

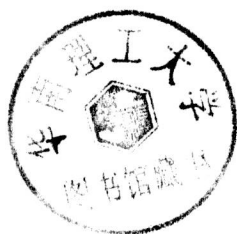


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# Global Transport Issues

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Volume 1



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# Global Transport Issues



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# INTRODUCTION TO THE VOLUMES

Although the late twentieth century has been characterised by the rapid advance of information technology as a means of global communication there is a continuing need for the physical transport of people and commodities at the national and international scale. The new means of electronic transferral of messages and finance across the globe have in fact stimulated and increased the requirements for transportation and at the same time have exposed the inadequacies of transport systems to meet satisfactorily all the demands being made upon them.

The transportation industry has developed in response to the requirements of modern societies for contacts between individuals and groups of people and for the movement of commodities to support the industrial economy. Improvements in the technology and organisation of transport systems have always been necessary in order to meet the fluctuating demands of the market and the various transport modes have experienced changes designed to enable them to adapt to these demands.

The structure of the contemporary transport industry is as complex as that of the local, regional, national and international markets it serves, and the efficient organisation and operation of a transport system is dependent upon a variety of specialists, ranging from market researchers and logisticians to engineers and operational staff.

The most significant development in the twentieth century has been the growth of mechanised road transport, with the automobile and truck now firmly established as the dominant means of personal and freight movement in advanced nations. The demand for long-distance personal transport is met by national and international air services although railways still account for a significant proportion of travel in some countries. Maritime transport, which with the exception of short sea ferry services and leisure cruising, is now almost entirely concerned with freight, offers facilities for the bulk carriage of commodities such as crude petroleum, coal, minerals, chemicals and foodstuffs, in large specialised vessels. Shipping companies, in conjunction with inland transport, also share in the operation of multimodal container transport.

Although the modern transport industry has been the recipient of continuing investment in its infrastructure there are still many areas where supply has failed to cope with demand, notably in urban areas where road congestion is a seemingly intractable problem. The motor car has been widely and enthusiastically accepted as the most convenient means of accomplishing personal journeys but this vehicle

has also been responsible for generating some of the most serious problems facing modern society.

The transport industry has been positively identified as one of the principal contributors to atmospheric pollution through the emission of waste gases from petrol and diesel engines on road and rail and from aircraft. Research into new fuels and more efficient methods of using fossil fuels in the internal combustion engine has as yet failed to produce a satisfactory solution to this pollution problem. The issue is complicated by the fact that the contemporary enthusiasm for and strong commitment to the motor car is responsible for the most serious levels of atmospheric pollution.

The material presented in these volumes has been selected to illustrate the principal contemporary issues in transportation in terms of its economic and organisational basis, the structure and technology that characterise the major modes, and the problems currently associated with urban transport and environmental pollution. Examples have been chosen from transport systems throughout the world, with the particular objective of drawing contrasts between the developed and developing nations.

Volume 1 provides an introduction to transport issues, examining the demand for transport, investment in transport systems and aspects of legislation under which the various modes operate, particularly in respect of safety. The ownership structure, costs and efficiency levels of transport undertakings are examined and the effects of the late twentieth century processes of deregulation and privatisation upon different modes are analysed.

Volume 2 provides an overview of the principal characteristics of land, maritime and air transport systems, considering innovations such as high speed rail, intermodality and containerisation. Technological advances in fuel efficiency and vehicle engineering are examined together with the ways in which information technology has been applied to passenger transport. Finally the development of logistical approaches to freight distribution are considered.

Transport systems in urban areas have evolved to serve the needs of rapidly growing populations but the transport infrastructure of most towns and cities is unable to cope adequately with the demands created by the motorist and the users of public transport. Volume 3 examines the principal urban transport modes in developed and developing countries and reviews the various policies that are currently being adopted to provide a more effective infrastructure for the movement of people within towns and cities. Fiscal and physical strategies for restraining the use of private cars are examined together with contemporary plans for reinvigorating public transport systems.

