The Supply and Quality of Rural Transport Services in Developing Countries

A Comparative Review

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Abstract

For many years, the World Bank has been assisting developing countries to improve their transportation systems and facilities. This assistance has been in many forms; the majority being through financing of investment programs to construct, improve, rehabilitate, and maintain transport infrastructure. However, apart from the studies and analyses carried out to help plan and design such infrastructure, little is known by the World Bank or others about the actual transport services which use the infrastructure.

This study identifies, reviews and analyzes various factors that influence the supply and quality of transport services in the rural areas of developing countries. The objective is to determine to what extent the World Bank and other aid organizations can assist the developing countries to improve their services and facilities through economic and sector work, technical assistance, credit facilities and investment financing, and so forth.
Extracto

Desde hace muchos años, el Banco Mundial viene prestando asistencia a los países en desarrollo para majorar sus sistemas y servicios de transporte. Esta asistencia se ha prestado en diversas formas, pero principalmente a través del financiamiento de programas de inversiones en construcción, mejoramiento, rehabilitación y mantenimiento de la infraestructura de transportes. Sin embargo, aparte de los estudios y análisis realizados para ayudar a planificar y diseñar esa infraestructura, poco es lo que el Banco Mundial u otros organismos saben acerca de los servicios de transporte que efectivamente la usan.

En este estudio se identifican, examinan y analizan los diversos factores que influyen en el suministro y calidad de los servicios de transporte en las zonas rurales de los países en desarrollo. Su objetivo es determinar en qué medida el Banco Mundial y otras organizaciones de asistencia pueden ayudar a estos países a mejorar sus servicios e instalaciones a través de estudios económicos y sectoriales, asistencia técnica, servicios de crédito, financiamiento de inversiones y otros medios.
La Banque mondiale aide depuis de nombreuses années les pays en développement à améliorer leurs réseaux et installations de transport. Cette aide revêt des formes multiples, cependant elle est acheminée surtout par le biais du financement de programmes d'investissement pour la construction, la modernisation, la réhabilitation et l'entretien de l'infrastructure de transport. Or, mis à part les études et analyses menées au stade de la planification et des avant-projets, la Banque et les autres instances concernées sont mal renseignées sur les services de transport auxquels profite cette infrastructure.

Cette étude identifie, examine et analyse différents facteurs qui influent sur l'offre et la qualité des services de transport dans les zones rurales des pays en développement. Elle a pour objectif de déterminer dans quelle mesure la Banque mondiale et les autres organismes d'assistance peuvent aider les pays en développement à améliorer leurs services et leurs installations par la recherche économique et sectorielle, l'assistance technique, les facilités de crédit, le financement de l'investissement et autres moyens.
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Summary

i. Adequate, reliable, and economic transport is an essential, although not of itself sufficient, requirement for the social and economic development of rural areas of developing countries. Government policy makers and planners as well as aid agencies involved in the preparation, financing and implementation of rural transport investment programs at present tend to focus on infrastructure projects and have assumed that private initiatives would respond to the demand for transport services. This study has confirmed the relationship between the existence of infrastructure and the type and quality of services that operate on it. However, it has also revealed a number of other factors and problems that inhibit the development and operation of an appropriate and adequate total transport system, especially for the large numbers of small farmers usually identified as target groups for the benefits of rural transport and rural development projects.

ii. First, at the present levels of funding and at presently used standards and costs of rural road construction and improvement, only slow progress can be expected in extending the geographical influence of motor vehicle transport services to all productive, or potentially productive, agricultural areas. In Brazil less than 20% of rural roads can be expected to be improved within the next 15 to 20 years. Second, in some countries, when rural roads are built or improved and transport services begin operating on them, evidence of household expenditure on, or usage of, public transport indicates that these services are not accessible to the poorer half of the rural population because they cannot afford the fares and rates to use them. Third, although many proven basic traditional travel aids and transport means (e.g., pack-animals, bicycles, pickul-bars, chee-kees, draught animals, barrows and handcarts, etc.) exist in various countries, or parts of countries, these are frequently not known or accepted for use in other areas where they could be of considerable advantage to those without physical or financial access to motor car, truck or bus services. Further, these more basic travel aids and transport means often have more modest, less costly requirements for infrastructure for their effective performance, but at this stage there are obstacles to the provision or improvement of such paths, tracks or trails: the main obstacles are the incorrect perceptions of existing problems and failure to recognize the diversity of transport demand as well as the 'road-orientation' of existing planning processes and, in some places, bureaucratic segregation. Fourth, foreign exchange restrictions, transport regulations and terms and conditions of credit available to farmers frequently act counter to the interests of achieving a more even distribution of the benefits of infrastructure investments and/or maximizing returns on investments. Fifth, many of these problems remain unperceived by policy makers and planners and financial aid institutions and accordingly little progress is being made to address them directly and effectively.

iii. This study has revealed a need for new perspectives in planning rural transport investments which require a better understanding of the real transport needs and problems of small farmers. These needs are often for
personal travel and for moving small loads over relatively short distances. The present rural roads investment emphasis on improving existing roads and extending them by relatively marginal distances, is frequently ineffective in the economic and social development of low-income farmers. What are needed, to reach these rural people more quickly and more effectively with transport services that will improve their economic and social situation, are:

- reviews of the real transport and mobility needs of the small rural farmer in terms of numbers, frequency and duration of movements, especially the numerous short trips by the people themselves rather than the longer distance trips by motor vehicles for which present procedures are available.

- acceptance and promotion by Government agencies and aid institutions of proven, basic, traditional travel aids and transport means, as a way of meeting the needs of the small farmer;

- the acceptance and active programming of lower level infrastructure improvements, including paths, tracks and trails for basic traditional travel aids and transport means as legitimate parts of investment projects; and

- acceptance and active programming of selected betterment, or spot upgrading, of trouble spots and bottlenecks on otherwise unengineered roads.

iv. In many countries systems and policies for making credit available for financing the purchase of even relatively simple vehicles, such as bullock carts or motorcycles with sidecars, make it almost impossible for other than relatively well-off businessmen or large farmers-cum-businessmen, frequently urban-based, to purchase them. These credit policies often fail to consider transportation as one of the required elements of efficient agricultural production and, therefore, only exacerbate existing transport problems if other inputs are successful in raising farm outputs. Access to credit is also important for transport-related local industries and commercial activities such as small mechanical and body repair shops, gasoline and servicing centers, insurance agencies, and small-scale vehicle frame manufacture and assembly. Where only fine-weather roads, tracks or trails exist, facilities to store farm produce through the wet seasons might induce farmers to produce additional surplus crops for later sale. Such storage facilities could rarely be provided without farmers having access to credit for this purpose. Consideration of a grant element in credits to low-income farmers and entrepreneurs, rather than subsidized interest rates, is recommended.

v. Restrictions on entry into the provision of rural transport services, fare and freight rate setting, and route or area selection often result in inefficient rural transport systems and hinder anticipated
agricultural development. The existence of highly bureaucratic and
legalistic systems of entry and operational controls, when not seriously
enforced, encourage the disregard of those regulations in which there is a
genuine public interest, i.e., those relating to safety. Accordingly,
regulation of the transport services industry should be kept to a minimum and
directed mainly to safety factors.

vi. The overall conclusion is that there is a need to go more for less
expensive solutions -- tracks and 'travel aids' -- and for private and
community capacities to build and maintain the tracks and to own and use the
'travel aids,' as an alternative and supplement to rural roads.

vii. Bank sector and economic work should assist Borrowers in defining
new policy directions in such matters as foreign exchange allocations for
vehicles, imports and production of vehicles, and promotion and assistance
for manufacturing low-cost traditional travel aids and transport means. In
addition, preparation and appraisal work for rural development and rural road
projects should take into account the need for (i) policy changes and action
programs in areas such as access to credit and regulations affecting rural
transport services, and (ii) rural road programs which include paths, tracks
and trails of basic design, and construction features suitable for simple,
effective traditional travel aids and transport means. During the early part
of the project cycle, consideration should be given also to the need for
direct support to the providers of transport services through, for example,
the development finance companies. Such preparation and appraisal work calls
for enhanced cooperation between transport, agriculture, and industrial
development and finance divisions in the Bank.
I. INTRODUCTION

1. Preamble. The lack of transport services, or problems associated with those available, are frequently identified as constraints to agricultural and rural development. Generally, planners have focused on improvements to transport infrastructure, usually roads, as the principal remedy, on the assumption that private initiative would respond to the resultant demand for transport services. However, there are often problems which hinder the development of this private initiative and therefore the supply and quality of transport services is often not fully developed. A better understanding of these factors and problems is important to:

   (1) maximize the return from investments in rural roads, which often constitutes a significant proportion of rural development projects; and

   (2) remove obstacles to the development of transport services since these often hinder anticipated agricultural development.

2. The general issue examined in this report is the extent to which transport services that should complement investments in rural roads can be presumed to materialize and satisfy movement demands efficiently. If not, why not, and what can be done to remove the obstacles to better services? A related concern is whether those services that do materialize are physically and financially available to all rural people. If not, whether anything could and should be done to provide some form of improved travel and transport means to those not reached.

3. Method of Study. The study was carried out through a comparative review of the supply and quality of rural transport services to help identify:

   (1) the way transport services are being supplied at present;

   (2) factors which influence the quantity and quality of ongoing services;

   (3) the various adverse and advantageous effects associated with these factors;

   (4) ways to alleviate the adverse, and enhance the advantageous, effects;

   (5) an action program to bring about such improvements; and
(6) possible Bank Group role and strategy in such an action program.

4. **Focus.** The primary focus of the study was on factors influencing activities which form the bulk of local level rural transport. Inevitably, this meant concentrating on road transport but not exclusively; for island and coastal communities, as well as those along inland waterways, boats and small ships are vital to transport activities. One difficulty has been that rural transport is an activity which cannot be easily isolated from a country's economy as a whole -- although there are features which are peculiar to rural areas. Frequently the cause of problems may be national policies and regulations which may be related only indirectly to the transport sector (e.g., pricing, foreign exchange, import controls). Accordingly, although they impinge on the rural transport sector, these problems are not always perceived as relevant for attention under transport sector policies and programs. It was necessary therefore to carry out a fairly wide-ranging review embracing the transport industry, its regulation and control, financing and relations with other sectors.

5. **Objectives of Rural Transport Investments.** The principal objectives of most rural transport investment projects are to increase agricultural production and/or to improve the welfare of small farmers. Usually this is presumed to occur if transport services improve, transport costs are reduced and the benefits are passed on to the farmers through reduced transport fares and rates. Each study included a review of how infrastructure and services are planned, organized and distributed downwards from the principal trunk routes. However, it also focussed on transport investments from the perspective of the farmer as he perceives and experiences changes from his 'farmgate' where, for him, the transport system begins.

6. **Approach.** These studies were not designed to be exhaustive or quantitative but to provide the basis for a background paper on the subject with an outline for action in specific areas as well as guidelines for use in operational work. The main means of data collection was a series of short field surveys in the Philippines, Indonesia, Sri Lanka, India, Sierra Leone, and Tunisia during 1981 and the first half of 1982. The objective was to cover a fairly wide spectrum of developing country situations with widely differing conditions and problems. The review also included relevant data and information from other sources including many non-Bank sources. A list of references is presented in Annex A.

