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TRANSPORT AND THE MILLENNIUM DEVELOPMENT GOALS IN AFRICA

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DEVELOPMENT GOALS IN AFRICA**

PREFACE

The papers here presented have been prepared as a background working document for the meeting of experts that is scheduled for April 4-5 2005 in Addis Ababa, immediately preceding the April 6 meeting of African Transport Ministers on the Role of Transport in Achieving the Millennium Development Goals (MDGs). The Ministers are expected to consider submitting proposals regarding the sector's contributions to the MDGs for consideration at the African Heads of State Conference in June 2005 and, if agreement is reached, at the UN General Assembly in September.

This working document has been prepared by a technical team, which met at the African Union in Addis Ababa on February 14-15. The team consisted of:

Mr. Aboubakiri Baba-Moussa, Chairman, and Director Infrastructure and Energy, African Union,

Mr. David P.A. Kajange, Secretary, and Head of Infrastructure and Tourism Division, Department of Infrastructure and Energy, African Union,

Mr. Joseph Atta-Mensah, Senior Economic Affairs Officer, Trade and Regional Integration Division, UN Economic Commission for Africa,

Mr. Robert Lisinge, Highway and Transportation Engineer, Trade and Regional Integration Division, UN Economic Commission for Africa,

Mme. Marie-Therèse Guiebo, Economist, Trade and Regional Integration Division, UN Economic Commission for Africa,

Mr. G. Yao Adzigbey, Principal Program Officer and Chief of Transport Division, ECOWAS, representing the Transport Coordination Committee of the Regional Economic Communities,

Mr. Eskendir Alemseged, Civil Engineer, African Development Bank,

Mr. Tesfamichael Nahusenay, Co-Chairman, and Deputy Program Manager, Sub-Saharan Africa Transport Policy Program (SSATP), World Bank,

Mr. Peter Roberts, Lead Specialist, Transport and Urban Department, World Bank,

Mr. Christopher Willoughby, Consultant to SSATP,

Mr. Ali Gaddaye, Observer, and Deputy Secretary General, Community of Sahel States.

The work of the technical team was assisted by a draft resource paper on Transport Connections with the Millennium Development Goals in Africa which had been prepared by the Sub-Saharan Africa Transport Policy Program (SSATP), benefiting substantially from country case studies submitted by the governments of Ethiopia, Ghana, Guinea, Lesotho and Mali, as well as helpful documentation provided by COMESA, FAO and WHO.

The present document consists of:

- A note on the key issues, introducing
- The matrix of suggested targets and indicators for transport that was developed by the technical team, and
- A revised version of the resource paper on Transport Connections, benefiting from team comments and additional submissions.

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THE KEY ISSUES

1. Efficient operation of transport infrastructure and services is critical to attainment of the Millennium Development Goals (MDGs), and nowhere more so than in Africa. The large size of the continent and the wide spread of population inherently raise the significance of transport in almost all development decisions. Backlogs in maintenance and inefficiencies in operations have serious effects on many other sectors. Expensive and poor-quality trunk services reduce the competitiveness of African products. Inadequate and ill-maintained local infrastructures prevent large parts of the population from participating in the modern economy.
2. The significance of transport services to each of the MDGs means that effective pursuit of the latter requires priority attention to those transport services, which are relevant to each. This document identifies these services. It seeks to develop targets which should help prevent them obstructing attainment of the MDGs. And it suggests practical indicators which should be monitored to measure and guide progress toward the targets.
3. The targets and indicators are spelled out in matrix form following this note which summarizes the main considerations underlying the selection made.
4. The overriding objective of all the MDGs is incorporated in the first: Eradication of extreme poverty and hunger. Africa's extensive rural areas harbor the continent's greatest concentrations of hunger and poverty. But they also offer the greatest potential for near-term growth, through increased agricultural production and processing. Unlocking these potentials requires rural transport infrastructure adequately maintained to permit farmers to obtain inputs and advice at reasonable cost and to sell their outputs at remunerative prices.
5. It is seldom, if ever, that roads alone can induce strong cumulative development but, in combination with initiatives and investments by private parties and public bodies, they can have dramatic effects, especially where transport investment has been seriously lacking as in much of rural Sub-Saharan Africa. Several of the case studies contributed by countries to the present exercise have been able to cite specific cases where production of an affected area doubled or tripled within a few years of road improvement. Indirect, follow-on effects normally result in substantial local growth of employment and reduction of poverty and hunger.
6. Equally important with improvement of rural access for the attainment of pro-poor growth in Africa is efficient operation and timely expansion of trunk and urban transport infrastructure and services, to avoid bottlenecks that constrain the growth of other sectors. The large capital investments have to be well managed and maintained. And service operators have

to be stimulated by appropriate combinations of competition and regulation to respond effectively to market demand and opportunities opened by advances in technology.

7. Comparisons of the costs of freight transport in Africa with those in other regions of the world repeatedly show that the former are substantially higher – by a factor of 2 or 3, or more, by comparison with Asian developing countries, for example. Analyses of the differences show that they are not to be explained by aspects such as taxes or unique physical/geographic features of Africa but rather by factors that should be more amenable to change, such as more limited competition or other inappropriate incentives, lower skills and poorer quality of maintenance. It is very important systematically to tackle these problems in order to enhance Africa's competitiveness in the global market and facilitate stronger economic growth.

8. Illustrative of the progress that can be made is the sharp improvement that several of the case-study countries have been able to report in the condition of their road networks as a result of better maintenance, with marked effects on vehicle operating costs. These improvements have generally resulted from better arrangements for financing and managing road maintenance, assisted in most cases by the creation of Road Funds, and of public-private Road Boards that strengthen transparency and accountability.

9. Ensuring basic quality of local transport infrastructure and services is important for achievement of primary school completion by all and of gender equality at all levels of education (MDGs 2 and 3). Easier, cheaper and safer physical movement is often a significant element among measures to improve attendance at primary and secondary schools. Besides easing pupils' and teachers' access to the school, transport improvements can also contribute to reducing the amount of time that household members, including children, have to devote to collecting water, fuel and food, which is usually a principal reason for non-enrolment. Improvements of local roads and footpaths tend to have particularly significant effects on school attendance in areas where little transport infrastructure had previously been built. Transport officials need to contribute to education authorities' difficult planning choices, and to participate in district monitoring of progress toward the education MDGs.

10. Sub-Saharan Africa faces particularly big challenges in bringing about the large reductions in child mortality and maternal mortality aimed at by MDGs 4 and 5. Transport has a significant role to play in getting the solutions effectively into the hands of the poor, through its part in ensuring reliable availability of supplies such as drugs, vaccines, bed-nets and spare parts for water systems, and of basic health services. Local transport infrastructure and services also affect the extent to which people can take advantage of such services, the scale and costs of the network the health authorities have to maintain, and the degree to which patients can exercise choice and hence stimulate quality of service provision.

11. Recent surveys in a number of African countries show that typically around 60% of households in the bottom two income-quintiles find distance to health services a major obstacle to accessing them, exacerbated in some countries by difficulties in securing transport. Road

improvement programs have sometimes been able to improve access particularly for poorer people.

12. One dimension of transport service that requires particular attention in the effort to reduce maternal and child mortality is effective provision for speedy response to medical emergencies, such as major obstetric problems or cerebral malaria, usually requiring urgent hospital treatment. Intermediate-technology vehicles, developed to suit local conditions, can sometimes be very useful for meeting these needs.

13. MDG 6 – a start on reversing the incidence of major communicable diseases – requires particular effort from the transport sector to bring to an end the role it has inadvertently played in the spread of HIV/AIDS. Transport bodies, private as well as public, need to mount and to monitor systematic education and treatment campaigns among their own workforces and in communities seriously affected by their activities, such as important transit and transfer points, main transport corridors, and major infrastructure construction sites. Agencies involved in road transport have to participate actively in formulation, with other concerned bodies, of effective strategies to reduce the scourge of road traffic accidents, and to play a leading part in the practical implementation of such strategies.

14. In assisting the achievement of environmental sustainability (MDG 7), the transport sector has a dual role – to develop and achieve improved environmental standards in its own operations and to support efforts to the same end in other sectors. Effective application of procedures adopted to minimize negative effects of transport activities on natural resources and local residents has to be actively monitored. Transport can also make significant contributions to preservation of forests and of good water supplies by making non-timber fuels more affordable and ensuring speedy delivery of spare parts for pumps.

15. Especially for urban areas, measures are needed now to move towards elimination of leaded petrol, with the serious consequences that high lead absorption has on children's life-long capacities. Reduction of other vehicular pollutants, especially particulates, will be an increasing priority, especially in the largest urban areas.

16. One problem highlighted in MDG 7 to whose solution transport has an important contribution to make is that of slums – which are believed to be home already to 80% of urban populations in most Sub-Saharan African countries and continue to expand. Community efforts to upgrade local roads and paths, and to secure more adequate transport services from the slum area to places of employment and social services, need active support. Even more important for the future, transport agencies have to work directly with land-use planners and other municipal services to prepare sufficient quantities of space for new residents to develop gradually without recreating the problems of access to work and services that are faced by many of today's slum-dwellers.

17. MDG 8, calling for global partnership for development, deals with many aspects of international cooperation. One problem that it underlines and which the transport sector has to play a large part in solving is the difficulty that landlocked countries face in participating effectively in the world economy. In Africa this problem is exacerbated by weak performance of the trunk transport sector generally, and international transport in particular. It therefore links closely with broader trade issues affecting all the continent's countries.

18. Since the landlocked countries are at the end of long international trade routes they suffer most from the typically high current costs of overland transport in Africa. Carriage of their consignments is expensive for a great number of reasons. Some are inherent to serving relatively small production sources and markets, at the end of long distances. But many relate to outmoded inconsistencies among the procedures and standards of different countries, to unscrupulous exploitation of transit traffic and passengers by those supposed to ensure smooth movement, and to inefficiencies in the bodies, public and private, involved in international trade. Most of these bodies belong to the transport sector, such as port and railway authorities, agencies responsible for highway maintenance and policing, freight transport companies and their suppliers, and the government authorities responsible for regulating trade and transport.