The final volume presents a collection of papers devoted to assessing the impact of transport on the environment and issues of sustainability and equity as they affect different groups within modern society. In particular the importance of contemporary efforts to promote green transport policies is reviewed and the concept and application of environmental transport management is analysed.

## **VOLUME 1 ECONOMICS, LEGISLATION AND POLICY ISSUES**

The contemporary problems associated with the market for transport are explored

in Ridley's paper on transport in society, which is based upon fundamental and innovative thinking on serious issues facing users of transport in its various forms. It is concerned to demonstrate that transport should always serve society's needs rather than determining the ways in which society should function. Urban congestion and environmental damage are identified as two of the principal dis-benefits generated by modern transport, and society must at all times be proactive in ensuring that appropriate transport means are available to meet the demand for the movement of people and goods in the most efficient and beneficial manner.

Leinbach provides a broad overview of the relationships between transport and development processes in the Third World, where in many states 40 per cent of public investment is regularly allocated to the improvement and maintenance of transport infrastructure. The paper reviews the more important research contributions to transport in developing countries since the early 1980s and proposes new research directions that could be of value in the future. There is a need to reconsider the priorities in transport policy in order that the various needs for improved transport in the developing countries are met in the most acceptable manner. A more detailed case study of the urban and regional transport needs in southeast Asia is provided by Rimmer, focussing upon Indonesia, Malaysia, the Philippines, Singapore and Thailand. The origins and present character of the various networks are examined and the failure of many capital intensive investments in infrastructure to meet demand in the region is noted. The author identifies a need to select transport projects to meet specific objectives and states that southeast Asia currently lacks the information on changing needs that are required in order to plan for long term transport objectives.

The overview of transportation geography in the USA contributed by Taafe and Gauthier explores the spatial aspects of transport and suggests that future studies of how transport demand is met will make more use of geographical information systems, policy analysis and regional studies.

The study of sugar export centres in Queensland, Australia, by Hoyle illustrates the ways in which the demand for transport in a changing and modernising economy over a century or so produces a series of contrasted and successive transport systems. Each of these in turn has responded to the need to enhance the competitive position of the regional economy and of the transport outlets and networks which have been built to facilitate its development. Within the developed world demand for transport is often focussed upon a clearly defined corridor and the study by Gibbs and Dundon-Smith of the Channel Tunnel between Britain and France illustrates how the enlargement of cross-Channel capacity by the opening of the tunnel between Folkestone and Calais in 1994 has had an impact upon the regional economy of northwest Europe. The future economic potential of various regions is analysed in terms of the changes in regional accessibility resulting from the use of the tunnel by freight and passenger trains.

In the late twentieth century many sectors of the transport industry underwent a series of fundamental changes with the introduction of privatisation and deregulation. These changes were made in a effort to improve the operation of transport systems and the ways in which they could respond to changing market demand. Beesley and Littlechild offer an overall review of the principal issues

involved in the privatisation process, and identify the criteria that should be adopted and the priorities for privatisation within the overall industrial sector.

Investment is critical to the success of the various transport modes in retaining and possibly increasing their share of the transport market and the next sequence of papers examines the issues involved in financing improvements in road and rail systems. They focus on Britain because this country has seen the introduction of many often controversial proposals for changes in infrastructure finance.

Starkie compares the allocation of investment between trunk roads and intercity rail in the United Kingdom in terms of pricing policy and the resultant levels of efficiency that investment can bring. The paper considers the Department of Transport's approach to investment, the recommendations of the Leitch Committee, the pricing of interurban road and railways and the calculation of costs and revenues for the two modes. It concludes that over-investment took place during the 1970s within the United Kingdom but that by the end of the century both road and rail will approach a balance of costs and revenues. Financing of the road sector is examined by Newbery, who recommends a radical change of attitude towards the current investment policy. He advocates the establishment of a public corporation which will own the assets and be subject to independent regulation, a situation similar in some respects to the railway industry. This regulator would set the level of road charges and revenue but the road authority would set the usage charges and operate the system subject to monitoring by the regulator.