7. **During the field trips as much time as possible was spent talking to small-scale farmers (both with and without access to all-weather rural roads), vehicle users and operators, local government officials, and private sector representatives. Mostly, the field trips included areas of ongoing Bank road and rural development projects; where relevant, service conditions of transport modes other than road transport were also reviewed. These inquiries were supplemented by wide-ranging discussions at national and regional levels.**
8. **Target Audience.** Since the study was action-oriented the observations and recommendations are made with the requirements of Bank project, sector and general economic missions in mind. However, the intention was to provide information that might be used to influence government policy-makers as well.

9. **Structure of the Report.** Five main themes have evolved from the findings of this study:

- in most developing countries approximately 80% of the total length of roads is rural roads of which only a small proportion have been improved above the level of basic tracks or trails. At maximum projected levels of investment in rural transport infrastructure and under current trends as regards rural road construction standards and costs, the prospects for reaching all potentially productive agricultural areas are poor, at least for a number of decades;

- regular, reliable and economic transport services offered in rural areas rarely extend beyond the all-weather motorable road system. Services available away from these roads are either non-existent or infrequent, unreliable and expensive. On the basis of available evidence, the people denied services tend to be the poorer groups;

- in some countries some entrepreneurs, including rural farmers and residents, have developed and adopted a variety of simple traditional but effective travel aids and transport means to facilitate their travel and transport activities without all-weather motorable roads. Despite their successful use and operation, many of these travel aids and transport means remain either unknown or unaccepted in other parts of those same countries, and in many other developing countries, despite the obvious advantages they would bring to small farmers;

- some parts of the rural population, within physical reach of the all-weather motorable roads and the services plying on them, are often denied the full user benefits of efficient services for other reasons. These reasons include excessive regulation as well as barriers such as lack of foreign exchange and lack of credit, which prevent or inhibit most of the rural population from owning their own means of transport, offering transport services or providing support services and facilities for the transport sector. This problem has particular relevance for some of the assumptions made concerning the level of benefits from rural road investments and their equitable distribution among beneficiaries; and
- many of the problems faced by rural residents as a result of poor transport facilities and services remain unperceived and neglected by the policy makers and planners. Existing policy analysis and planning procedures have evolved to deal with the more visible parts of the economy such as exports, imports, industry, and their major investments and infrastructure requirements.

10. The report is structured around these five themes. Chapter II discusses rural transport infrastructure, the general direction and focus of past and current investment programs, the implications for the future and prospects and options for change. Chapter III presents a discussion of the vehicles as well as the various travel and transport aids available and in use, the focus of present policies and investment programs and the implications, prospects and options for the future. Chapter IV discusses the transport disenfranchised, their plight and the prospects and options for reaching them. Chapter V discusses Government policies concerning rural transport matters and Government interventions and actions in the industry. Chapter VI discusses the need for a new perspective and approach to planning and formulating rural transport investment projects and programs. Chapter VII presents ideas and suggestions for Government attention and action and suggestions for the Bank's role in the matter.
II. RURAL TRANSPORT INFRASTRUCTURE

11. Infrastructure and Services. Evidence from each of the countries visited confirmed the close correlation between the type and quality of infrastructure provided and the type and quality of transport services provided. Where all-weather motorable roads are provided motor vehicles such as cars, trucks and buses move in and provide services. Such services are not normally provided on dry season roads and where they are, they charge premium passenger tariffs or freight rates from 200 to 400% of those charged on all-weather roads (Philippines, Sierra Leone, Tunisia, India). The highest rates are charged when the roads are at their worst during the rainy seasons. The higher rates are charged to cover actual higher costs of operation on the poorer roads due to the need to travel more slowly and carry only partial loads, and to cover risks of delay and serious damage, as well as some monopolistic profit due to lack of competitive services. On dry season roads other types of transport services are sometimes offered. These are by means of pack animals, draught-animal carts and sledge, barrows, bicycles, and motorcycle-sidecar combinations. Mostly these are able to operate, albeit slowly and at high ton-km or passenger-km costs and rates, under road and track conditions that normal motor vehicles could not traverse. Where even these means of travel are impractical the only alternative is human porterage either by backpack, headloading or pickul-bar.1/

12. For coastal areas or inland waterways the type and quality of services provided is largely governed by the available quality of landing docks or piers and the depth and roughness of the water. Where waters are shallow and no docks or piers are provided access is limited to shallow draught canoes or dug-outs that can be manhandled and beached. Where piers or docks are built out into deeper water, services by small boats or coastal steamers and river boats can operate. At locations where wide fluctuations in water levels occur, floating docks, rather than fixed piers or docks, may be required.

13. Infrastructure Backlog and Problems. The field surveys showed that in many developing countries a significant proportion of the rural population is not reached by all-weather roads. In turn, this means they do not have available transport services by cars, buses or trucks [1],[2],[3],[4].2/ In India about 70% of villages do not have all-weather road connections and 53% are not connected to any type of road; for them the principal means of access would be walking [5]. Annex B discusses the prospects for extending the all-weather rural road network in India. Similar

1/ Usually a bamboo pole or wooden stave carried across the shoulders with carrying containers and baskets suspended at each end.

2/ Numbers in square brackets refer to the references of Annex A.
situations exist in Indonesia, Philippines and Sierra Leone [6] as well as in most other developing countries. For example, Brazil has about 1.2 million kilometers of rural or feeder roads and based on present rates of construction or improvement, it will take up to 150 years to make an initial investment on all of these roads. That means that less than 20% of these roads will be improved in the next 15 to 20 years. Even in Sri Lanka, renowned for its intensive and well developed road network at the district and village level, the principal gap in the transport spectrum is still said to be the crucial first 3 to 8 km from the farm to the nearest made roads and motor vehicle services operating on them.

14. The large backlog of rural roads, coupled with the limited resources that can be allocated to this problem and the depressed state of the economies of those countries with the poorest levels of rural road access, means that only slow progress can be expected in extending the geographical influence of motor vehicle transport services.

15. The problem regarding river and coastal water transport is principally one of bureaucratic segregation and lack of coordination between agencies responsible for water and land transport. For example, many coastal villages on the island of Nias (Indonesia) are presently cut off from the regular port facilities of the island by a dilapidated and discontinuous road system. Inexpensive jetties or piers, built so that small boats and coastal ships could dock, would provide a tremendous boost to the accessibility of these villages. However, as minor investments, they do not figure in the priorities of the Government agency responsible for ports. In addition, due to the bureaucratic boundaries between that agency and the agency responsible for rural road investments, these jetties and piers cannot be provided under the rural road investment program which will be providing rural road access from these villages into their immediate agricultural hinterland.

16. Consequences of Lack of All-Weather Access. Apart from the effects on the provision of transport services, the lack of all-weather road access to rural areas has other consequences. For example in Sierra Leone, investments for improvements to clinics and schools, or building new ones, are programmed only for villages accessible by road. The irony in this 'to him that hath' approach is that, although communities without road access have the same needs for schools and health clinics as communities with road access, they do not receive them because planners, designers and builders cannot reach the villages. Most countries also reported disincentives for farmers to produce or harvest crops because of difficulty in transporting them. For example, high costs of transporting produce away from the farm cause purchasers to offer farmgate prices that are too low to cover farmers' production costs. Further, if the farmer transports his product to market, the price he gets may not cover production costs plus his high transport costs. Another consequence reported in most countries was crop losses due to spoilage as a result of unreliable transport and lack of adequate storage facilities. All countries also reported instances of lack of extension and welfare services in the inaccessible areas. Extension agents and providers of welfare services are reluctant, or find it difficult, to travel on poor roads. Also, where extension services exist, the results are often marginal, since recommended inputs are difficult to get and credit, frequently vital
for the purchase of inputs, is often not available for farmers not located near all-weather rural roads.

17. **Prospects for Infrastructure.** In light of the above, the only prospects for improving the rural transport situation through infrastructure investment programs is to increase the amount of facilities built by increasing the resources allocated to the program or extending the reach of those already being allocated. As mentioned above (para. 14) the prospects for additional financial resources for these investments are not encouraging. The only other possibility for applying additional resources to the problem is to mobilize unused or underemployed labor resources in the area for self-help rural road construction and maintenance programs.³/ This avenue is being pursued in a number of Bank-financed projects and increasing numbers of countries are introducing or contemplating this course. Other options include increasing the efficiency of present rural road construction programs. Although there is room for such improvement, this will come about only slowly and improvements can only be expected to be marginal. The remaining feasible option, and the alternative that holds most promise for significant results, is to reduce the costs of construction, mainly through reducing geometric design standards while maintaining the required structural standard to cater for the volume, weight and type of traffic projected for the road. More is said about this in Chapter VI.

³/ Such self-help programs may also promote the construction of landing facilities in communities where water transport is important.
III. VEHICLES AND OTHER TRANSPORT AIDS

18. Availability of Vehicles. Lack of access to motorable roads is only one side of the transport problem confronting many farmers; the availability of vehicles is another. A recent study in India showed that 73% of all rural households did not own any type of vehicle. Of households having holdings of less than 5 hectares the figure reached 89% [3]. Of course 'ownership' is not essential to 'availability' provided that a reasonable level of scheduled services exist, or vehicles can be hired without difficulty and at reasonable charges. The mission's surveys showed that this was frequently not the case, especially in the more remote areas. In most of the countries surveyed there were few, if any, regular services off the all-weather road system, or goods transport vehicles available for hire by farmers of remote (and usually small-scale) farms.

19. In Indonesia and the Philippines, most rural transport services are provided by urban-based businessmen and traders. Again, in Sri Lanka, it is the trader-businessman who supplies the transport. These same people are also, at times, the source of agricultural credit, frequently secured by a lien on the farmer's crop. Where these conditions apply in the more isolated areas, farmers become isolated from the marketplace and either have to sell their products at their house or at best in the local markets. For example, a recent study in Ghana, showed that 57% of small-scale farmers sold the major part of their surplus food crops at their house. A further 24% sold their food surplus principally at the local market [7]. To varying degrees, similar situations prevail in the other countries studied. The implication is that small farmers may be isolated from the marketplace for their agricultural products by the factors which preclude them from direct ownership, either individually or cooperatively, of their own means of transport.

20. For many of the poorer developing countries the availability of motor vehicles is likely to remain constrained by the chronic shortage of foreign exchange both for their purchase and to buy fuel and spare parts for existing vehicles. The position in this respect is so serious in Ethiopia and Tanzania, among other countries, that in the last few years the rationing of fuel and spare parts has probably caused total fleet utilization to decline. In Sierra Leone, India and Tunisia long delays (1-3 years) were reported in obtaining vehicles even for those with the money to buy them, again implying restricted availability.4/ Undoubtedly some countries are able to cope better than others with the problems caused by the shortage of particular types of motor vehicles because of the existence of a wide range of alternative means of movement.

4/ In India and Tunisia, the delays appear to be due to the interaction of a complex number of policy-related factors rather than just shortage of foreign exchange.
21. **Variety of Vehicles and Transport Aids.** Both on and off the all-weather rural road network there is considerable variation in the types of transport used. Generally, there is greater variety in the Asian than African countries. Sierra Leone presents an extreme example of deprivation; the only alternative to travel by bus, truck, or a combined passenger/goods pickup, is walking. Animal transport appears unknown and among rural households both bicycle (2%) and motorcycle (0.5%) ownership are rare and owned mostly by government employees [8].