19. NEPAD, the UN Economic Commission for Africa and the Regional Economic Communities are trying to draw the lessons from the many failed efforts of the past to overcome these weaknesses. The UN Millennium Project has highlighted the international transport problems of Africa, and especially the continent's landlocked states, in the final report it issued in January 2005. The UN Economic Commission for Africa made many valuable suggestions regarding ways forward in the *Economic Report on Africa 2004: Unlocking Africa's Trade Potential* that it published last September. The ECOWAS Council of Ministers agreed in January 2005 on a new structure of national, regional and corridor public-private committees, and new instruments, to help solve transit problems.

20. The effectiveness of these important initiatives at the international level will ultimately depend still on the degree of priority that the individual governments give to resolving the problems and to dealing with them comprehensively, so that the many bodies involved, both within transport and outside (such as Customs services), bring about change that will be much larger than the sum of its parts and hence rewarding for all.

21. Development of national sets of MDG-related transport outcome indicators/targets, adapting to each country's priorities and realities the Africa-wide matrix attached herewith, and adjustment of transport agencies' management systems in such a way as to focus effectively on the accomplishment of these targets, should greatly facilitate transition in foreign assistance for transport from project financing to budget support. This in turn would significantly increase the feasibility of channeling into the sector the required part of the much enlarged foreign aid flows that Sub-Sahara African countries need to help attain the MDGs.

TRANSPORT TARGETS AND INDICATORS RELATED TO THE MILLENNIUM DEVELOPMENT GOALS (MDGS)

MDG	Targets	Indicators
MDG 1 Eradication of extreme poverty and hunger	Access to inputs and markets, and generation of employment opportunities, improved by halving the proportion of rural population living beyond 2 km of an all-season road	Proportion of rural population within 2 km of an all season road % Reduction of travel and vehicle turnaround time % Increased productivity in agriculture and economic activities % Increase in employment opportunities and income generation from transport related activities
	The difference in average transport cost between Africa and Asia narrowed down by 50%	% Reduction in passenger fares (passenger kilometer) % Reduction in unit goods transport cost (ton kilometer) Level of affordability of transport cost by the urban and rural poor % Increase in the use of intermediate means of transport (IMT) Existence of sustainable financing mechanisms like Road Funds... % Increase in the proportion of roads in good and fair condition
MDG 2 + 3 Universal primary education and gender equality	Rural access and urban mobility improved to eliminate constraints on the time which all children have to participate in education and to enable effective education to be delivered and reached safely	% of schools which have reliable access % of households which report constraints on education due to: Lack of girls time for school Difficulty (cost) of access Poor quality of education service Lack of safe access to school
MDG 4 + 5 Child Health and Maternal Mortality	Rural access and urban mobility improved for reliable supply of inputs to health facilities, to provide affordable access for all households and to enable cost effective outreach health activities	% Health centers, clinics etc with reliable rural access. % of households reporting constraints on access to health services because of: Distance Cost / difficulty of travel Poor quality health service Unit cost immunization / capita Unit cost / coverage of outreach services / capita
	Emergency transport response for medical crisis in rural communities improved through community communications facilities linked to improved transport services	% Emergency patients unable to reach health care in time: Expectant or postnatal mothers Children under 5 years
MDG 6 HIV/AIDS, malaria and other diseases	Ensure transport sector ceases to be an agent for spreading HIV/AIDS	HIV/AIDS Prevalence among transport sector workers (public and private) HIV/AIDS prevalence rate in transport affected communities Inter-country coordination of actions relating to AIDS in transport
	Rate of road accident fatalities reduced by half by 2015	Rate of fatality (per million vehicles-km) Number of countries adopting road safety strategies

MDG	Targets	Indicators
MDG 7 Environmental sustainability	Share of urban residents for whom mobility problems severely constrain access to employment and essential services halved	% of households (in the various urban living environments) which report transport costs and time as major obstacles to employment % of households which report access as a major obstacle for essential services
	Environmental sustainability promoted in all transport operations and development programs	Environmental impact identified by audits of programs undertaken
	Production of leaded petrol ceased by 2010	Number of countries banning sale of leaded petrol
MDG 8 Global partnership for development	Transport cost for landlocked countries reduced by half and their access to global markets improved, all TAH missing links completed and existing portions of regional transport corridors maintained by 2015	Percentage reduction of missing links of the Trans-African Highways (TAH) network and transit corridors. % reduction in transport cost for landlocked countries
	All non-physical transport barriers that increase journey time, customs clearance, border delay and impede the flow of goods and services dismantled by 2015	Proportion of countries that have reduced checkpoints along their main transit corridors to a maximum of 3 (between port and border of landlocked country). Proportion of countries that have reduced their border crossing time to OECD average. Proportion of countries that have reduced their port clearing time to OECD average.
	Axle load limits, vehicle and road technical standards harmonized between RECs by 2015	Proportion of RECs with harmonized axle load limits Proportion of RECs with harmonized standards for vehicles Proportion of RECs that have harmonized road design standards
	Air transport services improved fares reduced, and movement of goods and services facilitated in all African countries by 2015	Number of new connections between African countries established. Number of products and volume of traffic of products transported by air. Percentage reduction in air transport fares.

I. INTRODUCTION

1.01 This paper has two purposes. First, it seeks to synthesize the results of research relevant to the role of transport in helping African countries achieve the Millennium Development Goals (MDGs). Second, it explores the possible desirability of either defining transport-specific targets for the sector to aim at in support of the MDGs, or at least including in countries' MDG planning and monitoring efforts more explicit recognition of the contribution required from the sector.

1.02 The statement of MDGs which was signed by all the Sub-Sahara African governments, as well as those of aid-giving countries, and developing countries from other parts of the world, in the months following the UN Millennium Summit of September 2000, makes no explicit reference to transport. But it has always been recognized that transport infrastructure and services indeed have an important supporting role to play. UN Secretary-General Kofi Annan, in reporting¹ to the General Assembly last September, specifically included "focused investments in economic and social infrastructure" in his short list of five key areas in need of "a quantum leap in scale and ambition" if the MDGs are to be fulfilled.

1.03 Use of broad sector performance targets has not been common in transport, even in the OECD countries, partly because of the great variety and specificity of services offered. Some of the exceptions have been road traffic fatalities, on-time arrival rates of planes and trains, and ship turnaround times. But interest in broad performance targets has certainly been rising in recent years, concomitant with efforts to apply 'Results-Based Management' philosophies generally, and to spread the use of performance-based contracting. China has been working over the last five years to achieve by this year road accessibility for 95% of townships and 93% of villages. Vietnam, one of the first countries to prepare a national version of the MDGs, adapted to the country's realities, insisted on adding a target for improvement of local infrastructure: 80% of poor communes were to have basic motorized road access by 2005, and 100% by 2010.

1.04 Over the last two years the UN Millennium Project team in New York has given great attention to developing MDG needs assessment methodologies and applying them in some pilot countries, including three African countries. Recognizing the importance of properly providing for transport, it nonetheless faced much frustration, finding no suitable data for ports or railways and assessing transport proposals included in PRSPs and country plans as "lacking in am-

¹ UN General Assembly, 2004. "Implementation of the United Nations Millennium Declaration: Report of the Secretary-General" (27 August 2004) UN document A/59/282.

bition”.² Analysis was therefore made of the relationship between per capita density of paved roads and a range of macroeconomic statistics, including GDP per capita, poverty headcounts, population density, rates of urbanization and agricultural output as percent of GDP, for a large number of countries. From this analysis it was concluded that the most useful approach was to establish “a target road density as a typical density achieved by middle-income countries that have managed to reduce income and non-income poverty to the levels that Sub-Saharan Africa needs to achieve in order to meet the MDGs by 2015.”³ The number tentatively selected was 0.5 kilometers of paved road per 1,000 persons, and proposed expenditure programs were drawn up against this target.

1.05 Dissatisfied with what was felt to be the over-simplification of this approach, the Millennium Project team suggested, in the same document, that a better method for future work might be to define “MDG-compatible” levels of access to transport infrastructure and services for individual households or communities. Considering aspects such as how far women might be carried by people on their way to emergency obstetric care (related to MDG 5) or agricultural produce could reasonably be transported by non-motorized means (related to MDG 1), the team concluded that minimum “MDG-compatible” access to an all-weather road in rural areas might be 2 kilometers. It suggested that once a country has chosen an appropriate value for its particular circumstances, attention could then be turned to assessing the increase in the share of population enjoying this level of access that would be consistent with the partly transport-dependent targets, such as the 75% reduction of maternal mortality rate sought under MDG 5.

1.06 Simultaneous with the work of the UN Millennium Project, the World Bank has been giving considerable attention to extending the range of indicators that it introduced under IDA-13 for measuring countries’ progress, to cover more of the real sectors, including infrastructure and transport. After much reflection, it has now adopted, and gathered a first round of country data for, an indicator called ‘Sustainable Access to Rural Transport,’ being the proportion of rural people who live within 2 kilometers of an “all-season road” (i.e., one that is motorable all year round by the prevailing means of rural transport, even though it may be temporarily closed periodically, for instance after heavy rains). Adoption of this particular indicator for inclusion in the very selective IDA system (only about 20 indicators in all) was justified on the grounds that sustainable access to rural transport is a key contribution to achieving many of the MDGs and that poor people view isolation as a major contributor to their poverty and marginalization, as shown by numerous opinion surveys.

² UN Millennium Project, 2004. “Millennium Development Goals Needs Assessments – Country Case Studies of Bangladesh, Cambodia, Ghana, Tanzania and Uganda” Working Paper, 17 January.

³ UN Millennium Project, 2004. “Millennium Development Goals Needs Assessments for Ghana, Tanzania and Uganda” Background Paper of 3 September to Sachs, Jeffrey D. et al. 2004. “Ending Africa’s Poverty Trap”, *Brookings Papers on Economic Activity* No. 2: 117-216.

1.07 Although the values of this indicator can be estimated on the basis of detailed maps, the most cost-effective way of gathering the necessary data is by incorporation of an appropriate question in major household surveys that are typically carried out every two or three years. The figures below are based mainly on household surveys carried out in the late 1990s or early 2000s.

