extensively from Ethiopia to Lesotho and in parts of West Africa. A range of ingenuity is possible in organizing and packing loads. They are particularly suitable in hilly terrain and easy to care for. Because less status attaches to them than cattle or oxen, they are often used by women.

Sledges. They are usually drawn by oxen. They are simple and cheap, often made at home from timber; hitching chain is the principal purchased component. Their capacity is similar to that of the pack donkey. They are mainly used for carrying loads to and from cultivation areas and can damage road surfaces (they are banned in Zimbabwe for this reason).

Animal-drawn carts. Smaller versions of these carts are hauled by donkeys; more common are the larger versions that are hauled by oxen. They have the highest load capacity of any IMT commonly found in SSA and the most expensive nonmotorized IMT. Used mainly for agricultural transport in countries where animals are used for ploughing, they need an adequately strong axle and wheel assembly, most frequently made of rigid scrap axles from motor vehicles. Problems with price and availability of suitable axles and wheels have led to successful introduction of split-rim wheels and axles, which can be made in small-scale workshops in some countries.

Bicycles. These are the most common IMT in Africa with variable acceptability and status. Their full manufacture is capital-intensive, but many SSA countries have plants for local assembly of kits that are completely knocked down. They are used for personal transport and load carrying for small businesses and to and from cultivated areas, allowing faster speeds and greater loads than walking and head loading. They are used by some women in Malawi and potentially many more could be used elsewhere (especially if more women's models were available). They are even used to provide taxi services in East Uganda. Key requirements are adequate spares at low prices and specialized repair services for spokes, bearings, chains, and so on.

Tricycles. These have a two-wheeled axle at the front (steerable) or back. They are used mainly in urban areas for small deliveries, ice cream sales, and other small-scale selling.

Bicycle trailers. These increase the carrying capacity of the bicycle. They are usually two wheeled with a detachable hitch to the cycle frame. They are best suited to flat or rolling terrain and can be manufactured in small metal-working workshops. They are found most commonly in francophone SSA countries.

Motorcycles and mopeds. These have not yet been adopted to the same extent as in parts of Asia, although they are more common in francophone West Africa including Burkina Faso. Structural adjustment, currency devaluation, and customs duties make them expensive. Repair and servicing capabilities are essential.

GENERALLY NOT (YET) FOUND IN SUB-SAHARAN AFRICA

Motorcycle adaptations. Principal adaptations are strengthened side-cars and detachable trailers. Neither is hardly seen in SSA, although side-cars are popular and widespread in the Philippines and experiments are due to begin with trailers in Sri Lanka.

Three-wheelers. "Bajaj"-type three-wheelers, ubiquitous in south and southeast Asia, are rare in SSA. Medium-scale versions are found in parts of Gujarat State in India, when on the order of 40,000 three-wheelers are in operation. Powered by 6.5 horse power, air-cooled diesel engines, they are assembled by more than twenty small- and medium-scale workshops. Typical usage is by fifteen passengers or to carry up to 1,000 kilograms as the maximum payload for short- and medium-distance journeys of up to 100 kilometers per day. They cost approximately US$3,500 each.

Locally made four-wheel vehicles. One example, the *itaen* found in N. Thailand, is powered by 8–12 horse power, air-cooled diesel engines (similar to those used in single-axle hand tillers). A variety of body styles are produced on fabricated steel chassis. They have a payload of up to 2,000 kilograms with a claimed maximum speed up to 60 kilometers per hour. They are legally registered as "agricultural work vehicles" but are often used for passengers and goods transport with the connivance of authorities. They typically cost about one-third that of a conventional imported pickup, but can be bought without an engine by farmers wishing to use their power tiller engine for different purposes at different times.

ENDNOTES

1. R. Chambers. 1980. *Rural Poverty Unperceived: Problems and Remedies.* Staff Working Paper No. 400. World Bank, Washington D.C. The other four dimensions of what Chambers characterizes as "integrated" rural poverty were poverty proper, implying lack of assets and income; physical weakness; vulnerability to contingencies; and powerlessness. He emphasizes that "isolation deserves special attention; this is the dimension which most impedes the understanding of outsiders and which, by its very nature, may be the least easy to recognize."

2. World Bank. 1994. *World Development Report 1994.* New York: Oxford University Press.

3. John Howe. 1992. *Aspects of Rural Transport in Ethiopia.* International Institute for Hydraulic and Environmental Engineering. IHE Working Paper IP-1. Delft.

4. P. Starkey. "Animal-Drawn Transport in Africa." In *Transport for the Poor.* Eschborn: GATE. 1989.

5. World Bank. 1989. *Sub-Saharan Africa: From Crisis to Sustainable Growth.* Washington D.C. Data on world and regional shares of motor vehicle and bicycle populations from "Automotive Environment Analyst," *Financial Times Newsletter* (17) June 1996.

6. Ian Barwell. 1993. *Synthesis Report: Local-Level Rural Transport in SSA.* World Bank, Sub-Saharan Africa Transport Programme. Washington D.C.