22. In a number of cases different types of vehicles were observed to perform a useful function in some countries while not being used to any extent in others. Examples are the bullock cart or other animal draught systems (India, Tunisia, Sri Lanka and some parts of Indonesia) and the two-wheeled tractor pulling a trailer (Sri Lanka and Philippines). The 1 to 1 1/2 ton pickup, which dominates motorized farm transport in Tunisia and some other countries, is rarely found in India. These contrasts in the usage of what are demonstrably useful forms of transport are even more marked if a world perspective is adopted and services on all types of rural roads (motorable road, track and footpath) are considered. There are several rural 'vehicles' that individually enjoy widespread use in one country yet are virtually unknown outside its boundaries. The motorcycle/sidecar combination, which in the Philippines is a highly significant means of rural transport for both passengers and goods, is seldom used in this way anywhere else in the world. Apart from these vehicles, there are many types of traditional travel aids and transport means developed and adopted by rural farmers and residents to help with their local level transport needs in the absence of other means.

23. The list of basic traditional travel and transport aids used effectively and successfully in rural areas is impressive and includes:

- pickul-bar -- particularly in Asia and Pacific Islands;
- chee-kee -- special backpack of Korea;
- pack animals -- Brazil, Sudan, Tunisia, etc.;
- draught animals -- India, Sri Lanka, Tunisia, Pakistan, etc.;
- barrows and handcarts -- China;
- bicycles -- India, Indonesia, Philippines, and Sri Lanka;
- motorcycles -- Sri Lanka, and Indonesia;
- motorcycles with sidecars -- Philippines; and
- tractor-trailer combinations -- India, Sri Lanka, Tunisia, and Crete (3-wheel).
Some of these are discussed and elaborated on in Annex C. Additional information on vehicles already produced and sold commercially throughout the world as well as information on various prototype vehicles is contained in a catalogue prepared by the Bank in 1978 [9].

24. The puzzle that remains is that although many of these are used to great effect in some countries, frequently their use is limited to only certain parts of a country and unknown or unaccepted in others. For example, on the island of Nias, Indonesia, there are no animal carts although there are plenty of suitable animals, no split bamboo pickul-bars, and no motorcycle/sidecar combinations, despite the existence of all three in effective and extensive use in North Sumatra, Nias' nearby 'mainland' island. The enigma widens when it is considered that other countries, even close neighboring countries, do not know of, or at least do not accept, some of these obviously useful transport aids developed and used to high levels of sophistication in some places.

25. In looking at these simple traditional transport aids and light motorized vehicles, one is also impressed by their relatively modest needs for infrastructure -- paths, tracks or trails would suffice. For example, walk trips with pickul-bars or chee-kees need only footpaths with horizontal and vertical clearance of vegetation to avoid hindrance to the aids. Creek and stream crossings can be narrow and bridges limited to foot-bridges. Similarly, modest trails would cater for pack animals, cycle and motorcycle traffic. Draught animals with carts and motorcycles with sidecars would require slightly more stable pavement treatments and stronger bridge crossings but still considerably less than would be needed for 'normal' car, bus and truck traffic. Another important consideration is that these simple and quite modest track, trail and path requirements are more amenable to construction and maintenance by local labor-based techniques including those carried out under self-help programs.
IV. THE TRANSPORT DISENFRANCHISED

26. **Transport for the Rural Poor.** There is another sector of the rural population for whom neither road nor vehicular access are the main travel constraints. It is simply their inability to pay for those transport services that are provided. The available evidence in the Philippines indicates that the people who use existing for-hire-and-reward passenger services have incomes at or above the median income level, i.e., the poorest travel little on these services [10]. A survey of one district in India found that nearly 40% of rural households spend no money on travel or transport [11]. In Kenya surveys showed that over 90% of rural trips were on foot, 4% by bicycle, 2% by paratransit (matatus) and only 0.5% by bus [12].

27. The inability to use transport services has the effect of locking-in the poorest segments of the population and cutting them off from the more rapid development, progress and income growth that access to transport would make possible. The plight of these people is further exacerbated by the conventional perception of transport problems, and the procedures and criteria by which investment programs are determined and the layout and design of rural roads are established. These perceptions, procedures and programs tend to ignore the non-users of transport services.

28. **Pedestrians are Traffic.** The principal cause of this treatment is that these people are usually ignored as 'traffic' because they travel as pedestrians or cyclists and few, if any, formal planning and design procedures in current use acknowledge them by including them in traffic counts and traffic forecasts. Nor are they considered as factors influencing geometric designs of infrastructure. It seems that there is a widespread inertia and apathy about doing anything for rural pedestrians and cyclists, as though, because they are adaptable means of movement there is no urgency, or even need, to try to make the process easier, more direct and more effortless. This is not the case in urban areas where either the extra visibility or the greater numbers of cyclists and pedestrians have often legitimized the provision of pedestrian ways and crossings, and cycle routes and other facilities. It is noteworthy too that in some countries the provision of low-cost 'rural' tracks for pedestrians, cyclists, and other non-motorized traffic is regarded as a legitimate infrastructure investment. For example, in the People's Republic of China roadbuilding efforts in the early 1960s focussed on opening commercial roads to the village to facilitate the transport of locally produced goods as part of the policy of priority given to agriculture. These roads were rarely fit for motor vehicles. On the better roads horse and ox-carts could travel; on others handcarts were pushed or pulled by men [13]. In the late 1960s Taiwan, China adopted a pattern for rice reclamation schemes which included 4 meter-wide roads spaced 400 meters apart, with 2.5 meter-wide side-roads leading to every field.
None of these roads was surfaced and whilst the larger ones could probably be used by cars and trucks, it was clearly intended that they be used by simpler forms of transport [14]. Lastly, in India road designs have been developed especially for bullock carts with steel-rimmed wheels, although the extent of their use is unknown [15]. Other than the fact of their existence little appears to be known about these road designs and operating experience with them; both aspects seem worthy of study.5/ The essential disenfranchisement of those without access to conventional transport services raises the issue of what could and should be done to reduce more rapidly the proportion of people so affected.

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5/ The Transportation Department of the World Bank is preparing a proposal to study rural roads design, construction and maintenance and intends to include these aspects for review and study.
V. GOVERNMENT POLICIES, INTERVENTIONS AND ACTIONS

29. Regulation and Control. All governments regulate and control their transport industries to some degree in four main areas:

(1) **Control of quantity:** usually applies to transport services offered by the private sector and entails:

(i) a limited supply of services obtained by:

- restricting entry to the industry;
- controlling the routes over, or areas within which services are provided or the commodities that may be carried;
- stipulating the days of the week during which services are provided;
- governing the fares and/or freight rates to be charged;
- prohibition of the carriage of goods in passenger vehicles and vice-versa;
- forbidding the owner of a vehicle to transport goods not produced by him; and

(ii) import and production restrictions on vehicles and/or spare parts which, although indirect in their effect on the supply of transport services, are usually effective means of achieving the same ends.

(2) **Control of organization:** in many countries, central and/or provincial governments directly own and operate part of the transport industry.

(3) **Control of quality:** encompasses a wide area including seating and standing ratios for passengers, comfort, spacing and width of seats, speed of travel, timetables, schedules, express or local services, etc. The emphasis is usually put in terms of safety.

(4) **Control of resource allocation:** is the ultimate objective of the first three spheres of policy, but of particular relevance is governments' use of:

(i) fiscal powers in taxing users; and

(ii) financial powers in providing assets for the transport sector and subsidizing its operations.
30. It became apparent from the field surveys that the regulatory factors of most concern to local level users were the controls on the quantity of services. (Annex D details the individual findings on regulation and control). As a result of these controls the following situations may arise:

(i) absence of any form of service;
(ii) limited, irregular service;
(iii) inefficient transport operations;
(iv) insufficient transport services while unused capacity, in farmers' vehicles and in some cases for-hire transporters' vehicles, cannot be sold; and
(v) significant and unnecessarily high differences between farmgate prices of agricultural products and prices prevailing in cities.

31. Items (i) through (iv) may lead to loss due to spoilage of agricultural products such as fruits and vegetables, increased cost of marketing agricultural produce, and (v) represents a disincentive to farmers to produce more regardless of whether rural roads are in good condition or not. To maximize the return on investment in rural roads, agricultural infrastructure and other inputs of rural development projects, it is therefore important to eliminate restrictions on free entry to the industry, fare setting, and route selection. Honduras is a case in point where deregulation of transport services has resulted in a trucking industry that has successfully met the rapidly changing needs of the country's economy. It is also important in many countries to obtain a carefully calculated balance -- for the economy -- between the effects of import restrictions related to vehicles and spare parts (with consequent repercussions on the efficient operation of the agricultural and industrial sectors) and the outflow of foreign currency.

32. With reference to the control of organization, the field surveys showed that national or state-owned transport organizations are generally inefficient and operate at a financial loss. These organizations have little incentive to improve their operations since they are heavily subsidized. Experience with government organizations supplying vehicles for sale, or parastatal bus and trucking organizations (Sierra Leone, Tunisia), shows that rarely are they able to provide an efficient service without extensive and self-defeating subsidies. In contrast the visibly most successful and extensive of the basic vehicle services observed during the mission's studies were all operating in the private sector.

33. With regard to the controls on quality, the existence of a highly bureaucratic and legalistic system of entry and operational controls, when not seriously enforced (e.g., Philippines), must encourage the disregard of those regulations in which there is a genuine public interest, i.e., those relating to safety.
34. The nature of the study precluded any detailed enquiry into the user tax structure of each transport industry or the extent to which governments were using financial powers to subsidize the assets or operations of different sectors of their transport services. However, the study did reveal examples in which policies controlling the allocation of resources were clearly in conflict with the provision of efficient rural transport services for the small farm sector, such as:

(1) generally insufficient funds for rural road maintenance;

(2) imbalance between expenditures on spare parts and vehicles; and

(3) insufficient advantage taken of the ability to influence importation and assembly or manufacture of proven inexpensive travel aids and transport means.

35. Credit Facilities. The need and justification for small-scale farmer credit in general is fully discussed in other literature worldwide and recognized in the preparation and formulation of agriculture and rural development projects. However, most of this same literature and the projects which include small farmer credit, ignore or overlook the possibility of providing credit for small-scale rural transport services and their necessary auxiliary repair and production facilities. Available evidence indicates that, if farmers are to benefit from rural infrastructure improvements, local transport services must be more ubiquitous and competitive. This will result in cost reductions being passed on to farmers or in their receiving benefits more directly through better and more economic services.

36. In all of the countries studied, present systems and policies for the allocation of credit for financing even relatively simple vehicles such as bullock carts, tractor trailers, and motorcycles with sidecars, make it almost impossible for other than relatively well-off businessmen or large farmers to purchase them. Small farmers and small-scale entrepreneurs are precluded from purchasing these vehicles because of lack of local credit institutions, excessive demands by credit agencies for collateral, high interest rates, high downpayments, or combinations of these reasons. For example, in Sri Lanka, less than 2% of rural households own tractors or trailers and only about 11% own bullock carts. Of the tractors owned in rural areas, most are owned and operated by large farmers or by full-time businessmen. Under a recent agricultural credit scheme in the Kurunegala Rural Development Project (Sri Lanka), provision was made for the financing of credit for 200 four-wheel and 500 two-wheel tractors. Most of the credit, and hence tractors, were snatched up by businessmen, and, further, the four-wheel tractors were purchased and applied to non-agricultural haulage activities. The average small farmer was excluded from the scheme because of his inability to raise the 10 to 20% downpayment. In some countries (e.g., Tunisia) credit for tractors is granted only for farms above a certain size and on the basis of the number of hours the tractor is used for farm
operations -- rather than farm plus transport operations -- thus denying
access to ownership by many small farmers. Obviously, traders and
businessmen will always fulfill an important role in the rural economy,
including transport. In this context, the recommendations made in Chapter
VII concerning transport regulations (para. 64 (iv)) should include the
matter of stimulating transport enterprise by these traders and businessmen.
However, there is also a case for more careful consideration of the
allocation of credit to small farmers and their transport needs.