Table 1. First Estimates of Rural Transport Access Indicator for Selected Sub-Sahara African Countries

Benin	32%	Ethiopia	27%	Mali	51%
Burkina Faso	19	Ghana	44	Niger	52
Burundi	19	Kenya	44	Nigeria (8 states)	47
Cameroon	20	Madagascar	67	Tanzania	38
Chad	5	Malawi	38	Zambia	51

The (unweighted) average for these 15 countries is 37%, which compares with 43% for all 24 IDA-only countries (including those from other regions) that were covered in the first round of the data collection effort. For comparative purposes 8 IBRD borrowing countries were also covered in that round, and they showed an average of 94% for the indicator. Five-year time-series data that were available for two of the IDA countries indicated an average increase in accessibility there of about 1% per year.

1.08 This paper is addressed to all countries of Africa, and all modes of transport operating in the continent, and it is believed that it contains points of interest to each. It refers directly, however, much more to some countries than to others because of the country case studies submitted and the apparent concentration of relevant past research on relatively few countries. The topic of connections between transport and the MDGs also directs attention mainly to Sub-Saharan Africa, where the dangers of countries falling short on the MDGs are greatest, and to local, and especially rural, transport which directly serves the largest number of poor people. References to rural roads should normally be taken to apply equally to riverine transport and jetties, for areas served more by water transport. References to trunk infrastructure, although expressed mainly in terms of 'highways,' should be taken normally to apply too to railways, mainline inland water transport, coastal and ocean shipping, and air transport. All modes of transport are highly relevant to the MDGs (and not only the first and the last ones) and all have important contributions to make.

1.09 To achieve each MDG, a variety of coordinated inputs is needed, and the significance of each input may vary significantly among different geographical areas. The following sections try to clarify, from research undertaken to date and the country case studies, the nature and significance of the transport input in connection with each of the MDGs in Sub-Saharan Africa. Each section then goes on to consider how the delivery of the contributions needed from the transport sector may best be monitored and what indicators might be most useful.

1.10 Three key questions need to be borne in mind in considering both the individual MDGs and the totality of these highly interdependent and mutually supportive goals:

- How much difference would improvement of transport infrastructure and services make to progress toward the goal/s?
- Would the addition of a transport target or indicator add value to the implementation strategy for the goal/s?
- To what extent do the needs of Africa seem to be different from those elsewhere, and do they recommend continent-specific solutions?

1.11 The following five sections of the paper thus take up the MDGs and related targets and indicators in turn: Transport and Inclusive Development – MDG 1 (Section II), Rural Transport and Education – MDGs 2 & 3 (Section III), Rural Transport and Health – MDGs 4-6 (Section IV), Transport and Environment – MDG 7 (Section V), and Transport and the Landlocked Countries – MDG 8 (Section VI). Section VII draws the overall Conclusions, focusing in particular on the dimensions of transport sector activity that countries should give greatest attention to in support of MDG achievement, and on the extent to which the challenges facing the sector in Africa are different from those in other parts of the world.

II. TRANSPORT AND INCLUSIVE DEVELOPMENT – MDG 1

2.01 MDG 1 is the eradication of extreme poverty and of hunger. The specific targets that were agreed were to halve the proportions of people who in 1990 had an income of less than a dollar per day, and equally of those who suffered from hunger. Since lack of adequate food often results from insufficient income to buy it (or the inputs to produce it), the targets are inter-related.

2.02 Achievement of this broadest and most fundamental of the MDGs depends on both the pace and pattern of overall economic growth. Historically, reduction of poverty has resulted mainly from achievement of sustained increases in national income substantially above those of population. But the extent to which such increases have been translated into poverty reduction has varied significantly, and sometimes even strong GNP growth has brought little benefit to the poor.⁴ Efforts to improve the pattern of economic growth, by making it more broad-based and pro-poor, can improve the distribution of income and may stimulate initiatives that accelerate a country's overall growth rate.

2.03 Transport, and the other infrastructure sectors, are particularly crucial to progress on MDG 1 through their effects on both pace and pattern of economic growth. Their significance to the pace of growth has long been recognized, and verified by extensive research.⁵ Trunk infrastructure networks have to be reinforced and extended in a timely way to avoid the bottlenecks and shortages that can, and too often do, severely constrain the growth of other sectors. The large capital investments involved have to be well managed and maintained. And service operators have to be stimulated by appropriate combinations of competition and regulation to respond effectively to market demand and opportunities opened by advances in technology.

2.04 The infrastructure sectors, and transport most particularly, also have large effect on the pattern of growth, especially its geographical inclusiveness. A clear illustration at the macro-economic level is the experience of Ethiopia and Uganda with the major reforms of economic policy that both countries began in the late 1980s. The benefits were substantial, and significant reductions in poverty resulted, but even in Uganda the results were geographically quite concentrated. Many areas were excluded from significant impact, largely for lack of effective

⁴ Bigsten, Arne and Abebe Shimeles 2004. "Prospects for 'Pro-Poor' Growth in Africa," *Research Paper* No. 2004/42, WIDER, Helsinki.

⁵ Easterly, William and Sergio Rebelo 1993. "Fiscal policy and economic growth: An empirical investigation," *Journal of Monetary Economics* 32: 417-458; Hulten, Charles R. 1996. "Infrastructure Capital and Economic Growth: How Well You Use It May Be More Important Than How Much You Have," *NBER Working Paper* No. 5847, Cambridge, Mass.; Aschauer, David A. 1998. "The Role of Public Infrastructure Capital in Mexican Economic Growth," *Economía Mexicana. Nueva Época* Vol. VII, num. 1, primer sem.

transport links, trunk and/or local.⁶ An illustration at the local level is cited by the *Ministère de l'Équipement et des Transports* of Mali,⁷ finding that the isolated and ill-connected commune of Soumpi, despite larger natural resources and receipt of \$2 million of aid for local projects, still lags significantly behind the commune of Alafia, situated in the same region but only about 20 kilometers from the main town of Timbuktu.

2.05 The main near-term growth potential of most Sub-Sahara African countries is in agriculture. Rural areas are also still home to the large majority of the continent's very poor people. Three-quarters of the 200 million malnourished people in Sub-Saharan Africa are thought to be small-scale farming families, and the reason they go hungry is mainly insufficient agricultural productivity.⁸ The greatest successes that the world has scored to date in reducing poverty have been in rural development too, in Asia and most outstandingly in China and India. In the late 1990s the International Food Policy Research Institute (IFPRI) developed an analytical system (exploiting provincial and district-level data) to estimate both direct and indirect contributions to growth and to poverty reduction that resulted from the different lines of government expenditure involved in rural development efforts.⁹ Lack of data has severely constrained application of the model to African countries, but in 2004 the Institute succeeded in generating estimates for Uganda.¹⁰

2.06 Among the most interesting results of these researches have been the estimates of returns to incremental expenditures in different fields as of the end of the periods analyzed (1970-93 for India, 1978-97 for China and mainly 1992-99 for Uganda). In all three cases the expenditures with highest marginal return were on agriculture research, rural roads and education. Such priorities would be expected, of course, to shift over time, and a recent extension of

⁶ Willoughby, Christopher 2004. "How important is infrastructure for achieving pro-poor growth?" Paper commissioned by UK DFID for DAC Network on Poverty Reduction, March, available at <http://webdomino1.oecd.org/COMNET/DCD/PovNet.nsf>; Christiaensen, Luc and Lionel Demery and Stefano Paternostro 2004. "Macro and micro perspectives on growth and poverty in Africa," *World Bank Economic Review*.

⁷ République du Mali Ministère de l'Équipement et des Transports 2005. "Objectifs du Millénaire (ODM): Etude de Cas sur les Transports et la Réduction de la Pauvreté." SSATP, Washington D.C. mnjore@worldbank.org.

⁸ UN Millennium Project 2005. *Halving Hunger: It Can Be Done*. Summary version of the report of the Task Force on Hunger. The Earth Institute at Columbia University, New York.

⁹ Fan, Shenggen and Peter Hazell and Sukhadeo Thorat 1999. "Linkages between Government Spending, Growth and Poverty in Rural India," *Research Report* 110, International Food Policy Research Institute, Washington D.C.

¹⁰ Fan, Shenggen and Xiaobo Zhang and Neetha Rao 2004. "Public Expenditure, Growth, and Poverty Reduction in Rural Uganda," *DSGD Discussion Paper* no. 4, International Food Policy Research Institute, Washington D.C.

the analysis for India¹¹ distinguishes each decade since the 1960s: it finds, for instance, that rural roads offered substantially the highest returns as of the end of the 1960s and slipped somewhat relative to other expenditure lines in subsequent decades in terms of impact on production, but remained the most effective poverty-reducing expenditure almost throughout the period.

2.07 Within any given region the analyses generally indicate only minor differences in the ranking of investments for impact on production increase and on poverty reduction, implying no conflict between the two objectives. On the other hand, the greater poverty-reducing impact of incremental expenditure in particular parts of countries (e.g., Western China¹² and the north of Uganda) emerges strongly, illustrating the need sometimes to consider marginal sacrifice of potential production impact of government expenditure in the interests of reducing poverty.

2.08 The factors that make rural road extensions and improvements such high-priority investments at early stages of intensified rural development efforts are best demonstrated by microeconomic research. They are particularly connected with the need to reduce farmers' transaction costs in order to provide incentives sufficient to induce sustained shift from subsistence cultivation to commercial production, with increasing use of inputs that can raise yields, labor productivity and incomes.

2.09 Research on fertilizer use in Ethiopia¹³ in the middle 1990s, when the government was making major efforts to increase it, showed that roads and farmers' level of education were the key factors affecting adoption (somewhat paralleling results of the broader IFPRI studies discussed). Access to banking facilities (for provision of credit) and ownership of at least two oxen, for tilling, were significant secondary factors, with agricultural extension service also showing some significance. A farmer's access to an all-weather road (from which transport was normally by pack-animal) increased the probability of fertilizer adoption by some 15-20%, depending on the region – more than any other factor. The Ethiopian Roads Authority (ERA)¹⁴ cites studies showing that farmers make little use of fertilizer when the delivered price is high, as a result of high transport costs, as in south and north Wollo.