Conflicting interests of many kinds have to be resolved in the formulation of transport policy and Gwilliam's 1979 paper reviews the changing trends in British transport policy up to the late 1970s. The paper focusses upon these conflicts in terms of their origins and suggests some alternative models for the organisation of the transport sector within the economy. Recommendations for changes in the transport sector are made in order to improve performance and produce more acceptable policy directions. Berechman takes the bus industry as an example of an activity where costs, scale economies and factor demand are issues that need to be clearly understood and concludes that type of ownership is a fundamental factor in performance within the industry. The deregulation of the British bus industry that took place in 1985 is examined by Gwilliam, who provides a critical review of the industry at the end of the 1980s and makes proposals for further adjustments to the existing regulations in order to secure improved performance. The position of the bus industry in Britain after 15 years of deregulation is analysed by Heseltine and Silcock, concentrating upon operating costs in the major metropolitan areas, excluding London. It is concluded that the 1985 Transport Act that enabled privatisation and deregulation of the industry did lead to cost reductions, with productivity improvements being the most significant factor in this process. Deregulation was also intended to promote competition within the bus market and Dodgson and Katsoulacos make use of economic models to analyse the British experience in the context of predation and costings.

Within the railway industry the problems of rising costs and a declining market have often led to line or service closures and Dodgson's paper examines the cost-benefit exercises carried out within Britain at a time when rail closure was

a highly controversial issue generating considerable opposition from special interest groups representing the consumer market. The eventual response by government in the mid-1990s to the economic problems of railways in Britain was privatisation and the policy objectives of this process are examined by Gibbs and others. The background to privatisation is analysed and the prospects for the future of the industry are assessed, although it is still too early to make any firm judgements.

Airline deregulation in the United States pre-dated many of the similar changes made in the transport sector elsewhere in the world and the experiences of American airlines have been closely examined over the past two decades. Dennis provides an overview of the measures taken to deregulate air transport in America and Europe and analyses the impacts in terms of European airline experience. Deregulation is also reviewed in the context of the current trend towards global airline alliances.

Ever-increasing air traffic has exposed the weaknesses of the air traffic control system within the most heavily-used aircraft movement corridors and Majumdar examines new proposals within the European Union for increasing the capacity of existing control systems without compromising safety. The expanding network of high-speed international rail services within the union has also created a need for improved methods of train control and methods of meeting this are considered.

Road safety is recognised as one of the most critical issues within modern society and Haight's 1999 paper urges that safety and mobility should be considered together in terms of their comparative costs. Working mainly within a United States context he reviews research on the valuation of deaths in accidents and proposes that further research is necessary to explore the costings of the safety-mobility link in more detail. Whitelegg argues that current efforts to combat the safety problem which involve blame or responsibility on the part of individual drivers or poor vehicle and road design are often misconceived. Fundamental changes in the modern transport system as a whole are necessary if road safety is to be improved and this is likely to involve a reassessment of the role of the car in modern society.

## **VOLUME 2 TRANSPORT MODES, INTERCHANGES, LOGISTICS AND TECHNOLOGY**

This volume addresses the principal transport modes in terms of changes in operating practices and techniques and proposals for further developments. Intermodal processes and systems are also examined together with recent advances in transport innovation such as electric road vehicles and information technology.

The continuing commercial success of maritime ports is dependent upon many physical, economic and political factors and Hoyle and Charlier's review of East African ports considers both the dynamics and spatial patterns of inter-port competition within the developing countries of Kenya and Tanzania. Each of the several ports on this seaboard has to try to maintain its competitive position in the context of the changing economic and political situation of the hinterlands

which it serves. The analysis of Indonesian passenger ferries by Rutz and Coull focusses upon the difficulties involved when a state with an emergent economy has to contend not only with low levels of development but with a fragmented national territory where inter-island communications are essential to maintain regular contacts. The extent to which these maritime services are improved will depend upon government investment priorities, the growth of the alternative air transport system and traffic demand.

The success of a port is dependent upon its attraction to the shipping lines that use it and increasing competition at the global level has obliged these lines to restructure their activities in order to survive. Slack, Comtois and Sletmo examine technological, marketing and business changes that are being adopted by shipping companies, using a Latin American example and emphasise that ports can only survive if they offer the required facilities.