37. Progress has been made in India (Annex E) where some banks are
prepared to finance the purchase of improved bullock carts provided the
farmers are tied to either the sugar or jute industries. What remains to be
demonstrated is whether the finance of such improved carts is also viable for
farmers living in mixed grain, vegetable or other produce areas. It seems
unlikely that local banks would be prepared to experiment with such a scheme
without the support of an outside institution such as the World Bank.

38. In the rural development project studied in Sierra Leone, there was
no provision for the use of small farmer credit facilities for the purchase
of transport and this appears generally to be the case with such schemes.
This situation seems in contradiction to the concept of 'integrated
development'. Moreover, such an approach to development fails to consider
transportation as one of the required elements of efficient agricultural
production. For example, if all other inputs are successful in raising small
farm output, the extra production and the resultant need for extra transport
will exacerbate the already difficult transport problem. Consideration ought
to be given to including the purchase of simple means of transport among the
legitimate uses of small farmer credit.

39. Apart from policies and procedures that would facilitate purchase
and ownership of vehicles or transport-related service facilities by
rural-based, creditworthy individuals, other possibilities that may be
appropriate in some circumstances are:

- cooperative associations where the total membership provides
  security backing or guarantees for an individual member;

- loans in kind (i.e., vehicles) through local 'vehicle loan
  offices' with appropriate applicant screening procedures, strict
  collection policies and arrangements for insurance; and

- inclusion of a grant element in credits to poor farmers which in
  most cases is preferable to subsidized interest rates.

40. Ancillary Industries. Access to credit for local industries and
commercial activities such as small mechanical and body repair shops,
gasoline and servicing centers, and even small-scale vehicle frame
manufacture and assembly, is also crucial to stimulate these activities.
Policies and procedures that would enable vehicles, associated small-scale
industries and commercial activities to be more widely owned and operated by
small-scale farmers and entrepreneurs, would increase the opportunities for
local private/community initiatives in dealing with the transport problems of
the area.
VI. NEW PERSPECTIVES FOR PLANNING RURAL TRANSPORT NEEDS

41. Need for Change. The conclusion is that the investment programs, policies and actions, ostensibly aimed at improving the transport system for rural farmers, are not reaching, and are unlikely to reach, a large proportion of small farmers in the meaningful future. Rural road programs, although important in extending the present systems outward from trunk routes and commercial centers, are a long way along the transport system from the average rural farmer. Until such time as the effects of road programs reach the farmer, in many countries, effective alternative travel and transport aids and their modest infrastructure needs should be considered, at least as interim measures. Also, the control, regulation and credit systems, largely established with the trunk roads and normal motor vehicle traffic in mind, do not act in the interests of increasing a significant proportion of small farmer incomes or achieving a more even distribution of the benefits of investments in infrastructure improvements. To achieve these objectives it is first necessary to understand the real transport needs and problems of the small farmer.

42. Small Farm Transport Needs. Transport needs at the farm level, and the constraints within which they must be met, have rarely been studied. Roadside surveys of the commodities carried by motor vehicles are a poor substitute since:

- they are too far along the marketing chain to be able to isolate individual consignments and the distances over which they are being moved;
- few of the studies have been sufficiently extensive to give an adequate measure of seasonal fluctuations in travel;
- they give no indication of the transport needs associated directly with the farming activity; and
- they ignore the potential use of animals in agricultural production as well as transport.

43. One farm level study was carried out in Kenya by the Bank in 1976 [17]. This suggested that most transport needs could be characterized as the movement of small loads (10-150 kg units) over relatively short distances (1-25 km). For transport related directly with the farming activity, the range of loads was likely to be the same, but the typical distances were shorter (1-13 km). The mission's studies in other countries tended to confirm the results from Kenya, although in Tunisia, some of the fruit and vegetable farmers were capable of generating significantly larger demands in both size of consignment and distance to market. However, in relation to the other countries studied, these farmers would be regarded as comparatively wealthy. Crop perishability is a major factor in determining the frequency, timing and bulk of a farmer's needs for transport. It also limits the
farmer's bargaining position with the providers of transport services.

44. The Bank's study in Kenya drew attention to a previously overlooked constraint on small farmer activities, i.e., household transport demands which cannot be satisfied by conventional approaches to service provision. The amounts of water and wood required daily for household use were noteworthy (50 and 30 kg respectively), and it was estimated that their collection occupied 3-6 hours per day. These results have been confirmed recently by other studies in Southern and Eastern Africa, which showed that in an average family of six or seven, one person's sole job is to collect and transport firewood, which often involves walking long distances [18]. Since the farmer must follow a fairly rigid farming schedule to obtain optimum yields, it is important that transport for crop production and household needs should not be so time-consuming as to delay operations or so exhausting as to leave little energy for other activities.

45. It is important to enhance our understanding of the nature — magnitude, frequency and duration — of small farmer transport demands and the personal constraints — in terms of income, physical location and its characteristics, etc., — within which these demands must be met. Such an understanding would enable the adaptation of design and planning procedures so as to try to meet a greater proportion of small farmer movement needs. It seems likely that such an adaptation will give greater attention to the numerous short distance trips by the people themselves which characterize local level movements, rather than the longer distance trips by motor vehicles on which present procedures concentrate.

46. The capital cost and availability of conventional motor vehicles evidently puts them well beyond the reach of all but the wealthy few. The expectation is also that in many countries there will only be a slow expansion in the availability of transport which can be hired by farmers. It follows that the basic transport demands of most of the rural poor must be met by vehicles very much simpler and cheaper than the conventional motor vehicle. Often these basic vehicles must be capable of operating 'off-road' on paths, tracks or the fields themselves and may be defined as the range of devices from aids to goods movement by man himself up to but excluding, conventional cars, pickups, buses and trucks (para. 23).

47. As mentioned in para. 24, usage of such basic vehicles and aids is often limited to specific countries and sometimes even restricted to areas within the same country. The available evidence points to this geographical confinement being the result essentially of a 'knowledge gap'. although in some cases prejudice, lack of credit and the inhibiting effect of some transport regulations are evident. It seems improbable that devices which clearly perform a useful, and in some cases vital, function in one country should not be capable of doing so elsewhere. In Kenya, only a very limited range of vehicles is in use by small farmers. Studies carried out there by the Bank showed farmers and officials to be enthusiastic about trying forms of transport used in other countries once the characteristics of these 'strange' vehicles had been explained to them. A specific example was the use of bicycle trailers by farmers who already owned bicycles [17].
48. Few people seem to be aware of how wide is the potential choice of basic vehicles and aids. Apart from the Bank's catalogue of vehicles already produced and sold commercially throughout the world [9], information on logically developed and adapted 'vehicles' and transport aids is not available in a form that is easily accessible to farmers for whom these items would be useful. The element of choice is important, since, given the variations in incomes, topography, roads and access paths, as well as in farming and social systems, and in local resources and capabilities, there cannot be a 'universal vehicle' appropriate to all the rural transport needs of developing countries. Rather the need is for a graduated choice of vehicles and aids whose performance matches demand and whose cost is in sensible relation to income.

49. Lower Cost Vehicles. There is undoubtedly a considerable reluctance in many countries to consider as 'transport' any form of vehicle that is not motorized. This is most evident in the small proportion of resources devoted either to the production or improvement of non-motorized vehicles and in the open biases against their use. It is only as recently as 1976 that serious efforts were begun in India to understand the socio-economic aspects and improve the design of the bullock cart, which has been, and is likely to remain, the backbone of that country's rural transport system for many years to come. Despite considerable numbers of work animals there is little apparent official interest or support for improved animal traction or transport programs in Indonesia. Similar attitudes to this were found in the other countries visited despite either the clear potential benefits of various non-motorized and even simple motorized means of transport, or the obvious dependence of significant proportions of the population on such means.

50. Generally the approach to the supply of vehicles in the past has been to put the main emphasis on the provision of a few mass means of transport rather than many small means of transport for the masses. This has not been the case universally and, as the figures in Annex F show, both the People's Republic of China and India have emphasized the mass production of low-cost vehicles rather than the manufacture of motor vehicles affordable by the few. The Kenya study referred to in paras. 43 and 44 [17],[18] and evidence collected in this review confirm the short distance nature of the majority of rural transport needs. Existing planning and appraisal procedures tend to focus on the long-leg of marketing journeys while the more numerous, short-leg trips by farmers tend to be ignored.

51. Available evidence suggests that changes in the use of basic vehicles and travel and transport aids cannot be expected to take place just because the technology exists and is being successfully used elsewhere. Farmers and other entrepreneurs would introduce, adapt and use these items if they were available and if the potential users could afford to buy them or could get credit for their purchase. The lack of these items of equipment in some countries can only be explained by restrictive regulations, lack of credit and, at times, lack of enthusiasm for reform, where government officials are apathetic or do not understand or accept the usefulness and applicability of such equipment to their country's rural transport problems.
52. **Lower Cost Infrastructure.** The correlation between rural road conditions and services has already been noted. In several of the countries studied, when road conditions deteriorated (through lack of maintenance) transport services tended to be withdrawn; when road conditions became extremely bad, they ceased altogether. The complete withdrawal of services could be caused by a deterioration in only a small proportion of the road; most obviously if a bridge collapsed or was washed away, but also where a short part of a longer road became difficult or dangerous to traverse. The implication of these situations for more effective maintenance policies is obvious, but there is also a useful corollary. A policy of selected betterment, or spot upgrading, of such trouble spots on otherwise unengineered 'roads' could be expected to encourage services. This was specifically noted to be the case in Indonesia, the Philippines, and Sierra Leone. Other countries such as Tunisia and Brazil are actively embarking on similar programs of spot improvement to lower the cost of providing required levels of access and extending the reach of their rural road investment programs.

53. More and more countries are considering the merits of such low-cost improvements, which in principle are a form of phased development of the road system, i.e., if the hoped-for services materialize, then more progressive improvements will be warranted. Most ongoing rural roads' programs tend to include uniform, relatively high standard improvements which are usually carried out with equipment-intensive high technology procedures. The adoption of a phased incremental approach using spot improvements could be carried out as a series of steps involving simple manual operations using hand tools similar to those used on labor-based farms. This makes them more fitted to labor- than to capital-based methods of construction and therefore they could be done with local resources and local organizations. This approach has been successfully developed and used in irrigation planning of farm-level ditches by farmers' self-help. This is also the basis of the current ILO pilot program of labor-based road construction and maintenance in Botswana. Similar proposals have been made in respect of Sierra Leone, but considerable obstacles will need to be overcome.