2.10 Studies examining prices received by farmers for their production have often found substantial discounts on supplies from less accessible areas, largely accounted for by high costs

¹¹ Dorward, Andrew and Shenggen Fan et al. 2004. "Institutions and Economic Policies for Pro-Poor Agricultural Growth," *DSGD Discussion Paper* No. 15, International Food Policy Research Institute, Washington D.C.

¹² Willoughby, Christopher 2004, op. cit.

¹³ Croppenstedt, André and Mulat Demeke 1996. "Determinants of Adoption and Levels of Demand for Fertiliser for Cereal Growing Farmers in Ethiopia," *Working Paper Series* 96-3, Centre for the Study of African Economies, Oxford.

¹⁴ Ethiopian Roads Authority, 2005. "Role of Road Transport Sector in Achieving the Millennium Development Goals (*Ethiopian Case*)." SSATP, Washington D.C. mnjore@worldbank.org.

of transport to market but further increased when small production surplus in an area, combined with difficult access, brought few buyers and little competition. The price difference for farmers in poor-access parts of an area, as against good-access parts, can easily amount to 15-20% of the price at the local market.¹⁵ The costs of spoilage due to absence of traders, or to poor travel conditions, at the critical moment represent significant additional risks to farmers in less accessible areas.

2.11 When local roads are improved, the impact can therefore be quite dramatic. The *Ministère des Transports* of Guinea¹⁶ carried out rural road impact studies, which showed that, over a five-year period, area sown doubled and output sold almost quadrupled in places where roads had been improved, while the same indicators stagnated in nearby areas chosen as controls because no road improvements had been undertaken. Travel time had halved, and freight transport costs had fallen 25% in the areas improved, but remained largely unchanged in the control areas. ERA¹⁷ refers to an ex-post evaluation study by the African Development Bank of the gravelling of the previously earth road Chida-Sodo: it was found that, within one and a half years of road opening, yields per hectare had doubled for many crops and tripled for some, much exceeding expectations.

2.12 Besides their direct impact on the incomes and food supplies of the farming families, such production increases usually have wider and larger effects, direct and indirect, through trading and processing of the inputs and the crops, which it is very hard to capture in individual project research. The special significance of the IFPRI studies cited above is in addressing this aspect much more thoroughly than previous work. A large part of the reason why investment in road improvements scored so high in reduction of people below the poverty line – both in India, especially in the early 1960s and early 1970s, and in Uganda at the end of the 1990s – appears to have been this indirect generation of employment in trading and processing and in the expenditure of the incomes that these functions, as well as the increased farm-sales, generated. UN Economic Commission for Africa research suggests that, besides places of notable agricultural potential, frontier areas between states sometimes have particular potential for rapid expansion of trade and indirect employment generation as a result of local transport improvements. The rural access indicator prioritized by IDA, as discussed in para. 1.06, appears useful not only because the two-kilometer distance to an all-season road may approximately

¹⁵ Minten, Bart 1999. "Infrastructure, Market Access, and Agricultural Prices: Evidence from Madagascar," *MSSD Discussion Paper* No. 26, International Food Policy Research Institute, Washington D.C.; Minten, Bart and Steven Kyle 1999. "The effect of distance and road quality on food collection, marketing margins, and traders' wages: evidence from the former Zaire," *Journal of Development Economics* Vol. 60: 467-495; Boadi, Yaa 2003. "Quantifying the Impact of Improved Accessibility on Rural Communities in Ekiti State, Nigeria," MSc dissertation, Univ. of Southampton; Renkow, Mitch and Daniel Hallstrom and Daniel Karanja 2004. "Rural infrastructure, transaction costs and market participation in Kenya," *Journal of Development Economics* 73: 349-367.

¹⁶ République de Guinée Ministère des Transports 2005. *Rôle des transports dans la réalisation des ODM* (Étude de cas Guinée) SSATP, Washington D.C. mnjore@worldbank.org.

¹⁷ Ethiopian Roads Authority, op. cit.

correspond to the minimum level of access required for sustained shift to commercial production (para. 2.08) but also because of the much wider poverty-reduction effects that shift can have.

2.13 What has been said here about the impacts of rural roads applies equally to water transport¹⁸ in the continent's numerous regions which are largely dependent upon it since they lie close to lakes, rivers or sea. Rural water transport often facilitates poor people's access to economic opportunities, enabling them to play a full part in fish trade, for instance, or to reach employment in cities while living in less expensive locations. It also generates employment directly, facilitate trade and often provides the only means of reaching medical, and higher-level educational services, in such areas. Maintenance of jetties, land access, and water ways is very important to their prosperity.

2.14 This brief overview of the importance of transport infrastructure and services to achievement of a pace and a pattern of economic growth consistent with MDG 1 shows that identification of synthetic indicators, which could help guide and measure transport activity is far from easy. Transport needs and services are too varied and specific to the areas served and the times when they are needed.

2.15 The most useful and feasible indicator in the short term would probably be the ratings that many countries now prepare of the quality of their roads through road condition surveys. Because of the scale of past investment in main roads, and the importance of timely maintenance interventions to prevent loss of such investment, these surveys tend to focus mainly on trunk networks. Macro- and microeconomic studies of rural development experience tend to underline mainly the importance of the sheer existence of small roads and tracks and their passability under normal weather conditions. Many such small roads and tracks are not classified or gazetted, and maintenance is in practice often left to local community, or even individual, initiative. In view of the importance of these facilities (and comparable installations in support of local water transport in riverine areas) to the poor, and pro-poor growth, it would be highly desirable to expand the coverage of annual transport infrastructure condition surveys to include all surface transport installations other than railways. Targets would be established for the shares of each type of facility that are expected to be in 'good' and 'fair' condition, using pavement-related standards for main roads and much simpler passability standards for lower-grade facilities.

2.16 Ethiopia has made great efforts to extend its limited road network, almost doubling it over the last twelve years, but it has simultaneously given high priority to improving maintenance and reaching defined targets regarding the condition of the network.¹⁹ The network-wide share of roads in good condition was raised from a very low 18% (which had large impact on vehicle operating costs) in 1995 to 29% in 2002, at the end of the first phase of the Road

¹⁸ IFRTD Forum News Vol 10, Issue 4, April 2003

¹⁹ Ethiopian Roads Authority, op. cit.

Sector Development Program, and 37% currently, well on the way to the 2007 target of 45%. The longer-term plan that ERA would like to follow, believing it essential to the country's fulfillment of MDG 1, would raise the share of roads in good condition to about 70% (87% of the federal network and 52% for rural roads) by 2015, while at the same time doubling road density from present half-kilometer (all types of road combined) per 1,000 population to about one kilometer. Ghana has also been giving great attention to strengthening maintenance in order to improve the condition of its roads.²⁰ It succeeded in raising the share of the overall network rated good from 17% in 1997 to 30% in 2003, and it is aiming at reaching 60% in 2006, upon completion of its current five-year Road Sector Development Program.

2.17 A very important factor in the recent improvements of road maintenance that have been achieved in a number of Sub-Sahara African countries has been assurance of more substantial and reliable financing. In several of the countries this has resulted largely from the creation of Road Funds, whose merits have been strongly propagated by the SSATP Road Management Initiative, jointly promoted by UN ECA and the World Bank. Some twenty countries in the region have now initiated Road Funds, and most have put in place independent auditing and transparency measures and are managed by Road Boards with a mixture of private and public sector representation.

2.18 More countries now are also making regular use of rural access indicators and targets, consistent with the thrusts of the MDGs though not generally in the form that has now been suggested by the World Bank and the UN Millennium Project (para. 1.05-1.07 above). In developing its own national MDGs, the government of Guinea has added to MDG 1 transport-specific objectives for improvement of access for production zones, strengthening of local capacities for management of the infrastructure provided, and reduction of transport costs for fertilizer.²¹ Indicators to be used are the percentage of production zones opened up, as well as kilometers of rural road built, rehabilitated and maintained. Ethiopia has used as a principal indicator the percentage of the country's land area which is more than half a day's walk from all-weather roads – estimated at 80% in 1996, 75% in 2002 and 70% currently.²² ERA's full plan for the longer term envisages cutting this percentage to about 35% by 2015.

2.19 The adequacy of trunk transport services for supporting strong economic growth depends mainly on the costs at which they are available, given the standards of timeliness, reliability, damage-rate and packaging requirements that the customer seeks. Studies have normally indicated that road freight costs are substantially higher – by a factor of 2 or 3 – in Sub-Saharan Africa than in Asia, for a variety of reasons mainly connected with more limited com-

²⁰ Ghana Ministry of Roads and Transport 2005. "A Case Study of the Role of Transport in Achieving the Millennium Development Goals." SSATP, Washington D.C. mnjore@worldbank.org.

²¹ République de Guinée Ministère des Transports, op. cit.

²² Ethiopian Roads Authority, op. cit.

petition in each component of service provision.²³ Reduction of these costs would clearly make a significant contribution to consumer welfare, expansion of domestic and foreign trade, and faster economic growth. Valid estimates of how these costs are evolving are unlikely to be possible, however, on the basis of anything other than actual experience of shippers sending comparable consignments. Much increased recent interest, in all parts of the world, in supply chain analysis may mean that it would now be possible for a country to identify a small sample (between a dozen and fifty) of standard shipments for which accurate information could be gathered, say every three months, from company logistics specialists and consultants. The data, and the efforts that its presentation should stimulate to identify ways to improve the service/cost ratio, would be of great interest to potential investors as well as to the public more generally.

2.20 ERA pays close attention to gathering national data on road freight rates and comparing the results with averages for other countries, to assess Ethiopia's efficiency and competitiveness.²⁴ Currently it estimates Ethiopia's freight rates are in the range of US\$0.04-0.06 per ton-km., depending mainly on the quality of the road-surface on the route. It considers these costs to be fairly high, given that the information available indicates average domestic freight costs per ton-kilometer of US\$0.07 for Zambia and US\$0.065 for Malawi but only US\$0.03 for Zimbabwe and US\$0.02 for South Africa. One of the specific objectives under Ghana's Road Sector Development Program is to reduce average vehicle operating costs for transport of agricultural products by 10%.