Within Europe the economic growth of the European Community (and subsequently Union) has stimulated increased international traffic flows. The distribution of freight by inland waterways with major ports at their seaward ends has been improved with the use of what are termed river-sea ships, small vessels designed to navigate short-sea crossings and also to penetrate inland on rivers and canals, avoiding the break of bulk at the port to road or rail. Rissoan assesses the value of this innovation to inland regions of Europe in terms of lessening the demand for road or rail transport and the advantages of the low operating costs offered by water transport.

Seaport economics are often heavily influenced by state transport policies and Goss discusses the evolution of British policy towards ports. The merits of state and private port ownership are assessed and it is suggested that ports policy has not always been successful because governments have not always appreciated the economics of port working.

Motorway systems have played a major role in the development of road freight transport at the national and international level in western Europe and the paper by Gutierrez and Urbano attempts to assess the impact of the planned trans-European road network upon accessibility levels. Existing economic centres will enjoy greater levels of access and peripheral regions will be brought closer to central areas. Many of the existing European motorway networks have been financed through toll charges for road use and Munro-Lafon and Musset examine the operation of toll motorways in terms of construction, finance and levels of traffic.

Road transport operations in the less developed states have suffered greatly from a lack of investment in infrastructure and vehicles and in the rural areas many roads are in urgent need of improvement. Howe investigates the problem in rural Africa and proposes an asset management approach whereby maintenance of the network is achieved in a more effective manner.

Although the overall share of global freight and passenger traffic carried by rail has declined steadily in the face of road competition many rail systems still perform vital roles in national economies. Heaver provides a detailed analysis of rail-borne freight within Canada, comparing traffic on the two major systems and the effect that recent free trade agreements and state legislation has had upon rail operations. Competition for long distance traffic between Canada and

the United States is also examined, together with the battle for freight within Canada between road and rail.

The Japanese railway system has undergone several radical changes since the 1960s and Saito presents a critical review of how railways in Japan have been involved in the moves towards achieving greater measures of transportation within the country. As in many other highly-industrialised nations it is concluded that inappropriate state transport policies are responsible for much of the losses incurred by Japanese railways.

Many advanced nations have attempted to regain passenger traffic for railways by introducing high-speed rail services, often running on completely new tracks. Savelberg and Vogelaar examine the prospects for a high speed rail network in the Netherlands and northern Germany, with links into Scandinavia, in terms of contemporary traffic trends and measures of travel demand. Walrave examines the current high-speed rail network in Europe, comparing it with systems in Japan and the United States, and justifies continuing investment in Europe with rail becoming more closely integrated into a multimodal public transport system. He considers that high-speed rail is essential for the international transport system within Europe and for implementing the Common Transport Policy advocated by the European Union.

In the less-developed world the rail networks provided by the former colonial powers have often received less investment than road transport since independence. Turton argues that in Zimbabwe the government is still committed to supporting its internal rail network for long-distance freight and passenger movements and many of the routes are part of longer international routes providing access to seaports in South Africa, Mozambique and Tanzania. The various national development plans all emphasise the vital importance of the rail system but actual levels of investment have been limited.

Air transport has undergone radical changes during the late twentieth century with the introduction of privatisation and deregulation policies and mergers at the global scale between airlines of the various advanced nations. The continuing rapid growth of air passenger traffic in Europe has promoted vigorous competition for traffic between the various hub airports, and Dennis assesses the effectiveness of these major airport terminals as hubs and the extent to which they interact with each other. Graham has produced a study of American airports and their unique financial and administrative structures which are not found in other airports. However it is suggested that as the policies of privatisation and deregulation are being adopted in other parts of the world then certain of the financial practices used in American airlines could be applied to other airlines.

The second half of the twentieth century saw the application of intermodal freight haulage and handling operations designed to reduce the cost of goods transfer between the major transport modes. Containerisation has proved to be the most effective of these innovations and Hayut, in an original and pioneer study, examines this mode of operations in the context of major container ports in North America. This paper is complemented by Slack's review of the wider topic of intermodal transport in North America, where long-distance rail freight is gradually being concentrated upon a small number of load centres acting as regional distribution points for road freight.