54. The main agency building rural roads in Sierra Leone is the Cooperative for American Relief Everywhere (CARE). When CARE started its operations in 1975, the intention was to build low-cost rural roads by labor-based methods but this never happened and construction continues to be capital-intensive and relatively expensive: approximately US$35,000/mile. Comparable costs on the Kenya Rural Access Roads Program are only about US$10,500/mile [3]. A considerable body of official opinion supports the idea of building high standard, if necessarily few, feeder roads on the basis that maintenance must be 'built in' to overcome the (certain) default in this respect by government agencies. It appears also that CARE may have unwittingly undermined previously established self-help traditions of road construction and maintenance. The mission's studies indicated that attitudes now tend to be 'CARE built the roads so they should maintain them', i.e., there is no local identification with the product. The mission's observations also did not support the contention that the CARE-built roads stand up to lack of maintenance any better than other existing low-standard roads; rather the reverse. It was notable that there was much greater
support for the concept of low-cost spot improvements among the operational staff of the regional offices of the Ministry of Agriculture than there was among either CARE or central government personnel.

55. In some circumstances there may be a case for infrastructure improvements to villages whose main mode of transport is walking. This would involve acceptance of all-weather, convenient pedestrian, cycle or barrow paths as eligible transport investments. These ideas are already being actively considered by national and state planning agencies in India. A considerable body of data exists on the planning and design of such roads, especially in the USA, but only for recreational purposes, e.g., the Appalachian and other mountain trails [20], [21]. It is reported that the People's Republic of China and India have experimented with such roads, but more needs to be known about their design and subsequent operating experiences with them.

56. Some of the more obvious limitations of providing what may not be fully all-weather roads could be overcome by more organization of self-help capability, with some outside technical assistance from Government public works agencies. In some cases village or farm storage facilities could provide a substitute breathing-space for produce that cannot be moved due to poor road conditions during wet seasons. Clearly this implies even closer coordination of agricultural and transport investments than is currently the case.

57. Changing Perceptions of Need. Perhaps the most disturbing aspect of the surveys was the often diametrically opposed views on the travel problems of the poor as perceived by influential decision-makers on the one hand and small farmers themselves. Assurances — such as 'every village economically worthy of the name is connected by motorable road' (Sierra Leone); 'all farmers have at least either animal carts or pack animals' (Tunisia); and 'bank credit is available for the purchase of vehicles' (Philippines) — given by those who would normally be regarded as key informants for Bank mission and project preparation staff, were emphatically refuted by small farm representatives. Many authorities did not perceive that the demand for travel services even in remote rural areas is diverse. Most commonly there are two broad types of clients: those trading money for time with a preference for fast but relatively expensive services; and those trading time for money, preferring slower travel at reduced cost. It would appear that the failure to recognize this range of market demands is behind much restrictive regulation. The study concluded that not only is a significant proportion of the rural population effectively disenfranchised of transport services but that this fact is not generally perceived by those responsible for improving the situation.

58. There is evidence that this 'official' view of both problems and possible solutions prevails to a certain extent in Bank appraisal reports. Rural road and rural development reports that start by acknowledging the need for better transport and the constraints imposed on farm inputs and outputs by poor transport, often finish by diagnosing the need for road improvements, with the possible provision of a few motor vehicles to state marketing or extension services. Concern with vehicles, per se, rarely goes beyond the
routine prediction of motorized traffic growth and generation. The assumptions underlying the growth and generation forecasts so far as the transport industry is concerned — the policies governing the production or import of vehicles and inherent delays in the system, the availability of credit for vehicle purchase, government allocation of priorities for vehicles, likely fuel or spare parts shortages, and transport regulations — are rarely subject to detailed scrutiny as a routine component of the design and appraisal of rural development projects, and are sometimes not adequately dealt with in rural road projects. Moreover, consideration is seldom extended to traditional or non-motorized means of transport as a possible, or desirable, way of satisfying a proportion of rural movement demands.

59. More accurate perception of needs is only likely to result from placing greater emphasis, than has traditionally been the case, on direct interviews with farm representatives throughout the influence area of proposed investments. More effort is required in the future to overcome the bias resulting from 'official' views of problems or even those obtained by 'roadside' interviews. The views of transport users as well as the transport disenfranchised, with regard to improved transport services rather than just improved roads, ought to be included in the planning process too. Perhaps more fundamental still is the need to re-examine the orientation of project design and appraisal procedures. The need is to go more for less expensive solutions — tracks and 'travel aids' — and for private and community capacities to build and maintain the tracks and to own and use the travel aids, as an alternative and supplement to rural roads.

60. If government transport policies in developing countries are to be changed so as to explicitly include measures to promote the provision of lower-cost vehicles for those currently denied transport services, then it will be necessary to:

(i) change official perceptions of the transport needs of small farmers;

(ii) make influential decision-makers more aware of the potential range of proven low-cost vehicles that might be considered in the design and planning of transport services;

(iii) broaden planning procedures so that they reflect a transport (with commensurate attention to the supply of vehicles), and a less road, oriented viewpoint; and

6/ There is also room for improvement in analyzing the interdependencies between investments in agricultural and rural road infrastructure and agricultural inputs and outputs, which is discussed in Section IV of Economic Appraisal of Rural Roads: Simplified Operational Procedures for Screening and Appraisal, by H.L. Beenhakker and A.M. Lago, Staff Working Paper No. 610, October 1983.
(iv) reconsider, as a consequence of items (i) to (iii), what changes might be required in the role that Government and the Bank play in the provision of transport services.

61. **Planning Implications.** For many developing communities the provision of more appropriate means of both goods and personal movement will require major changes in the way transport facilities are planned, financed, designed and constructed. Fundamentally, it is necessary to ensure that rural transport planning starts by considering the needs of the small farmer and the constraints within which his choice must be made. Under such a process the most appropriate type of vehicle and the 'track' it requires, or must operate on, would be issues to be decided by local circumstances.
VII. AREAS FOR POLICY CHANGES AND ACTIONS

62. **Role for Governments.** There seems to be no logical reason why, in the future, governments should not play as dynamic a role in supporting and fostering the development of the many complementary and mutually dependent parts of the rural transport system as they have in the provision of roads in the past. The foregoing material and discussion has demonstrated that many factors affect the supply and quality of rural transport and that inattention or misaction in any one can have significant repercussions.

63. **Government Planning and Decision-Making Procedures.** Currently these procedures seem to address the questions 'Will this rural road improvement reduce transport costs?' and/or 'Is the existing poor rural road infrastructure an obstacle to agricultural development?' However, if properly coordinated actions are to result the question to be asked is whether the measures being proposed 'will overcome existing transport constraints to an extent sufficient for the project to meet its objectives?' Another important question to be asked is whether, 'In a situation of limited financial resources it would not be "better" to increase funds for the improvement of simple tracks and simple motorized or non-motorized vehicles and to decrease funds for the construction of gravel/paved rural roads?' Such shifts in the use of funds will increase the target population reached and may be more economical in the long-run.

64. **Indicated Areas for Policy Changes.** The latter two questions imply much more attention being focussed on:

   (i) **Planning and decision-making** to address directly all travel and transport needs in data collection and analysis for investment decisions. As an immediate step, all traffic, by whatever means should be taken into account, including slow-moving pedestrian, bicycle, draught animal, etc.

   (ii) **Vehicles** and any constraints affecting their supply and how to overcome them:
   
   - foreign exchange;
   - import or production quotas;
   - regulations inhibiting ownership;
   - credit availability and its likely recipients;
   - import and distribution of spare parts; and
   - availability of servicing and repair capacity and facilities.
(iii) The benefit distribution mechanism and how to make it more equitable:

- the proportion of transport disenfranchised and how to help them, including the possibility for local people to obtain vehicles or transport aids to use the new 'infrastructure'; and
- likely transport rate charges and fares and whether alterations in the availability and ownership of vehicles induced by new policy directives and credit availability offer any prospects that suppliers of transport services will redistribute savings rather than retain them.

(iv) Transport regulations and how they affect the development of rural transport services.

(v) Low cost travel aids and transport means and how to foster and promote their use through:

- demonstration of simple non-motorized and motorized vehicles and other aids, similar to the demonstration plots in agricultural projects;
- importation and/or local manufacture of these vehicles or aids; and
- providing credit facilities for their purchase as well as repair and maintenance shops.

(vi) Transport infrastructure and the opportunities for extending the reach and catchment areas of rural road programs by stretching from them paths, tracks and trails of basic design and construction features suitable for simple effective traditional travel aids and transport means.

(vii) Storage as a buffer against insufficient transport capacity and temporary interruptions in transport.

(viii) Piers and jetties for coastal or riverside villages to facilitate access by water craft.

65. Changes in policies relating to foreign exchange allocations for vehicles, quotas for importing or producing vehicles, promotion of and assistance for producing low-cost travel aids and transport means will probably need to be reviewed in some depth and in some cases await the results of studies and analyses. The Bank's sector and economic work could also help in these analyses and in defining new policy directions. However, the other areas for policy changes mentioned above could be translated into early action programs and be incorporated in Bank project preparation and appraisal.
Role for the Bank. In most of the countries studied there is undoubtedly a need for the Bank to make parallel changes in its approach to project identification, preparation and appraisal. As mentioned above, Bank sector and economic work should assist Borrowers in defining new policy directions in such matters as foreign exchange allocations for vehicles, imports and production of vehicles, and promotion and assistance for manufacturing low-cost traditional travel aids and transport means. In addition, preparation and appraisal work for projects should take into account the need for policy changes and action programs in the other areas identified in para. 64. For example, the Bank should strengthen its past efforts to deregulate the operation of transport services. At present, many Bank-financed highway projects deal with improvements in transport regulations through studies and loan conditions. However, the effect of these regulations on rural transport and agricultural development needs to be dealt with more explicitly. In project preparation and appraisal, the Bank should ensure that:

- transport investment programs for rural areas are based on data and information that include all local-level transport needs of small farmers targeted as beneficiaries; and

- preparation and appraisal reports include a detailed substantiation of the transport services assumptions inherent in traffic projections and agricultural production increases predicted in farm models.

In defining project elements for financing, the Bank should consider inclusion of the following, as appropriate to the particular case:

- demonstration projects for low-cost traditional travel aids and transport means including simple motorized and non-motorized vehicles;

- providing credit facilities for the purchase of these items as well as small workshops for their manufacture and assembly and maintenance shops for their repair and servicing;

- low-cost infrastructure improvements to paths and trails for traditional travel aids and transport means;

- spot improvement programs for rural roads;

- piers and jetties for coastal or riverside villages; and

- small-scale village or farm-level storage.
LIST OF REFERENCES


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THE PROSPECTS FOR ALL-WEATHER ROAD ACCESS IN INDIA

Table 1 shows the road accessibility of villages in India (1978) by population size. Only 29% of villages are connected to an all-weather road,

Table 1

<table>
<thead>
<tr>
<th>Population/ Size of Village (1971 census)</th>
<th>Type of Road Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All-Weather</td>
</tr>
<tr>
<td>1500+</td>
<td>69,681</td>
</tr>
<tr>
<td></td>
<td>(100%)</td>
</tr>
<tr>
<td>1000-1500</td>
<td>54,623</td>
</tr>
<tr>
<td></td>
<td>(100%)</td>
</tr>
<tr>
<td>&lt;1000</td>
<td>451,632</td>
</tr>
<tr>
<td></td>
<td>(100%)</td>
</tr>
<tr>
<td>Total</td>
<td>575,936</td>
</tr>
<tr>
<td></td>
<td>(100%)</td>
</tr>
</tbody>
</table>


16% serviced by a fair-weather road and 55% without any type of road connection. The Government has initiated a program (Minimum Needs Plan) to progressively connect villages by all-weather roads as follows:

- villages with 1500+ population by 1990;
- villages with 1000-1500 population, 50% connected by 1990; and
- 50% of the above program to be completed by 1985.