2.21 An indicator which captures a small but useful direct contribution that the road sector makes to poverty reduction is the amount of unskilled labor-days paid. Especially at regional and local level, such employment – in construction/maintenance gangs or as length persons for maintenance – can be quite significant if labor-based methods are used. It provides regular income, at least for a limited period, to people who would not otherwise have had paid employment, and can sometimes enable them to accumulate the skills or small capital needed to develop follow-on employment or business. Many countries, like Lesotho,²⁵ are trying to ensure that women are given fully equal opportunity for such work, provided that it is not too heavy in the given instance. Another indicator that attracts interest in many countries is one capturing the employment created by provision of transport services, including ancillary functions such as vehicle repairs.

2.22 A more qualitative way of establishing targets, and measuring their fulfillment, would be through the regular conduct of opinion surveys on the performance of bodies responsible for transport services. The work of the Public Affairs Centre in Bangalore, India²⁶ on 'Citizen Re-

²³ See, for example, Hine, J.L., and J.H. Ebdon and P. Swan 1997. "A Comparison of Freight Transport Operations in Tanzania and Indonesia," *TRL Report 267*, TRL, Crowthorne.

²⁴ Ethiopian Roads Authority, op. cit.

²⁵ Lesotho Ministry of Public Works and Transport 2005. "Case Study for Lesotho." SSATP, Washington D.C. mnjore@worldbank.org.

²⁶ www.pacindia.org

port Cards' has made recognized contributions to the improvement of public services there and has extended to various transport agencies. Application of a similar approach in Africa, probably covering transport infrastructure and services as part of a broader assessment of all the public services available in a local government area, could be of great value. It would provide the local authorities a more balanced and objective picture of the range of citizen opinion than presently available, reveal some problems of which they were unaware, and assist them in mobilizing action by concerned bodies to respond more effectively to user needs. Targets could be established in terms of attainment of higher levels of consumer satisfaction – such as have gradually been reached according to some of the more recent Indian surveys.

III. RURAL TRANSPORT AND EDUCATION – MDGS 2 AND 3

3.01 MDG 2 is to achieve universal primary education, in the sense of completion of a full course of primary education. MDG 3 is to promote gender equality and empower women, with particular emphasis on the elimination of gender disparity in education. Progress toward these objectives has been accelerated in a number of Sub-Sahara African countries in the last few years. But that acceleration has to be greatly increased, and spread much more widely, for the goals to be met.

3.02 This section focuses on rural areas because it is there that the acceleration will have to be greatest. Enrolment rates typically remain significantly lower in rural areas. But patterns also differ greatly between countries and even within them. The 2004 Nigeria Education Survey,²⁷ for example, indicates net primary-school attendance rates averaging just over 80% for girls and boys alike in the southern states, with the main northern states achieving nearly two-thirds this level for boys but less than half for girls. At secondary level, the pattern of interregional variation is similar, but the differences much greater.

3.03 Transport is an important input into education for carriage of pupils, teachers and supplies. The costs, dependability and safety of transport all affect school enrolment and attendance decisions directly and, especially in rural areas, also indirectly – through their effect on the quality of teacher who can be recruited and on the extent to which inspectors will monitor the school's operation. Research in the early 1990s,²⁸ based on Living Standards Measurement Survey (LSMS) data for Morocco, led to the conclusion that the presence of a paved road in a community more than doubled girls' school attendance rate, from 21% to 48%, while raising boys' attendance rate from 58% to 76%.

3.04 Subsequent evaluation of a sample of investments in the paving of major rural roads²⁹ in Morocco found that, in these roads' areas of influence, the share of girls attending primary school had tripled to 54%, and that of boys doubled to 81% – increases much greater than in areas without road improvements. Elimination of temporary road closures had also reduced teacher/student absenteeism, teacher recruitment had become easier, and supplies improved,

²⁷ National Population Commission 2004. "Nigeria DHS Ed Data Survey 2004: Preliminary Report". National Population Commission, Abuja and ORC Macro, Calverton, Maryland.

²⁸ Khandker, Shahidur R. and Victor Lavy and Deon Filmer 1994. "Schooling and Cognitive Achievements of Children in Morocco," *Discussion Paper* No. 264, World Bank, Washington D.C.

²⁹ Levy, Hernan and Claudine Voyadzis 1996. "Morocco Impact Evaluation Report: Socioeconomic Influence of Rural Roads," Operations Evaluation Department, Report No. 15808-MOR, World Bank, Washington D.C.

including that of water, often brought by the teacher by handcart. However, the improvements reflected not only the impact of the road investments but also significant simultaneous increase in the number and staffing of schools in the areas served. Instances where the effective constraint to building a school is lack of access adequate to bring in the construction materials – so that the full benefits of the school might be considered attributable to breaking the access bottleneck – are relatively rare. The rural road impact studies in Guinea,³⁰ for instance, showed that the number of schools increased at almost identical rate, over the 1995-2000 period studied, in areas served by the road improvements as in the control areas without road improvements.

3.05 Further research in the 1990s has helped to clarify the ways in which transport infrastructure and services most seriously affect the spread of education. Transport problems are clearly only one of many obstacles to increased school enrolments. Others are the need of very poor families for children's household/farm work or earnings, inability to pay for out-of-pocket expenses involved in schooling, poor quality of school/teacher available, parents' low expectations of the difference that the schooling they can afford could make to the child's future, specific cultural traditions setting other priorities, and parents' lack of any educational experience of their own.

3.06 Extensive work, trying to take account of all these factors, was carried out in Ghana. It found³¹ that the difficulty and expense of transport to middle and secondary schools (often 8-25 s, or even further, away from pupils' homes) was a significant direct obstacle to enrolment at those levels, modified to a degree when public transport was available. But this problem, in turn, had an important feedback effect on enrolment in primary schools (normally available within the community itself) because they were seen by the population (and the labor market) mainly as an unavoidable hurdle to reaching secondary school rather than providing useful education in their own right. Thus primary enrolment was held back by the lack of realistic prospects (due to transport constraints) of being able subsequently to attend secondary school. Similar results emerged from comparative research with Côte d'Ivoire,³² which found that the obstacles described affected boys and girls equally there, whereas in Ghana girls were affected somewhat more seriously than boys.

3.07 Interesting research³³ on Vietnam, besides identifying greater direct impact of roads on secondary than primary enrolments there too, also finds that these impacts were systematically greater (especially at secondary school level) the poorer the province, with lower average in-

³⁰ République de Guinée Ministère des Transports, op. cit.

³¹ Lavy, Victor 1996. "School supply constraints and children's educational outcomes in rural Ghana," *Journal of Development Economics* Vol. 51: 291-314.

³² Tansel, Aysit 1997. "Schooling Attainment, Parental Education, and Gender in Côte d'Ivoire and Ghana," *Economic Development and Cultural Change* Vol. 45 No. 4: 825-856.

³³ Deolalikar, Anil B. 2001. "The Spatial Distribution of Public Spending on Roads in Vietnam and its Implications," draft report for Asian Development Bank.

comes and less inherited infrastructure. The Ministry of Public Works and Transport in Lesotho also notes that the social value of road upgrading is much higher in that country's mountainous areas, with only limited alternative routes to use, than in the lowlands.³⁴ The principal initial impact of the four very recently completed road improvements that it studied in 2004 seemed to be small reductions in children not attending school and larger increases in those who had carried through to junior certificate level.

3.08 Analysis in 1999 of the results of all the national Demographic and Health Surveys (DHS), with relevant coverage, that had been carried out up to that time suggested³⁵ that the probability of a child being enrolled in primary school was significantly increased (by some 10-25%) by the presence of a primary school within the community in the majority (8 out of 13) of the Sub-Sahara African countries covered. In three of these countries enrolment probability was increased still more (by as much as 20-50%) if the community also had a secondary school (consistent with the findings from the Ghana research). However, only in one country, Benin, were the effects described significantly greater for girls than for boys; for the other countries they were gender-neutral. The large effect of the presence of a primary school within the community is striking because it was paralleled in none of the eight countries from other regions of the world that were covered. While cultural obstacles to enrolment in a school outside the child's own community might be a factor in some cases, the main explanation must clearly be that distance and transport are more serious obstacles in Africa than elsewhere.

3.09 Thus, while transport is only one of many obstacles to achievement of the education MDGs, it is an important one, particularly in Africa. A recent review³⁶ for the World Bank Africa Region of countries' experience in bringing about increased enrolment of girls stresses the need for tailor-made strategies responsive to the particular combination of obstacles that a country and its different regions face. Among the likely characteristics of effective strategies it puts in first place cross-sectoral interventions such as "improvements in employment and labor policies, out-of-home child care, labor-saving technologies, transportation, and HIV/AIDS communication and support programs." Second, it emphasizes multiple interventions – a flexible package responding to a "continuing analytical process of thinking through challenges and change" – and cites as a successful example Bangladesh's program involving provision of new buildings, improvements in school water supply and sanitation services, recruitment of more female teachers, and a scholarship program to reduce opportunity costs for girls and help cover out-of-pocket costs such as transport.

3.10 It is important to note, too, the broader contributions that transport, especially local infrastructure and services, can make to lightening the heavy burdens borne by African women

³⁴ Lesotho Ministry of Public and Works and Transport, op. cit.

³⁵ Filmer, Deon 1999. "The Structure of Social Disparities in Education: Gender and Wealth," background paper for a World Bank Policy Research Report on Gender and Development.

³⁶ Kane, Eileen 2003. "Girls' Education in Africa," *Africa Region Human Development Working Paper Series*, World Bank, Washington D.C.

and to empowering them. ERA research found that domestic transport for household needs accounted for more than 90% of households' transport effort in the rural areas studied, and that this was performed almost entirely by women and occupied 20-25% of their working time.³⁷ Better access to farms, wood lots, water supply points and markets is only one of the measures needed to reduce the load and free up time for other purposes, but it is an important one.

3.11 In most Sub-Saharan African Countries, improved support from the transport sector to achievement of the education MDGs is needed at two levels: central policy and planning in the Ministry of Education, and local management of education services at the district level.