Transport is a vital component of logistics, dealing with the entire supply chain of goods from manufacturing to final marketing, and Browne's paper examines freight logistics strategies in the Single European Market. The various strategies now in place will have implications for freight traffic patterns within the Union as various manufacturers adopt new policies for goods production and distribution. Freight rates are a very significant factor in the choice of a transport mode and Mwase demonstrates how the Tanzania-Zambia railway in East Africa, completed in 1976, has affected the railway rate structures in states exporting to the southern African ports. The new link competes with other railways connecting inland states with the seaboard, and freight rates are a vital factor in its continuing success for the haulage of minerals and other heavy freight.

The final theme in Volume 2 is innovation in transport and communications technology and its probable effects upon general transport costs and patterns. Ward's general overview assesses the opportunities available for improving the efficiency levels of existing transport modes and for the introduction of entirely new systems. Possibilities of innovations in all the principal modes are examined and the roles that might be played by the private and public sectors in promoting technological change are discussed. The specific example of the electric road vehicle is analysed by De Luchi, Wang and Sperling in the context of performance, operating costs and implications for environmental benefits.

Innovations in information technology as applied to the transport industry are discussed by Everts and by Morrison. The first paper examines progress in the development of global driver information systems which aims to provide a European-wide standardised system of in-vehicle information. The second paper focusses upon the provision of information to public transport users, drawing upon examples from France, Germany and Spain. The final paper by Plaut draws upon data from Israel, Canada, the United States and Europe to discover whether current technological advances in telecommunications have reduced the need for physical transportation by industry. The evidence shows that in fact an increased use of communications generally tends to produce a greater use of transportation by industrialists, a conclusion that conflicts with views held elsewhere that modern advances in communications result in a decrease in the demand for travel and transportation.

### **VOLUME 3 URBAN AND RURAL TRANSPORT ISSUES**

The contributions in this volume have been selected to illustrate the range of current approaches to the solution of urban and rural transport problems in advanced industrial and developing nations. The introductory paper by Hellewell is a radical and extensive review of contemporary policy issues, with particular attention being paid to the needs of the consumer. It is affirmed that a market approach to urban transport policy has not been a success and that substantial investment must be made to improve public transport. A radical policy shift is necessary before the current problems can be alleviated. Knowles examines the current developments in light rail transit as a realistic move towards solving urban traffic congestion and stresses the additional benefits to be obtained from

such systems in terms of economic regeneration. Most metros and urban bus transit systems involve heavy capital expenditure but they also require large operating subsidies to cover their costs.

Congestion pricing is a device whereby car drivers are charged for road use in urban areas with high traffic volumes and it is suggested by Fielding that this policy will make public transit more competitive. In Britain government policy aims to reduce car-travel to and from towns by locating new housing and commercial developments in areas provided with public transport services. However it has been found by Curtis that the proximity of such new developments to strategic transport routes generates more travel, and planners need to ask whether the concept of self-contained or balanced communities requires further thought in terms of transport needs. Road pricing schemes have been subject to detailed economic analysis and the papers by Newbery and Day consider the case for charging in urban areas. Newbery considers that road pricing is the best way in which congestion can be reduced and would lead to an improvement in the quality of public transport. If the use of roads can be correctly priced then traffic in the most congested areas would be reduced and eventually a state of balance could be attained where road charges would be roughly equivalent to road costs. Day identifies the three problems that have to be addressed before road pricing can be introduced, namely the basic economic argument for charging, the practicalities of a charging mechanism and the political aspects of a pricing scheme. It is emphasised that the effects of bad transport policies take time to eradicate and that a road pricing system is a rational approach to urban transport problems.

A successful car parking policy for central urban areas is essential if excessive use of cars is to be reduced and Polak analyses management policies as applied to central area car parking facilities in British cities. Current and alternative policies are examined using a modelling approach and it is suggested that the existing transport models used in planning for parking need to be complemented by other types.