'Connection' in this instance was defined as being not more than 1.6 km from the road. Such a program would involve construction of nearly 250,000 km of road costing Rp 34 billion (US$3.5 billion in 1978 prices) and would still leave over 60% of all villages, mainly those with less than 1000 population, without an all-weather road connection as at 1990. The connection of all villages would require construction of nearly 1.3 million km of road and cost Rp 180 billion (1978 prices) or approximately US$20 billion.
EXAMPLES OF EFFICIENT WIDELY USED BUT GEOGRAPHICALLY UNIQUE VEHICLES

REPUBLIC OF KOREA (Chee-kee)

1. **Background.** The chee-kee is a traditional load-carrying frame which is worn on the back and is unique to Korea (1),(2). The evolution of the chee-kee in Korea is believed to be related to that country's harsh winter climate, predominantly mountainous terrain, fragmented farming land, and narrow and undulating movement routes, all of which favour its use. For many years the Korean people have burned firewood in their 'on-dol' (flues that carry the hot gases of a fire under the floor of the main rooms) heating systems. Therefore they frequently needed to haul wood to their villages from the mountains, often for long distances. Since 80% of Korea is unfarmable mountain terrain, the remaining arable portion is small and comprises numerous irregular pieces of land. There are also many small and large streams. The combination of these factors means that most of the roads and paths between village and field are narrow and winding. There is often little choice other than human load carriage on the head or back. There are few situations that permit the use even of hand or animal-drawn carts.

2. **Structure of the chee-kee.** The traditional chee-kee is made mostly of wood, which is readily available from the pine trees growing in most rural areas. Because the natural crotches of the trees are used for making the chee-kee, its construction is relatively straightforward.

3. Every part of the chee-kee looks simple, but it can only carry heavy loads efficiently when it is well balanced. The basic attachments are a basket and staff. The basket is used to carry loads made up of small pieces (such as fruit and vegetables).

4. The staff is fundamental to one of the chee-kee's main advantages: the ability of the carrier to load and lift the device unaided. The load that a person is physically capable of carrying on his head or back is much greater than can normally be lifted in position unaided. (On Asian construction sites where headloading in baskets, or metal pans, is the preferred method of moving sand, mortar, etc., it is normal to employ a 'loader'). The staff enables the chee-kee to be propped up whilst it is loaded by the carrier who then 'climbs into' the shoulder harness and departs unaided. The staff is carried as a balancing aid and to enable the carrier to stop en route for a rest: the chee-kee is simply propped with the staff and the carrier can then 'climb out of' the harness.

7/ Numbers in parentheses refer to references at end of this Annex.
5. Studies of traditional chee-kee use. Surveys have been carried out by Soon Jung University/Georgia Institute of Technology with 121 typical small farm homes distributed among plains, intermediate and mountainous areas (1), (2). All of the farmers questioned used a chee-kee and 95% said that it was necessary for their work. The study also showed that with the lack of adequate farm roads and difficult terrain there was no practical substitute for the chee-kee (87% of farmers).

6. An analysis of the ability of farmers to carry various loads showed that 26% could carry between 51-61 kg, and 23% could carry from 71-80 kg. Although there were extreme variations, 87% were able to carry maximum loads ranging from 31-80 kg. Surprisingly, load-carrying ability did not seem to vary a great deal between the ages of 30 and 60, experience and practice being the deciding factor.

7. The chee-kee is an example of a simple traditional technology that is essential for the Korean small farm environment which precludes the use of other forms of transport. It appears greatly superior to other forms of human porterage both in respect to the amount that can be carried and in the ability of users to load and lift it unaided. Although it was developed for the Korean environment, in its present form it can be used to advantage in almost any rural situation.

CHINA (WheelBarrow)

8. With the notable exception of China, the wheelbarrow does not appear to be widely used for rural goods movement, its major application being in civil construction. However, there is evidence of a number of attempts to use barrows for rural transport. Extremely crude barrows, made entirely from wood, having very small wheels, primitive bearings and poor weight distribution, have been observed in a number of countries. Clearly their use, however seemingly inefficient, is preferred to human porterage, and is the most obvious indication of the latent demand for such means of movement.

9. The Chinese Wheelbarrow. The Chinese wheelbarrow is of quite different design from the Western wheelbarrow found in most other parts of the world (3). The Western wheelbarrow has a relatively small diameter (up to 400 mm) wheel positioned below the sloping front of the load tray. The center of gravity of the load is well behind the line of the wheel axle.

10. The Chinese wheelbarrow uses a larger diameter wheel (about 700 mm) with the load placed directly above it on a horizontal platform so that the center of gravity is just behind the wheel axle. The Chinese wheelbarrow is a more effective device than the Western type. Because the load is placed close to the wheel axle the operator only has to support a small proportion of the load, sufficient to maintain control of the barrow. Thus, more of his energy can be devoted to propelling the barrow forward. The large diameter wheel reduces rolling resistance. The tendency of the barrow to tip sideways is mitigated by the use of a shoulder strap attached to the handles of the barrow.
11. Studies carried out by the World Bank showed that in civil construction activities the maximum load for a Chinese barrow was about 180 kg compared with about 120 kg for the Western configuration (4). Traditional rural barrows with wheels in excess of a meter in diameter are capable of moving loads over several kilometers.

PHILIPPINES (Motorcycle/Sidecar)

12. Although there have been attempts to motorize (pedal) tricycles in India and other countries, and a successful moped-sidecar combination was observed operating taxi services in Medan, Sumatra, the small engine (50 cc) and structural weakness of the bicycle frame limits operations to flat, generally urban areas. In contrast the motorcycle/sidecar tricycle combination (motor trike) of the Philippines is more powerful and ruggedly built and is able to operate in urban and rural areas.

13. **Vehicle features.** Several different designs are available, but the general basis of the motor trike is a two-stroke motorcycle -- of from 125 cc to 150 cc -- sold by several companies (Yamaha, Kawasaki, etc.). The manufacturers have modified their design and manufacture to strengthen the cycle frame, as the predominant application of these motorcycles is as base units for conversion to tricycles by the addition of a sidecar. The sidecars are usually manufactured in small, independent workshops using metal-cutting and welding equipment. These are then used as for-hire vehicles for the transport of people, goods or both, in urban, semi-urban and rural areas. The sidecars are designed for rural use (passenger and goods) although in urban areas some are designed with a flat bed platform exclusively for goods transport.

14. The features of these vehicles which are relevant to their successful performance in rural areas are the following:

- regular (large diameter) wheels which make them less vulnerable than small wheel scooter-type wheels on potholed roads;

- relatively larger ground clearance than scooter types and therefore more suitable to rough road operations;

- two-track configuration which enables them to span over potholes, ruts or outcropping rocks on bad roads;

- relatively light weight which enables them to be manhandled through or around bad sections of road or track;

- simple mechanical features so that drivers quickly become proficient at running repairs and maintenance;

- highly maneuverable especially as drivers quickly develop high levels of skills in their operation;
- low fuel consumption;
- relatively low cost of purchase and operation;
- fast travel, restricted only by road or track conditions and load;
- high load carrying capacity for their size and 6 passengers plus some goods not unusual;
- good medium for rural-based ownership and operation providing suitable credit financing schemes exist; and
- motorcycle and sidecar manufacture present promising opportunities for local industrial development.

15. **Scale of Operations.** In 1978 it was estimated that approximately 70 thousand motor trikes plied for hire, about the same number as the much more widely known jeepneys. Apart from the 'for hire' vehicles, others are owned and operated privately for 'own use'. In this category, in 1978, there were about 53 thousand motor trikes and 113 thousand jeepney-type vehicles. There were estimated to be approximately 140 thousand people deriving a major part of their income from motor trikes (0.8% of the total Philippine workforce and 1.5% of the non-agricultural workforce) (5).

**GREECE** (Three-Wheeled Vehicles)

16. **Three-Wheeled Vehicles in Crete: Beginnings** (6). Until the mid-1960s there were relatively few motorized agricultural implements in Crete. Perhaps the most common item within this small group was the two-wheeled rototiller, such as the German Hako-Werke. A 6-8 hp petrol engine powered the two wheels and any attachments. The farmer controlled and steered the rototiller with hand controls mounted on extensions from the chassis. A two-wheeled cart was one attachment. The farmer could transport some goods or a few passengers while he sat in the cart, driving the vehicle via the hand controls.

17. For the few farmers that could afford these rototillers, large increases in productivity were achieved. The work of one man tilling with a machine could equal that of ten laborers (and vineyards must be tilled twice each year). The small cart could carry more grapes or olives than a mule and perhaps a little faster, although produce had to be hand-carried to the nearest navigable track. As a vehicle, the cart and engine was relatively slow. On an open paved road it could go no faster than 25 km/hour and on a path not much faster than a brisk walk.

18. **Development.** Quite suddenly in the late 1960s, the situation changed. Mechanization became much more widespread and locally manufactured vehicles began to appear. A vigorous government roads program ensured year-round connections with the coastal cities. The roads permitted the
delivery of necessities of mechanized agriculture; at the same time they also stimulated new desires and demands for transport. During this time, technological and mechanical expertise began to develop, both through the construction of new equipment and the repair of older equipment. Moreover, the people of Crete have always prized their independence and self-sufficiency. This was reflected in the support facilities, such as machine shops, which were far more sophisticated than would be expected for a region of Crete's size (about one-half million population).

19. In the late 1960s, several factories in Crete began manufacturing the two-wheeled rototillers, with much of the financing coming through the Agricultural Bank of Greece. Many parts were imported but the design soon become uniquely Cretan. In the early 1970s, the pace quickened and an entirely new vehicle appeared which was a true three-wheeler. Instead of the engine driving the two front wheels with a flexible link to the cart, the engine rested on a rigid chassis driving the rear wheels, with a gear and drive shaft system replacing the belt drive. The multi-purpose character was maintained, however, because only 3 bolts fixed the engine to the chassis. In less than half an hour, the engine could be transferred to a rototiller.

20. The appearance of the agricultural three-wheeler coincided with the sharp rise in oil prices. It may merely have been a coincidence, although the economics would suggest otherwise. Gasoline prices in Greece were then among the highest in the world, $0.60/liter -- about three times U.S. prices. Diesel oil prices, however, were about a third that of gasoline ($0.21/liter). Most of the rototillers, such as those used to pull carts, were gasoline-powered. With diesel oil costing only a third as much, there was certainly a strong economic incentive to build small (8-12 hp) diesel vehicles. The Cretans may have been the first to do so on a large scale.

21. By the summer of 1977, the agricultural three-wheeler had come of age, and about 20 factories in Crete were building them. The largest plants were building about 1500 vehicles/year while the smaller ones, some in shops smaller than 150 square meters, appeared to be building about one hundred vehicles/year. Statistics are not available, but it is estimated that about ten thousand of these three-wheelers came into use in the first four years after their appearance, with total annual production at the end of that period of around several thousand vehicles a year.