3.12 Ministries of Education face an enormous task of trying rapidly to expand services with limited budgets and with a workforce often severely affected by the HIV/AIDS epidemic. They have often been reproached for planning on the basis of unrealistic assumptions – for instance, that a school can serve a catchment area with a radius of several kilometers, whereas the local reality is that pupils come only from much closer – or disregarding transport considerations so that pupils have to walk longer, or pay for more transport, than would really be necessary.³⁸ Having now to plan for comprehensive coverage, they confront, in one form or another, important choices between spreading facilities, bringing a basic level of service direct to more and more communities, and strengthening the capacity and quality of more centralized facilities to which students travel. The latter course involves more pupil transport expenditure, but enables more efficient use of educational resources. In view of the large expansions underway and needed, more attention needs to be given to analyzing the true costs to society (not only to the budget of the Education Ministry) of these alternatives, taking account moreover of the likely changes in the local transport network in the coming years. Rather than uniform nationwide standards, it may well be appropriate to adopt a highly decentralized, small-school pattern for relatively sparsely populated areas where the transport network is not expected to grow much – and, on the other hand, much more emphasis on improvement of quality and expanded capacity at relatively centralized facilities in areas of substantial agricultural potential where significant expansion of the road network will anyway be needed to tap that potential. This illustrates the significant need for transport authorities' cooperation in education sector planning.

3.13 At the local government level, transport sector assistance is needed most for participatory community-level planning of small works and initiatives, and for good coordination on the siting of services and the provision of convenient public transport. Participatory planning efforts often highlight small improvements³⁹ for extension of footpaths, and repair of small bridges, whose priority can only be identified by persons who live there; many of these needs relate to access to public facilities such as schools. Specific local siting of new schools needs careful consideration from the point of view of minimizing walking time from the areas from

³⁷ Ethiopian Roads Authority, op. cit.

³⁸ See, for example, the website <http://www.eclac.cl/dd/localizacion/index.asp>.

³⁹ Mahapa, Sabina M. and Mashiri, Mac 2001. "Social exclusion and rural transport: gender aspects of a road improvement project in Tshitwe, Northern Province," *Development Southern Africa* 18 (3).

which pupils are likely to be drawn. Local government has an important responsibility in applying the school planning guidelines that come from the national-level considerations discussed above, adjusting them to local realities, and bringing them to effective fruition. Transport sector representatives need also to participate in local monitoring meetings on progress toward the education MDGs, to identify further actions that may be needed from the transport side to ease their fulfillment.

3.14 Top-level transport officials will be concerned to make sure that the institutional processes of sector support to Education just described take place constructively. Indicators that would be useful for monitoring the sector contribution to the education goals could be of a wide variety, depending on the strategies chosen for meeting them and the institutional processes for transport support to the Education Ministry and local authorities. They should be selected through these processes and would be likely to be quite specific to the local situation and not necessarily comparable with the indicators chosen for another region or country. Guinea includes, in its national MDGs, indicators regarding ease of physical access to schools.⁴⁰

⁴⁰ République de Guinée Ministère des Transports, op. cit.

IV. RURAL TRANSPORT AND HEALTH – MDGS 4, 5 AND 6

4.01 MDG 4 is to cut the 1990 under-five mortality rate by two-thirds by 2015. MDG 5 is to cut the 1990 maternal mortality rate by three-quarters. And MDG 6 is to have halted the spread, and begun to reverse the incidence, of HIV/AIDS, malaria and other major diseases, particularly tuberculosis.

4.02 UNICEF estimates that Sub-Saharan Africa accounted for as many as 50% of maternal deaths worldwide in 2000, and 42% of all the deaths of children less than five years old.⁴¹ The World Bank finds no Sub-Sahara African country on track to fulfillment of MDG 4.⁴² Poorer people are the most seriously affected by all the health scourges highlighted by the MDGs, and progress in reducing child mortality has been slowest in poor communities.

4.03 Well-established, widely used technologies exist whose application would enable fulfillment of all the goals on the agreed schedule. The problem is to get these technologies actually used, especially by and for poorer people, and that depends on a complex variety of interacting factors, notably education, prices, incomes, society's arrangements for helping families that run into chance catastrophes, and the availability of medical services and various forms of infrastructure – including transport. Strategies for spreading the use of the relevant technologies effectively to the people who have to be reached to fulfill the goals need therefore to be targeted to them, and to embrace actions in several sectors.

4.04 The role of transport is partly in ensuring adequate and reliable availability of food in any area, as well as of medical supplies and personnel in the facilities established. The larger and more difficult part of transport's contribution is in bringing people to medical stations, sometimes urgently as when a few hours' delay in treatment can make the difference between life and death, and more often regularly, for treatments that have to be phased and repeated on fairly rigid schedules. Transport infrastructure and services therefore have three important effects:⁴³ first, on the usage of medical services (as alternative to self-care or no care); second, on the catchment areas that can be served by health facilities, and hence the size and costs of network required; and third, on the extent to which people can choose among alternative facilities – with significant likely impact on the quality of service that will be offered.

⁴¹ UNICEF 2001. *Progress since the World Summit for Children: A Statistical Review*. UNICEF, New York.

⁴² Wagstaff, Adam and Mariam Claeson 2003. *The Millennium Development Goals for Health: Rising to the Challenges*. World Bank, Washington D.C.

⁴³ Downing, Andrew and Dinesh Sethi 2001. "Health Issues in Transport and the Implications for Policy," paper prepared for DFID, London. www.dfid.gov.uk

4.05 Poorer households are often further away from medical facilities and, especially in rural areas of Sub-Saharan Africa, they typically face long journeys and high opportunity costs to access health care.⁴⁴ Since 2000 national Demographic and Health Surveys (DHS)⁴⁵ have increasingly included a set of questions to the main female in each household about the extent of problems she faces in accessing health care. In all ten surveys for which results have already been published the highest ranked problem was getting money for treatment, followed by distance to the facility and difficulty in getting transport. Lower-ranked problems show more variation between countries. In 2002, DHS reports also began to introduce analysis by household wealth quintiles (based on assets reported). Table 2 shows the percentages of women who rated distance and transport availability as big problems in the five surveys for which a quintile analysis was presented.

Table 2. Share of Women Stressing Distance/Transport Obstacles to Health Care in Five Countries' DHS

	Burkina Faso		Eritrea		Ghana		Nigeria		Philippines	
	Dist.	Trpt.	Dist.	Trpt.	Dist.	Trpt.	Dist.	Trpt.	Dist.	Trpt.
Urban	23.7	25.0	14.3	16.7	16.8	16.1	9.5	8.5	17.1	16.0
Rural	52.7	44.6	56.6	62.4	47.7	49.2	32.2	31.8	40.9	38.6
Average	46.4	40.4	38.4	42.7	32.7	33.1	24.4	23.8	27.2	25.6
Quintile1	60.8	53.4	63.8	70.1	60.1	63.3	47.8	48.9	59.1	57.1
2	58.5	48.3	57.1	62.6	51.7	53.7	33.6	33.4	33.8	32.5
3	50.5	42.0	50.5	57.1	31.7	31.5	23.2	21.8	22.2	20.3
4	44.1	38.6	23.7	26.1	20.3	19.1	13.5	12.3	18.7	17.4
5	24.1	24.3	10.1	11.8	13.6	12.9	8.2	7.0	13.6	12.0

4.06 The most striking point about these numbers is the clustering, around 60%, of the share of women in the lowest quintile stressing the distance problem – with the sole exception of Nigeria. Quintile data for the two non-African countries besides the Philippines where these questions have been asked are unfortunately not available, but only in the case of Indonesia did the overall results indicate transport being considered a problem by many fewer respondents: some 18% for rural areas. Another interesting facet of the results summarized in the table is the variation among African countries, especially at the lower quintiles, in the extent to which the availability of transport services was considered to reduce the problems felt (as in Burkina Faso) or to exacerbate them (Eritrea and, in lesser degree, Ghana). In the impact assessment for its 1996-2001 program that the Ghana Ministry of Roads and Transport carried out in 2003,⁴⁶ it gave particular attention to the quality of public transport services on roads that had been improved; it found that travel times had been reduced by a third on a

⁴⁴ Castro-Leal, F. And J. Dayton and L. Demery and K. Mehra 2000. "Public Spending on Health Care in Africa: Do the Poor Benefit?" *Bulletin of the World Health Organization* 78 (1): 66-74.

⁴⁵ www.measuredhs.com.

⁴⁶ Ghana Ministry of Roads and Transport, op. cit.

number of the roads studied and, thanks to increased volumes of travel, waiting times had in several cases fallen dramatically, by 50% or even more.

4.07 In response to demands of the type implied by these DHS findings, many African countries have been trying to expand their networks of health facilities by building additional rural health centers. The existence of reasonable roads often helps. For instance Guinea's rural road impact study⁴⁷ shows that the share of villages having a health centre was virtually the same, just below 30% at the outset, in areas with road improvements as in the control areas. By 2000 over 80% of the villages in areas where roads had been rehabilitated had a health centre, almost twice the proportion among control villages. But concerns have also arisen in many countries about the relatively low use of some rural centers and the possibility that the productivity of government spending on health might be increased more by strengthening existing centers' coverage of the catchment areas they are supposed to serve. Various factors influence the use of health services, and their importance appears to differ significantly in different cases. Many studies have shown that service quality and patients' education levels are particularly important.

4.08 Extensive analysis of data for Ghana⁴⁸ indicated that poorer people were especially sensitive to distance but even more so to the quality of the service provided, especially in terms of predictable availability of basic requirements – particularly essential drugs and immunization – more than high professional services. One of the rare studies that could assess the actual health outcomes (i.e., direct effectiveness) of medical interventions, using late 1980s data for Côte d'Ivoire,⁴⁹ found these basic services to have substantial beneficial effects specifically on poorer children. Recent work on Mozambique⁵⁰ found quality of service offered (extent of personnel and equipment) to be an important factor, in addition to distance, in mothers' decisions to deliver in a health establishment, but a minor factor for use of outpatient services. Studies based on survey data in Kenya⁵¹ and Ethiopia⁵² have found reductions of distance to rural health centers, on their own, to have rather limited effects on use – an increase of around 1.5% for a distance reduction of 15-20%, whose achievement would often require an increase of some 30-40% in the number of facilities serving an area. And the

⁴⁷ République de Guinée Ministère des Transports, op. cit.

⁴⁸ Alderman, Harold and Victor Lavy 1996. "Household responses to public health services: Cost and quality tradeoffs," *The World Bank Research Observer* Vol. 11 No. 1.