McShane and Meyer employ American urban case studies to demonstrate that car parking strategies need to achieve much more than simply meeting the demand by drivers for space. Such strategies should be viewed according to how they relate to other urban transport issues such as the aggregate amount of parking space in a city, access by drivers to parking areas, the spatial distribution of parking within the urban area and parking costs.

The demand for urban road space and for inner city car parks can be reduced if the occupancy rate of commuter cars can be raised and the policy of car sharing has been identified as one method of achieving this reduction. Shaheen, Sperling and Wagner provide an overview of car sharing experience in the 1990s, drawing upon practice in several European countries, in North America, in Japan and in Singapore. Car sharing organisations are growing in number and can generate both social and environmental benefits to urban communities.

Various policies for restraining traffic at the area level are also widely advocated as a means of limiting congestion growth and Monheim draws upon experience in Germany to promote this method of improving urban transport. Actively promoting the reduction in the number of cars using central areas in towns and

cities leads to a decline in accident rates and pollution and a rise in the patronage in public transport. Roberts' challenging paper on 'autolatry' suggests that modern society is now passing into a state of disenchantment with the private car and realises that present levels of car ownership and use are now seriously detrimental to the quality of life. After assembling an impressive range of evidence in support of his claim he emphasises the urgent need to counter the adverse effects of the car on the environment and upon society.

Attempts to counter the problems caused by the excessive use of the car in urban areas rest heavily upon improvements to public passenger transport services, which have seen a steady reduction in their appeal during the second half of the twentieth century. Urban bus and rail undertakings have undergone substantial reorganisation since the 1980s in an attempt to strengthen their financial base and become more competitive as an alternative means of transport to the private car. Evans questions the extent to which bus privatisation and deregulation in the United Kingdom has actually resulted in free competition, showing that most local urban bus services continue to be operated as monopolies by the companies in place at the time of privatisation in the mid-1980s. Where competition has been attempted it has usually been eliminated by existing undertakings and the author uses evidence from British bus companies in support of his claim that users of buses can often benefit in urban areas where one company still controls all routes in a near monopoly of the market. Hibbs adopts a direct approach to evaluating the effects of deregulation in his discussions with senior managers in the bus industry and with a sample of passengers.

The role of the railway as a public transport mode in urban areas is especially critical in terms of commuter traffic but the provision of services continues to be dependent upon investment for improvements to infrastructure and upon annual subsidies towards operating costs. Bradshaw examines the problems of railway operation in Britain in the period immediately prior to privatisation in the mid-1990s. He suggests that some suburban and inner city rail services could be better operated by light rail transit as in Greater Manchester and advocates a transport policy which would define a more important role for the railway industry.

Although the demand for people movement dominates the current debate on urban transport problems it must not be forgotten that freight carriage accounts for a substantial share of all town and city traffic. Policy issues relating to urban freight are examined by Ogden in terms of demand-supply relationships and he stresses the need for goods movements within urban areas to be recognised more widely as a component of urban transport systems planning. He enumerates the various aspects of freight transport that require to be considered when formulating public policy and the paper is significant in advocating the necessity to incorporate goods movements patterns within the overall policy and planning structure.

The remaining contributions provide case studies of transport planning and policy issues in individual towns and cities throughout the world. The Metrolink light rail system in Greater Manchester was opened in the early 1980s, linking former suburban rail routes to the north and south of the city with a section through the central area. This new system exemplifies the trend towards light

rail that can be seen in many European cities and in other world urban areas. The Manchester network is intended to attract passengers away from cars and to provide direct and congestion-free access to the city centre for commuters and shoppers. Knowles demonstrates that the volume of passengers attracted to the Metrolink was greater than that originally forecast despite competition from deregulated buses, and road congestion was reduced in the suburban corridors to north and south. Newman provides an Australian perspective with his study of the factors which have shaped the sprawling extent of major cities and recommends that the promotion of compact cities may be the answer to counter the continuing expansion of the suburbs. He advocates that better public transport and appropriate land use planning could tackle the problem of excessive car use, together with new design options and a new planning approach involving demand management and integrated strategic network development.