22. The three-wheeler's design had become standardized to the extent that it was a recognizable vehicle even though 20 unrelated factories were building it. Most of the vehicles used an 8 to 12 hp rope-started forward position diesel engine driving the rear wheels. The automobile-strength rear axle could typically support a 1000 kg payload. Maximum speed was 40-45 km/hr.
23. **Usage.** The usage of the vehicle depends upon the season. In the late summer activities centered around the grape harvest. Occasionally they would carry support materials, such as polyethylene sheets (which are used to accelerate raisin production) and extra baskets. But harvesting grapes is very labor-intensive. More than anything else, the three-wheelers carried people. The three-wheelers could easily carry six people, and often without any adaptation, up to nine, on trips to the city. In other instances, the three-wheelers carried feed, a few goats, firewood, and insecticide. In some seasons farmers till and plow the fields. The engine must be removed from the three-wheeler and connected to the tiller. This will probably occur less frequently in the future since many of the newer three-wheelers have permanently attached engines.

24. A spectrum of transport alternatives seems to have developed. At the lower end is the cart pulled by the rototiller. It has limited speed and capacity but is obviously the cheapest alternative. Here the overriding requirement is for a mechanized agricultural implement, with transport being almost incidental. The three-wheeler comes next, providing greater speed and capacity. The models with a removable engine still provide motive power for cultivation, but the fixed engine designs are only for transport. At the top is the group of light pickup trucks which offer even higher speeds and slightly more capacity as well as much greater personal comfort. The choice of vehicles depends upon the size of the farm, the farmer's income, and his perceptions of status.

25. Without any planning, a motor vehicle industry developed in Crete. Besides the creation of a unique vehicle, the evolution of the three-wheelers indicates the importance of transport in agricultural areas of less developed countries. Starting with what was essentially an attachment to a mechanized farm implement, a vehicle emerged for which the implement became secondary, and eventually entirely dissociated. The rapidity with which this demand was realized and met -- less than a decade in Crete -- indicates the importance and potential of improved rural transport.
References

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TRANSPORT SERVICE REGULATION AND CONTROL
AND THEIR EFFECT ON LOCAL LEVEL SERVICES

INDIA

1. Passenger Transport. On the major routes services are almost exclusively in the hands of public monopolies: State Transport Undertakings (STUs). Services operating on other routes are operated under a permit system either by these same STUs or by private sector bus companies. For these routes STUs compete with the private sector for the available permits. The competition between the private companies and the STUs does not stop here, however. Private sector buses sometimes charge slightly lower cash fares on their 'permit' routes and successfully attract passengers from the competitive STU service.

2. Regularly scheduled bus services, whether privately or publicly owned, operate mainly on the better roads, mostly paved, and the officially sanctioned fare structure is based on all-weather paved road operation. Rarely do private bus operators seek permits for and offer services off the good roads system. Where they do offer such services, they do so informally (i.e., without permits) and charge about double the officially set 'good roads' fare rate. Rural areas with poor roads are served by an extensive informal sector of transporters who use bullock carts, ponycarts (tam-tams) and tractor-trailer combinations. These informal sector operators charge fares fixed by private arrangement which range up to more than double what a bus might charge on bad roads or four times the officially set 'good roads' rate.

3. Goods Transport. On the major routes the transport of goods is undertaken by a state-licensed transport industry owned and operated mainly by the private sector. However, at the level of the areas reviewed in the field surveys, trucks rarely operate, mainly because of a general shortage of trucks nationwide and because of the poor roads which frequently become impassable to conventional vehicles. India manufactures its own trucks and does not import any. However, because it exports significant numbers of the trucks that it produces, there are insufficient marketed within the country to satisfy demand. The same problem restricts the availability of spare parts. At the levels of interest of this study, the predominant means of transporting goods are the bullock cart and headloading, as shown in the following table which shows the proportions of rural goods transport, in quantity (tons) and ton-kilometers, carried by each type of transport mode.
<table>
<thead>
<tr>
<th>Mode</th>
<th>Tonnage (%)</th>
<th>Ton/km (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bullock carts</td>
<td>67.5</td>
<td>67.0</td>
</tr>
<tr>
<td>Headload</td>
<td>20.5</td>
<td>4.9</td>
</tr>
<tr>
<td>Truck</td>
<td>4.3</td>
<td>18.0</td>
</tr>
<tr>
<td>Tractor-trailer</td>
<td>4.1</td>
<td>5.8</td>
</tr>
<tr>
<td>Others (bus. animal,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>other)</td>
<td>3.6</td>
<td>4.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100.0</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

4. The average haul distance for the bullock cart was found to be about 3.8 km, for headloading about 1 km and for trucks more than 16 km. The implications were that each mode complemented the other, i.e., that headloading acted as feeder to bullock carts which in turn acted as feeder to trucks. Accordingly, each link is important in the chain of transport and improvements to each means could be amenable to justification through economic criteria.

**INDONESIA**

5. In theory, the Government of Indonesia regulates transport services through a wide range of laws and regulations with the most severe restrictions applied to passenger services. However, the area visited (Nias Island) is so remote that the effect of the regulations is hardly felt and services are virtually unregulated.

6. **Passenger Transport.** Regular services operate only in the vicinity of the two main towns which have vestiges of a road system connecting with a limited hinterland (one other town has a goods-only service in operation). Services are provided by both small and large buses all of which were said to be owned by urban traders. There is little competition, except in terms of comfort. Fares are high because of the road conditions and common to all buses. The poor road conditions counteract the normal speed and flexibility advantages of smaller vehicles since all are forced to travel at the same relatively slow speed.

7. **Within the major town and its immediate hinterland, pedal tricycle passenger (and goods) services were successfully introduced in 1977-78. Curiously, there were no motorized tricycles anywhere in Nias in spite of their use in Medan (Sumatra), the provincial capital with administrative responsibility for Nias. No satisfactory explanation for this situation was obtained, but official prejudice seemed the most likely reason.**

8. **In one location motorcycles, operating illegally, offered on-demand for-hire services on the same routes as the buses and, despite the fact that they charged 2 1/2 times the bus fare, were carrying up to 25% of passenger traffic on some routes. The government was proposing to eliminate the motorcycle services on the basis that they were unsafe and to protect the buses.**
9. **Goods Transport.** These are also only provided in and around the three locations which have remnants of road systems serving them. The trucks are owned by traders and operate under free market conditions despite nominal regulations governing their use. In the absence of road transport where good roads do not penetrate, goods are carried by headloading or shoulder pole.

10. **Other Transport Modes.** Passenger and goods services are also provided by sea (coastal and inter-island) transport. The most important local level services are offered by unlicensed small own-account traders located in the coastal villages.

**PHILIPPINES**

11. The Government has a battery of laws and regulations and a substantial bureaucratic organization aimed at planning, controlling and regulating rural transport services, which are almost entirely privately owned. If these organizations and procedures all worked and fully achieved their stated objectives, they would determine and closely control the number and type of vehicles operating, routes and schedules offered, fares charged, maximum loading, as well as a number of other aspects of the industry.

12. There is widespread evidence, however, that the legal control and regulation system and the existing planning process is virtually ineffective, and for rural passenger transport an almost free market situation exists. This is probably the reason why rural transport in the Philippines is better developed than in other countries where such a situation does not exist. However, rural transport would be better developed if access to credit on reasonable terms was easier.

13. **Passenger Transport.** The variety of services offered in the Philippines is greater than in any other country studied. Buses offer essentially long distance main highway services; mini-buses also concentrate on main highways but offer shorter-distance services; jeepneys provide the main short distance services on both main routes and penetration roads; motor tricycle services operate on penetration roads almost exclusively; and in areas where roads are rough and steep enough to prevent or severely discourage operation of other services, trucks provide limited passenger transport as an auxiliary service to cargo transport. There is little evidence of competition between these groups of transport services. The different services appear to be complementary, with each one providing a different type and quality of service to satisfy different travel markets.

14. **Goods Transport.** For the majority of small farmers there are virtually no for-hire trucks to transport produce in bulk. Most services are provided by urban-based traders who come either to the farm or to weekly markets to buy farmers' produce. Where farmers use the weekly markets they transport goods from the farm by headload, animal sledge or bicycle; motor tricycle, jeepney or occasionally mini-bus, at tariffs approximating the passenger space substitution fare; or as an auxiliary load on bulk transport trucks.
15. **Passenger Transport.** The main inter-urban services are provided by one large public company, the Sierra Leone Road Transport Corporation (RTC). In the past RTC handled goods traffic, but now it provides only passenger services. Shorter distance services are provided by taxis and mini-buses, on good surfaced roads only, and mixed passenger-goods pickups (poda-poda). Local level services, where they exist at all, are almost exclusively by poda-poda. The proliferation of small operators has promoted competition, except in areas where poor road conditions have discouraged services, resulting in local monopolies and higher tariffs. Passenger fares are set by the government, and increases often lag far behind inflation. For example, the latest increase, applied for in 1975, was not granted until 1979. In the last ten years, there have been only two increases in passenger fares. These regulations are ignored so far as local level services are concerned.

16. The difficulties which culminated in RTC's shutdown of freight operations date back many years. The Government had not allowed RTC to increase its freight rates sufficiently, and as a consequence, RTC could not offer the flexibility provided by owners of smaller trucks. By late 1977, when RTC ceased freight operations, it had accumulated losses exceeding Le 2.0 million (US$1.9 million). Since 1974, the Kreditanstalt fur Wiederaufbau (KfW) and the Government have been assisting RTC by supplying loans for buses and technical assistance for their maintenance. In addition, the Government subsidizes RTC by exempting it from duties on imports of spare parts and on office rents. Until July 1979, RTC was also exempt from paying gasoline taxes. The Government now expects RTC to break even on its passenger activities; however, this will be difficult if RTC is to operate its buses without subsidy. A system of regular rate adjustments will therefore have to be established.

17. **Goods Transport.** There is no regulation of entry into the road freight transport industry other than the license required by the Ministry of Transport and Communications and the legal limitation of ownership to Sierra Leonean nationals, a regulation which is not uniformly enforced. The daily operations of road transport are essentially unregulated, although the Government retains, but does not use, its power to control competition on routes formerly plied by RTC. Freight transport is unorganized. There is no regulation of tariffs for freight haulage, and rates are freely negotiated between private operators and potential customers.

18. It has been alleged that 'contract transporting of agricultural commodities is a lucrative business. Because producers are numerous, scattered and not organized in associations or groups, the transport operators deal with them as individuals. Transport charges are high as there is no agreed price per mile for transporting a certain weight of the commodity. Some wholesale traders who own transport make substantial profits from the use of their vehicles'. In general, the evidence from this mission supported these contentions.

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19. Passenger Transport. At the national and regional level, Sri Lanka has an extensive bus transport network which brings regular scheduled services to all cities, towns and larger settled areas. The bus route network also stretches into rural areas, bringing regular services to within 10 and mostly within 5 miles of most rural households. Mostly, these services are provided by nine public sector Regional Transport Boards (RTBs) with the Sri Lanka Central Transport Board providing a central service and coordination function.

20. The acceleration of economic activity, the increased volume of employment, the inflow of tourist traffic and the rise in the cost of fuel which reduced the use of private vehicles for transport, subjected the public transport system to a severe strain in 1978. Although a World Bank project to improve the performance and efficiency of the public transport system was in preparation, the Government saw the need for more immediate action to relieve the pressure on the bus system and improve passenger transport services. In April 1979, it decided to permit the private sector to operate passenger services. The private sector responded immediately by switching available vehicles which had been catering to tourist traffic needs and placing orders for importing additional buses. In 1979, an additional 1,576 buses were added to the private bus fleet and a further 2,647 in 1980, with the increased pace of imports being maintained in 1981. The increased private sector fleet has been mostly in small buses of 25 seats or less, many with air-conditioning. These imports compare with fleet increases of 265 in 1978 and less than 80 each year previously. These buses are issued with route licenses on inter-city or inter-provincial routes where they compete with RTB buses.