⁴⁹ Thomas, Duncan and Victor Lavy and John Strauss 1996. "Public policy and anthropometric outcomes in the Côte d'Ivoire," *Journal of Public Economics* Vol. 61: 155-192.

⁵⁰ Lindelow, Magnus 2003. "Understanding spatial variation in the utilization of health services: does quality matter?" *Working Paper Series 2004-12*, Centre for the Study of African Economies, Oxford.

⁵¹ Mwabu, Germano and Martha Ainsworth and Andrew Nyamete 1993. "Quality of Medical Care and Choice of Medical Treatment in Kenya: An Empirical Analysis," *The Journal of Human Resources* Vol. 28 No. 4: 838-862.

⁵² Collier, Paul and Stefan Dercon and John Mackinnon 2002. "Density versus Quality in Health Care Provision: Using Household Data to Make Budgetary Choices in Ethiopia," *Working Paper Series* No. 2002-17, Centre for the Study of African Economies, Oxford.

Ethiopian study, in particular, found much greater responsiveness of demand to improved quality, especially reliable availability of a nurse and drugs.

4.09 Mechanized transport for patients to health centers and for outreach services from centers to villages are likely to remain, in many parts of Sub-Sahara African countries, more important than if it were to be possible rapidly to achieve the standard sometimes suggested of a network of centers from which no community would be more than 8 kilometers away.

4.10 The most appropriate solutions, in terms of development of infrastructures and health and transport services need joint consideration between health and transport planners. While uses of roads for medical purposes are seldom likely to be a dominant consideration in the decision about major upgrading investments, they may certainly be more important in establishing maintenance priorities, and potential impact of road improvements on the use of health services needs to be recognized. The few cases which appear to have been analyzed in some depth show very varying impacts. The study mentioned earlier, covering improvements to certain main rural roads in Morocco,⁵³ found that visits from the areas affected to health centers and hospitals had doubled, growing more than in the neighboring control zones used in the study; but this appeared to be the result, at least in part, of greater upgrading of the relevant medical services. Rehabilitation of a road in Makete District in Malawi was found to have increased patient numbers in the local hospital by 15%, thus improving coverage of its catchment area.⁵⁴ Substantial improvement of a main district road in the Meru district in Kenya was found to have had little or no beneficial effect on health services to the poor since the main facility whose effective catchment area was increased was a private non-profit hospital offering better service than elsewhere but with somewhat higher fees.⁵⁵ On the other hand, a rural roads upgrading program in Vietnam was found specifically to have benefited the poor, reducing average walking time to the local hospital by 22 minutes, more than the average over the whole population.⁵⁶

4.11 Indications are that transport has a particularly important role for the poor in extending choice among alternative facilities as suppliers – private as well as public – gradually increase in number and diversity of offerings. Exploitation⁵⁷ of a uniquely detailed data set on supply and demand for health services in one district in Sri Lanka found that the poor were bypassing closer facilities as much as the better off, especially in cases of severe illness. To ac-

⁵³ Levy, Hernan and Claudine Voyadzis, *op. cit.*

⁵⁴ Ellis, S.D. 1997. "Rapid Appraisal Techniques for Identifying Maintenance Priorities on Low Volume Roads," unpublished report, Transport Research Laboratory, Crowthorne, cited in Downing and Sethi 2001, *op. cit.*

⁵⁵ Airey, Tony 1991. "The influence of road construction on the health care behavior of rural households in the Meru district of Kenya," *Transport Reviews* Col. 11 No. 3: 273-290.

⁵⁶ Van de Walle, Dominique and Dorothyjean Cratty 2002. "Impact Evaluation of a Rural Road Rehabilitation Project," mimeo, World Bank, Washington D.C.

⁵⁷ Akin, John S. and Paul Hutchinson 1999, "Health-care facility choice and the phenomenon of bypassing," *Health Policy and Planning* Vol. 14 No. 2: 135-151.

cess health care, they were systematically traveling further than the better off, in small part because their homes were typically somewhat further from medical facilities, in larger part because they were taking the time to get the best quality and price combination they could afford – which was usually not the cheapest.

4.12 The most important contributions of the transport sector to the reduction of child mortality (MDG 4) are probably assurance of general supplies (especially food, and spare parts for water systems) in the area and adequate support for the provision of needed medical services, especially at birth and in the first year of life. Recent econometric analysis⁵⁸ of results of 43 national DHS found important actionable determinants of child mortality, apart from general income levels, to be female literacy, nutrition, and household infrastructure services, especially water; none of the regressions yielded statistically significant coefficients on medical services, despite their admitted importance. Earlier analyses, based on detailed data respectively for Côte d'Ivoire⁵⁹ and Ghana,⁶⁰ underlined much the same factors, with some contrasts in detail, and did find a weak tendency for child mortality to be lower with greater proximity and access to basic health services, including antenatal care, skilled attendance at birth, infant care and immunization. Recent analysis⁶¹ of the medical factors affecting child survival experience in a rural area of western Burkina Faso in the 1990s found that households located more than 10 kilometers from a health centre (some 35% of all the households in the area) suffered infant mortality levels as much as 33% above those within a 10- radius. The authors suggested that an important factor underlying the strong showing for the effectiveness of health-centre services may have been the country's success in maintaining uninterrupted availability of affordable drugs at all peripheral health centers.

4.13 To enable attainment of the agreed reduction in maternal mortality (MDG 5) the transport sector has a critical role to play because of the need for urgent evacuations to hospital of women who suffer serious problems in childbirth. The main measures towards this goal are improved maternal nutrition, birth spacing, good antenatal care and professionally attended deliveries, but even if all are fulfilled emergencies will still arise, requiring urgent transport (often 40-80 kilometers) to a regional hospital. Introduction of a dedicated four-wheel drive vehicle at Bo in Sierra Leone in the early 1990s, before the civil war, enabled referrals from a large sparsely inhabited rural area to be doubled and contributed to halving the

⁵⁸ Leipziger, Danny and Marianne Fay and Quentin Wodon and Tito Yepes 2003. "Achieving the Millennium Development Goals: The Role of Infrastructure," *Policy Research Working Paper* 3163, World Bank, Washington D.C.

⁵⁹ Benefo, Kofi and T. Paul Schultz 1996. "Fertility and Child Mortality in Côte d'Ivoire and Ghana," *World Bank Economic Review* Vol. 10 No. 1: 123-158.

⁶⁰ Lavy, Victor and John Strauss and Duncan Thomas and Philippe de Vreyer 1996. "Quality of health care, survival and health outcomes in Ghana," *Journal of Health Economics* Vol 15: 333-357.

⁶¹ Becher, Heiko et al. 2004. "Risk factors of infant and child mortality in rural Burkina Faso," *Bulletin of the World Health Organization* Vol. 82 No. 4: 265-271.

death-rate of women suffering major obstetric complications.⁶² In southern Tanzania a motorcycle trailer was designed, using locally available materials and replicable technologies, to carry a patient with two healthcare workers or, when not needed as an ambulance, six passengers: in the first six months of operation, it saved several women's lives and earned enough from passenger transport to subsidize the ambulance function.⁶³ More recently, in Malawi, a bicycle-drawn trailer has been developed to serve as both an ambulance for shorter distances and a vehicle for efficient handling of the last leg in distribution of emergency food supplies.⁶⁴ Two small British NGOs dedicated to transport, TRANSAID and Riders for Health, have been prominent in projects of this nature and in assisting the development of systems for managing health-service vehicle fleets.

4.14 In the campaigns to roll back the communicable diseases (MDG 6) the transport sector has a particularly important role to play on HIV/AIDS. Transport construction and transport operations often involve long absences of mobile and migrant workers from home. Particularly through relations with commercial sex workers they have often become themselves vectors of the disease, transmitting it to their home areas and the rural areas where construction is underway. Bringing to an end the spread of the disease depends in part on actions by the transport sector. Senior managements of all transport agencies, public and private, have therefore to give strong leadership to the formulation of action programs consistent with the scale and impact of their overall operations, and to the breaking of bottlenecks that obstruct the programs' implementation. Key components of such programs are normally, on the one hand, Information, Education and Communication (IEC) activities within the organization itself, and for communities affected by its activities, to develop understanding of the disease and conviction about the necessary preventative measures and, on the other hand, support for treatment activities serving the same groups. Agencies which contract out construction and maintenance work, or subcontract parts of their work to others, need to pay particular attention to inclusion, and effective enforcement, of clauses requiring appropriate action by contractors/subcontractors for their own workers and the places they will stay while on the job.

4.15 Transport's contribution to the prevention and treatment of malaria and tuberculosis is in line with its role in support of health services in general. Infrastructure and services have to be adequate to ensure timely and efficient delivery of key inputs such as impregnated bed nets, drugs, repellents, quinine and medicines – with particular attention to maintenance of the cold chain for certain vaccines. Local visits to the health centre can pose a problem for those suffering from malaria, particularly children, and more especially for TB patients.⁶⁵ Tu-

⁶² Samai, O. and P. Sengeh 1997. "Facilitating emergency obstetric care through transportation and communication, Bo, Sierra Leone," *International Journal of Gynecology and Obstetrics* 59 Suppl. 2: S157-S164.

⁶³ DFID *Transport Newsletter* May 2000.

⁶⁴ TRANSAID *Hub & Spoke* September 2003.

⁶⁵ Godfrey-Faussett, P. 1995. "Recruitment to a trial of tuberculosis preventive therapy from voluntary HIV testing centre in Lusaka: relevance to implementation," *Transactions of the Royal Society for*

berculosis therapy has to be sustained for six months or longer to be successful in eradicating TB from the patient, and regular visits are required throughout this period. Cerebral malaria is a medical emergency requiring rapid transport to hospital. When this is not available, the fatality rate can be high (50%) as shown in a study from Malawi where the majority of children with presumed cerebral malaria or meningitis died whilst awaiting transport or within an hour or two of delayed arrival at hospital.⁶⁶

4.16 Another area where the transport sector has to take a strong leading role, working in close cooperation with health authorities and other sectors, is reduction of the large burden on human welfare, and on countries' scarce health resources, that is imposed by road traffic accidents. WHO estimates that worldwide fatalities from road traffic accidents are now running at 1.2 million p.a., 90% of them in developing countries. Long-term projections indicate that already by 2015 the health burden of road traffic accidents will be almost as great as that of communicable diseases in developing countries as a group. Many of the victims are poor pedestrians. Integrated national strategies to improve road safety, prepared under the auspices of committees including representatives of all the main organizations – private as well as public – that need to contribute, have brought some progress in a few developing countries. But the country's political leadership in the transport sector has to galvanize effort, keep the focus on a few doable priorities, and insist on action at the executive level.⁶⁷ Ghana's National Road Safety Commission developed a comprehensive strategy aiming at 5% reduction in annual fatalities and injuries between 1998 and 2005.⁶⁸ The data available indicate that fatalities have indeed fallen substantially, from 31 per 10,000 vehicles in 1998 to 23 in 2003.