A wider assessment of the effects of new rapid transit systems is provided by Walmsley and Perrett, with examples from Europe and North America. All aspects of rapid transit are examined, from objectives, methods of funding, the form of the urban areas to be served, effects upon the environment and implications for future development and land-use.

The implications for the urban transport infrastructure of opening a large out-of-town retail and entertainment complex are explored by Hall in the context of the Metrocentre in the Tyneside conurbation in Britain. Although levels of car-ownership in this area are amongst the lowest in Britain, and public transport provision is at a high level, the Metrocentre is still essentially a complex designed for car-based access and bus and rail usage could be increased with suitable planning.

Many cities in the developing countries are already showing evidence that the problems of car-induced congestion experienced by their western counterparts could well become a major issue for Third World transport planners in the future, although at present public transport still accounts for a large part of total passenger movements. An extensive survey of non-motorised travel in Third World cities conducted by Maunder and Fouracre indicates that this form of transport is also of great importance for urban mobility, especially where low-income communities on the urban fringe are concerned. Walking and cycling are essential means of transport for many urban workers who are unable to afford the costs of what is often an over-stretched and inefficient bus system. It is recommended that transport planners should allocate more investment to meeting the needs of these forms of non-motorised transport and that future land-use planning should seek to minimise trip lengths of walking and cycle journeys. The uneven nature of public transport facilities in developing countries is analysed by Camora and Banister in a Central and South America context. In many cities there is a discrepancy between the quality of public transport and the needs of much of the population, with higher-income communities often being provided with a better level of service than poorer residents in peripheral zones. The better-off urban residents are thus more mobile, in terms of use of both private cars and public transport, and have a higher level of access to central urban facilities. Transport supply, especially in the public sector, has failed to grow to meet the demands of the poorer communities on the city margins who

now suffer as a result of the longer and more expensive trips necessary to reach employment and other urban services.

A few cities in the Third World have already achieved high levels of car ownership and are already experiencing congestion problems similar to those found in advanced states. Gray's review of transport in Singapore, a small nation-state in southeast Asia, describes how investment in a mass transit rail system has been coupled with car restraint policies in order to combat traffic congestion in the city centre. An area licensing scheme introduced in 1975 controls peak hour traffic and many drivers have now been attracted to the commuter rail network.

The final group of contributions focus attention upon the problems of transport and mobility in rural areas of advanced and developing regions. Declining levels of accessibility for certain sections of rural communities is a growing social problem and Nutley, in his study of rural Wales, suggests that a time-space approach be adopted. This involves a combination of processes ranging from conventional bus services to modes such as social cars and mobile shops. He also advocates the adoption of what are described as 'non-transport solutions' such as altering or extending the opening hours of facilities in larger centres so that they are more easily accessible to rural dwellers. The study of mobility in rural Oxfordshire by Banister is based upon a consumer survey in which respondents expressed preferences for different transport modes and policies. Mobility and accessibility are seen as a part of a total welfare structure in which many types of rural services, such as post offices and shops, are involved and where subsidies for rural transport can be introduced.

Mwase investigates the benefits of rural transport improvement in Africa in terms of agriculture and marketing and the integration of rural areas with the wider national territory. Investment in rural roads is considered in relation to agricultural development and the pricing of farm products, using examples from Tanzania. Rural road feasibility studies are examined and the management of rural transport services is analysed in terms of haulage costs and government intervention policies.

Both urban and rural transport problems need to be considered in a community context, where mobility and accessibility to essential public and private services depends to a large extent upon adequate transport facilities, but where new policies directed towards reducing the need to travel by providing services closer at hand to the market can also help to solve transport difficulties.

#### **VOLUME 4 ENVIRONMENTAL ISSUES, EQUITY AND SUSTAINABILITY**

Global warming, atmospheric pollution and increasing energy consumption have emerged as three of the most critical issues in the late twentieth century. The steadily rising consumption of energy, and in particular petroleum, by the transport industries has been responsible for a large proportion of the current levels of atmospheric pollution, and road transportation can be identified as the most damaging mode. Air transport also contributes in large measure to pollution,