21. Apart from the formal passenger transport services offered by both public and private sector buses, there exists a range of informal passenger transport services offered by private sector vehicles. For example, lorries carry passengers in rural areas as an auxiliary function to their main goods transport services. Tractor-trailers and bullock carts also ply for hire in goods transport with many also offering passenger transport as an auxiliary service and at times in some rural areas, some can be seen offering exclusively passenger transport services. The government also now permits private vehicles to carry up to 6 fare-paying passengers without restrictions and, with increased insurance, more than 6 passengers can be carried.

22. Together with the increased motorcycle fleet since import restrictions were removed in 1978-79 and a large bicycle fleet, the formal and informal passenger transport system provides a wide range of personal transport services. These are so widely available and used that pedestrians, the main symptom of poor, inefficient or non-affordable personal transport, are rarely seen in Sri Lankan rural areas. Except in the immediate vicinity of towns or villages where pedestrians are numerous making intra-urban or
intra-village trips, walking traffic is rarely seen in rural areas. This indicates a good supply of affordable services which are used, as are bicycles, motorcycles, bullock carts or tractor-trailers, for local feeder trips to main thoroughfares where the higher-capacity, faster bus or lorry services are available.

23. Goods Transport. Apart from a minor role played by the railway and coastal shipping systems, the freight transport task is performed by lorries, principally in the private sector, but with some large fleets owned and operated on own-account by Government departments, public corporations and cooperatives. In 1977, the Commissioner of Motor Vehicles (CMV), estimated that 63% of the lorry fleet was in the private sector. Further, based on earlier studies, the private sector contains few large fleets with most operators having only one lorry; the average fleet size is only 1.3 lorries. Since vehicle import restrictions were relaxed in 1977, the lorry fleet has been increasing rapidly with about 5,000 imported in 1978, over 6,000 in 1979 and 9,000 in 1980. Coupled with the fact that, apart from safety and axle load type restrictions, the freight transport system operates under a free market system, goods transport is well catered for in Sri Lanka. Even at the local and district level where lorries sometimes have difficulties of access where the short local access roads are not motorable or not all-weather, goods transport is quite well catered for by tractor-trailers and bullock carts. These slower vehicles also compete with lorries for some of the intermediate distance trips from 10 to 20 miles.

TUNISIA

24. A forthcoming Transport Sector Memorandum provides a detailed analysis of the regulations applied to the industry and the state of both passenger and goods services. It is, however, mostly concerned with the broad strategic issues of national, regional and particularly inter-urban transport. Only a brief outline of these issues is given here, for consistency; attention is focused instead on the effect of the regulations and controls on local level transport services.

25. The Government exercises considerable control over road transport through its policies on vehicle imports and production, restrictions on vehicle ownership and entry to the industry, and the regulation of tariffs, routes and areas of operation.

26. Public road transport is provided by two national transport companies: the SNT for passenger traffic and the STM for freight traffic. In addition, 12 semi-public regional transport companies (SRT) handle both passengers and freight. Several large commercial and industrial enterprises and many small private firms also operate own-account fleets. Although restrictive regulatory policies are applied to own-account trucking with a view to controlling the expansion of the road transport industry and concentrating the monopoly of for-hire transport in the semi-public companies, own-account truck fleets have increased rapidly in recent years, mainly because of the poor services provided by the public companies. Small
trucks -- up to 3.5 tons for general cargo and up to 5 tons for agricultural produce -- fall outside the general entry regulations and, as a result, there is a relatively large number of private owner-operators.

27. Despite the regulations intended to protect the public trucking companies, inter-urban freight traffic is dominated by private and own-account trucking. Similarly, more than half the inter-urban passenger traffic is carried by private operators.

28. **Passenger Transport.** Local level passenger (and goods) transport is greatly affected by the quality of the road system with few services offered off the main all-weather road system. The negative effect of poor roads on transport services is exacerbated by the general regulations banning the mixed carriage of passengers and goods -- the motor vehicles most commonly found on local level roads are pickups and tractor-trailers -- and the very considerable fines that are levied (US$500-800) if operators are caught doing so. It is possible for pickup owners to apply for a license to carry passengers only, but very few do so since it obliges them to limit operations to specific routes, days and hours: operations are not permitted on paved roads at all, these are reserved for SRT services. In addition, these owners do not expect a significant demand for passenger traffic only since most farmers wish to accompany the transport of their agricultural produce. Again, non-compliance with any of these conditions leads to heavy fines. The ban on services on paved roads is particularly unfortunate, since it prevents those local market feeder operations, a proportion of which have to traverse a paved section of road.

29. **Goods Transport** is predominantly by pickup, with some 5-ton trucks, tractor-trailers, animal carts and pack animals. The reason own-account goods transport is limited to pickups appears to be because these are assembled locally whereas trucks are imported. (Local truck and bus assembly is scheduled to commence in 1983). However, agricultural officials feel that the current import quota for vehicles in excess of 5 tons gross is too low and that it is resulting in much long distance transport being undertaken by several small vehicles rather than one large one. Interviews with farmers indicated that there are still substantial obstacles to their entering the transport industry either as own-account or hire operators. There are 9 to 12 month delays in obtaining a pickup, unexplained delays in obtaining a license and little or no access to credit. Free entry into the transport industry is an important farmer priority because of the very large price differential that often exists between local and main town crop prices: these were quoted as ranging from 300 to 700%. 

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*ANNEX D*  
Page 7
DEVELOPING MORE EFFICIENT BASIC TRANSPORT:  
EXPERIENCE WITH THE BULLOCK CART IN INDIA

1. Rural goods transport in India has always been, and remains, dominated by the bullock cart. Currently it is estimated to account for 67% both of the goods tonnage and ton-km (1).9/ There are estimated to be in excess of 13 million bullock carts in India; the majority of these carts are of traditional design.

2. The traditional cart costs US$100-180, has a maximum payload of about 1 ton, and moves at 3.0-4.5 km/hr. It has large diameter narrow iron-rimmed wheels, which enable it to operate on very muddy tracks, though they cause damage to surfaced roads because of the very high contact pressure at the rim.

3. Because of the damage to surfaced roads, Dunlop developed and launched in 1936, an alternative animal-drawn vehicle (ADV) wheel. This is a pneumatic (rubber) tired wheel run on ball bearings, the whole assembly being fitted to a specially fabricated steel axle. The cost of a cart with a steel axle and ADV tires is approximately twice that of the traditional vehicle but on average it is 25% faster and can carry up to 2.5 tons. The type is simpler in construction than that used for motor vehicles. The tread pattern is simpler and low cost materials can be used for the reinforcing plys because of the slow travel speeds.

4. Despite all the marketing skills and experience of Dunlop, the ADV's penetration of the market has been slow, reaching just 500,000 units, or 4% of the total stock, in 1976. One school of thought attributed this to the conservatism of the Indian farmers and because the ADV performs less well than the traditional cart in muddy conditions.10/ Use was certainly concentrated in urban areas and in the affluent agricultural regions with good roads, and there is some evidence to support the contention that the ADV is less effective on wet ground (2). However, the principal reason for the comparatively poor sale of ADVs, according to Dunlop's managing director, was the absence of bank finance (3). Other more recent evidence supports this conclusion (4). In the wake of the oil crisis, the shortage of motorized transport was adversely affecting the sugar and jute industries which then turned to bullock-cart transport. Pressure from sugar and jute organizations persuaded some banks to finance ADV purchase by farmers directly linked to those industries. In effect, this tied the farmer to the sugar or jute factory, and since his income was reasonably predictable and fairly secure, the banks considered the risks acceptable.

5. Farmers' and related industries' response was immediate and by 1979 eight other companies had joined Dunlop in supplying ADV tires and other components (5). Although banking representatives in one state of India

9/ Numbers in parentheses refer to references at end of this Annex.

10/ 73% of rural households in India cannot afford any type of vehicle, and for the remainder, most could only afford the cheapest (traditional) type cart.
agreed that demand for ADV finance was 'insatiable', their reaction has been conservative and they have continued to make only a limited number of loans, geared still to the sugar and jute industries. The field surveys showed that in Bihar State, the Agricultural Refinance and Development Corporation, one of the main institutions lending for bullock carts, will advance Rp 4 million in 1981-82 for this purpose or enough for about 700 carts, adding 0.1% to the stock in the state.

6. The financial viability of ADV purchase by small farmers is well established for sugar and jute growing areas. What remains to be demonstrated is whether their finance is also viable for farmers living in mixed grain, vegetable or other produce areas. Given the conservatism of the Indian banks, it seems unlikely that they will experiment with such a proposition without the support of an outside institution like the World Bank.
References


VEHICLE PRODUCTION AND GROWTH IN THE
PEOPLE'S REPUBLIC OF CHINA AND INDIA

CHINA

Production of Various Means of Transport
in the People's Republic of China (1978)

<table>
<thead>
<tr>
<th>Type</th>
<th>Quantity</th>
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<tr>
<td>Handcarts</td>
<td>10,000,000</td>
</tr>
<tr>
<td>Bicycles</td>
<td>8,500,000</td>
</tr>
<tr>
<td>Hand tractors</td>
<td>324,200</td>
</tr>
<tr>
<td>Motor vehicles</td>
<td>149,100</td>
</tr>
<tr>
<td>Tractors</td>
<td>113,500</td>
</tr>
<tr>
<td>Freight wagons</td>
<td>16,950</td>
</tr>
<tr>
<td>Locomotives</td>
<td>521</td>
</tr>
</tbody>
</table>

1. The figures for the production of different types of vehicles in China in 1978 are typical of a trend that has been apparent for some time (1). They indicate the deliberate emphasis that has been placed on the mass production of relatively simple low-capacity, and low-capital cost means of transport in preference to the manufacture of higher-capacity but higher-capital-cost vehicles. The importance of the bicycle for personal mobility is noteworthy. At present there are about 400 million bicycles, or 4 for every 10 people. In general, every family has at least one bicycle available.

INDIA (2)

2. Between 1959 and 1974, by severely restricting car imports and giving special assistance to indigenous manufacturers of two- and three-wheeled vehicles, India achieved the following growth rates in its vehicle population (2).

<table>
<thead>
<tr>
<th>Type</th>
<th>Percentage</th>
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<tr>
<td>Scooters</td>
<td>2790</td>
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<tr>
<td>Mopeds</td>
<td>2350</td>
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<tr>
<td>Motorcycles</td>
<td>1560</td>
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</tbody>
</table>

11/ Figures in parentheses refer to references at end of this Annex.
The very rapid increase in two- and three-wheeled vehicles in general was not just a case of expansion from a small base. In 1959 they were a quarter as numerous as four-wheeled vehicles: by 1974 they were twice as many. India also has some 30 million bicycles, approximately 25 times as many per capita as there are motor vehicles.

<table>
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<th>Percentage</th>
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<tr>
<td>Three-wheelers (motorized)</td>
<td>820</td>
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<tr>
<td>Cars and Jeeps</td>
<td>180</td>
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<tr>
<td>Commercial vehicles</td>
<td>100</td>
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