7. Colin Relf and Khanyama Dixon-Fyle. 1988. *Local-Level Transport in Rural Malawi: The Case for Intervention.* Report of an International Labour Office (ILO) Exploratory Mission, Infrastructure and Rural Works Branch, Employment and Development Department, ILO, Geneva. Updated information from fieldwork in Malawi in April/May 1996.

8. From its inception to the end of 1977, transport was the single largest sector in cumulative World Bank/International Development Association (IDA) lending, accounting for nearly 24 percent of the total. By 1989 cumulative lending for transportation had fallen back to about 15 percent, having been overtaken by agriculture and rural development and energy. In 1995 transport was again the single largest sector for World Bank/IDA lending, accounting for just under 18 percent of the total cost of all projects approved. (World Bank annual reports)

9. C. Carnemark, J. Biderman, and P. Boret. 1976. *The Economic Analysis of Rural Road Projects.* Staff Working Paper No. 241. World Bank, Washington D.C.

10. R. Dennis. 1995. "Meeting the Challenge of Animal-Based Transport." Paper submitted by I. T. Transport Ltd. to the Second Workshop of the Animal Traction Network for Eastern and Southern Africa (ATNESA).

11. P. Starkey and F. Ndiamé, eds. 1986. *Animal Power in Farming Systems.* Braunschweig/Wiesbaden: Friedr. Vieweg & Sohn.

12. P. Starkey, ed. 1995. *Animal Traction in South Africa: Empowering Rural Communities.* Development Bank of Southern Africa in cooperation with the South African Network of Animal Traction, Gauteng, South Africa.

13. Africa generally has not—or not yet—developed the characteristics of such countries as India (notwithstanding

its aggregate poverty), Indonesia (particularly Java), Sri Lanka, and Thailand (particularly the Chao Phraya basin), which have networks of medium- and small-sized towns surrounded by relatively intense and market-oriented agricultural production, showing the purchasing power and diversification of production and services that goes with such interrelationships.

14. P. Starkey, ed. 1995. *Animal Traction in South Africa: Empowering Rural Communities.* Development Bank of Southern Africa in cooperation with the South African Network of Animal Traction, Gauteng, South Africa.

15. In Sri Lanka, efforts have begun to introduce motorcycle adaptations as IMTs that may be appropriate in relation to income levels and the already growing ownership of motorcycles for personal and family transport. One of the first adaptations to be tried has been the strengthened passenger/goods sidecar on motorcycles of 100–150 cubic centimeters, which is widely used throughout the rural areas of the Philippines. The initial reaction to such vehicles in Sri Lanka was to condemn them as being "ugly."

16. A scotch cart is a relatively small cart, usually of wooden construction with flared sides and a hinged rear tailgate on a steel frame, pulled by one or two oxen. The origin of the term scotch cart, which is unique to Zimbabwe, is somewhat blurred but is thought to derive from the Boer War.

17. Colin Relf. 1983. "Appropriate Technology in Rural Zimbabwe: Problems and Prospects." Mimeo. Technologies for Employment Branch, Employment and Development Department, International Labour Office, Geneva.

18. Colin Relf and Khanyama Dixon-Fyle. 1988. *Local-Level Transport in Rural Malawi: The Case for Intervention.* Report of an International Labour Office (ILO) Exploratory Mission, Infrastructure and Rural Works Branch, Employment and Development Department, ILO, Geneva. Updated information from fieldwork in Malawi in April/May 1996.

19. *Manufacture and Diffusion of Low-Cost Transport Devices in Zimbabwe* (UNDP/UNIDO Project No. DP/ZIM/89/003). The project also developed successful designs and production techniques for such vehicles as water bowsers and hand carts.

20. For example, projects being designed principally to stimulate agricultural production and marketing or perhaps to enhance private sector mechanical engineering capabilities may have IMT components built in. Neither may have a physical infrastructure component, yet the lack of capacity and resources for rural road maintenance may significantly dampen enthusiasm for IMTs among potential users. In an extreme case this may jeopardize the viability of the IMT component. If so, signals should be sent for additional attention to be paid to the road maintenance problem.

21. Malawi. *Annual Statements of External Trade Statistics.* National Statistical Office.

22. One of the clearest manuals on the LFA is that prepared by NORAD, titled *The Logical Framework Approach: Handbook for Objectives-Oriented Planning* (1992. Second Edition. Trykk & Kopisenteret). The European Commission has another manual, *Project Cycle Management: Integrated Approach and Logical Framework* (1993).

23. The problem tree depicted derives from work done by a Technical Working Group on Rural Transport in Africa in Nairobi in July 1991 as part of preparations leading to the establishment of the International Forum for Rural Transport and Development. It is expressed in broad terms because it is intended to convey a generic rural transport problem applicable throughout most of SSA. The problem trees for individual projects or programs are expected to be more specific.

24. The problem tree depicted was approved by the Swiss Development Cooperation, one of the bilateral aid agencies that uses the LFA. It does not fully comply with the approach used by

some other agencies, which suggest that problems stated in terms of a lack of something bias solution toward filling that lack.

25. World Bank. 1986. “Agricultural Credit Portfolio Review.” Mimeo. Operations Evaluation Department, Agricultural and Human Development Division, Washington D.C.