4.17 Indicators useful for monitoring the transport sector's contribution to the health MDGs will be a combination of quite specific ones for the few areas where transport improvements can make a large difference even in the short term, with more general ones on the passability, and competitiveness of transport services offered to the public, of regional networks. Specific indicators should cover the mortality experience of all women referred for emergency obstetric care and the effect of transport factors, HIV/AIDS prevalence and treatment among staff employed in the sector and communities heavily influenced by transport (important transfer points, areas of large transport construction), and road traffic accidents (with greater weight given to hospital statistics while the major problems with many police reporting systems are remedied). It is interesting to note that, in its national MDGs, Guinea⁶⁹ specifically includes an indicator regarding HIV/AIDS infections in the transport sector, and

Tropical Medicine and Hygiene Vol. 89: 354-358; Westway, M.S. 1990. "Common health problems and health care utilization," *South African Medical Journal* Vol. 78.

⁶⁶ Cullinan, T.R. and C. Pieterick 1998. "Packaged treatment for first-line care in cerebral malaria and meningitis," *Bulletin of the World Health Organization* Vol. 76 No. 3: 257-264.

⁶⁷ Downing, Andrew and Dinesh Sethi, op. cit.

⁶⁸ Ghana Ministry of Roads and Transport, op. cit.

⁶⁹ République de Guinée, Ministère des Transports, op. cit.

that Lesotho's studies⁷⁰ identified, simultaneous with the road projects, huge increase in the share of the local population aware of the problem – though unfortunately not yet of those taking appropriate measures to stem its spread. The broader indicators will be based on road condition surveys, administrative records regarding road closures, and information from the national statistical office, or the agency responsible for regulating transport services, on prices actually charged for transport.

4.18 Increased collaboration between transport and health authorities in pursuit of the health-related MDGs should permit identification of problem areas requiring joint effort for which specific indicators could be collected: for instance, transport problems in the logistics of drug distribution, or patient access problems in areas where health facilities are having particular difficulties in properly serving parts of their catchment areas. WHO is calling for increased interaction generally between leaders of the health and transport sectors to further transport's contribution to the health-related MDGs. While transport infrastructure improvements and new transport services will be designed mainly to serve objectives other than those of health, opportunities should also be sought for MDG-supporting initiatives such as the medical emergency loan fund and community transport service organized at the initiative of Ahmadu Bello University Hospital⁷¹ or the work planned on intermediate-technology vehicles under Nigeria's Rural Access and Mobility Program.

⁷⁰ Lesotho Ministry of Public Works and Transport, op. cit.

⁷¹ Essien, E. and D. Ifenne et al. 1997. "Community loan funds and transport services for obstetric emergencies in northern Nigeria," *International Journal of Gynecology and Obstetrics* Vol. 59 Suppl. 2: S237-S244.

V. TRANSPORT AND ENVIRONMENT – MDG 7

5.01 MDG 7 is the achievement of environmental sustainability, with emphasis (through targets) on four issues: integration of the principles of sustainable development into country policies and programs, reversal of the loss of environmental resources, halving the share of people without sustainable access to safe drinking water and basic sanitation, and improving the lives of slum-dwellers. Specific aspects highlighted through indicators include forests, biodiversity, energy efficiency, carbon dioxide emissions and households' security of tenure (to protect against unwarranted eviction).

5.02 Transport has a significant dual contribution to make to most of these objectives, on the one hand by raising the standards of its own environmental performance, and on the other hand by facilitating environmental improvements in other sectors. Concentrating on the environmental issues most relevant to Sub-Saharan Africa and not discussed elsewhere in the paper, this section refers briefly to rural areas and deals a little more fully with problems in urban areas.

5.03 Procedures to minimize the serious negative effects that transport activities can have on natural resources (especially forests, land stability and water courses), and on local residents, in the areas traversed have been introduced widely by the bodies responsible for building transport infrastructure and for managing and regulating services. But for these procedures to be effective, continuous high-level attention has to be given to their full application and systematic observance and to the adoption of remedial measures where they have proved inadequate.

5.04 Increased attention has to be given in transport planning and management to opportunities for helping to reduce environmental problems arising outside the sector. According to FAO statistics, forest cover deteriorated in the 1990s much more rapidly in Tropical Sub-Saharan Africa (at a rate of 1.6% p.a.) than in any other part of the world, – with additional serious consequences, in extensive areas, in the form of desertification. A major causative factor is continued high dependence on fuel wood for cooking – which also has negative effects on health due to smoke inhalation. Out-of-pocket costs for more convenient alternative fuels tend to be much greater, especially in rural areas. But road improvements have been demonstrated sometimes to halve such costs even in rural areas – with the positive impact that would be expected on use of such fuels.⁷² There is in fact some evidence⁷³ that most of the fuel wood consumption is by better-off people who should more easily be convinced to convert. Reliable all-season transport access is also important for minimizing the water-pump maintenance prob-

⁷² Levy, Hernan and Claudine Voyadzis 1996, *op. cit.*

⁷³ World Bank 2003. "Nigeria: Poverty-Environment Linkages in the Natural Resource Sector," Report No. 25972-UNI, World Bank, Washington D.C.

lems so frequently reported and, in areas where wells and streams lack water in the dry season, even for bringing supplies the several kilometers necessary from alternative sources.⁷⁴ The Guinea rural road impact study⁷⁵ showed the share of villages with boreholes rising from 34% in 1994 to 93% by 2000, while the increase in the control villages over the same period was only from 44% to 61%.

5.05 Due to natural increase and in-migration, the population of Sub-Saharan Africa's major urban areas has been growing particularly rapidly, at some 4-5% per year. But in most of the countries as many as 80% of the people are accommodated in slums – as defined by the criteria, now internationally agreed, of lack of improved water/sanitation, of space or of durability of construction. In 2001, some 166 million people – 72% of the region's total urban population, the same percentage as in 1990 – were estimated to be living in slums.⁷⁶ The proportions of urban populations living in slums in other parts of the world are much lower and have, in almost all cases, dropped since 1990; South Asia has very high numbers living in slums but they have fallen from 64 to 59% of total urban population.

5.06 The specific target that was incorporated into the MDGs is improvement in the lives of at least 100 million slum-dwellers by 2020 – very large absolutely, but still small compared with the 900 million living in slums worldwide in 2001, let alone the 1,600 million slum-dwellers projected on current trends for 2020. Most professionals in the field therefore take the MDG target as implying a commitment in principle also to the broader objective of bringing about policy and investment improvements that would enable net additions to urban population to be accommodated in more acceptable conditions, thus avoiding the creation of further slums. Such a clarification, meaning that the target would be to cut 2020 slum population to half the level presently foreseeable (giving the target a form somewhat more in line with other MDGs) may perhaps be adopted at the summit review meeting on the MDGs planned by the UN General Assembly for September 2005.

5.07 One large task to which the transport sector thus has a supporting contribution to make is improvement of the lives of existing slum-dwellers, particularly their access to public services and work opportunities. Poverty sets tight constraints: a recent review of Dar es Salaam, using figures from a household survey, shows that daily purchase of a single roundtrip minibuss ticket would amount to 10% of total expenditure by a household in the lowest income quintile – and 5% even for the next quintile.⁷⁷ Adjusting school and health centre locations, as well as places for business, more frequently to changing geographical spread of population, to reduce

⁷⁴ Boadi, Yaa 2003, op. cit.

⁷⁵ République de Guinée Ministère des Transports, op. cit.

⁷⁶ UN-Habitat 2004. "Dialogue on the urban poor: improving the lives of slum-dwellers," paper prepared for the World Urban Forum, Barcelona, September 2004. UN-Habitat, Nairobi.

⁷⁷ Diaz Olvera, Lourdes and Didier Plat and Pascal Pochet 2003. "Transportation conditions and access to services in a context of urban sprawl and deregulation. The case of Dar es Salaam," *Transport Policy* Vol. 10: 287-298.

average walking distance, may be one of the most important steps. Facilitating non-motorized transport, such as bicycle taxis, has been an important contributor to employment generation even in places where this mode has not been traditional such as Kisumu, Kenya.⁷⁸ A very important by-product of greater security of tenure for slum-dwellers is increased interest in contributing to community improvements, with high priority often attached to introducing roads.⁷⁹ Government technical advice is usually required, and financial assistance needs to be provided to the poorer among the slum communities, which are not capable of carrying out the work entirely on a community self-help basis.⁸⁰

5.08 In the effort to eliminate the need for emergence of new slums the transport sector has a vital role to play. Success will depend crucially on much more effective cooperation than in the past between municipal land-use planning and road/transport planning.⁸¹ At the trunk level of main radial and circumferential roads, attention has to be given to efficient relative siting of residential and commercial facilities and potential areas of employment, taking account of the frequency of contacts that residents will need to have with different facilities and their realistic possibilities of paying for motorized travel. At the subdivision level, efficient, travel-minimizing sites must be chosen for public facilities, and land reserved for roads and paths between areas that will be made available for housing.

5.09 In the large metropolitan areas of the continent the sector will also have to give increasing attention in the coming years to the urban environmental sustainability problems that are already preoccupying so many Asian cities – notably vehicular air pollution (especially particulates) and traffic congestion. Measures are needed already now to move towards ending the use of leaded petrol, with the serious consequences that high lead absorption can have on children's lifelong capacities. For the issues of vehicle emissions more generally and congestion, the most important steps at this stage to prepare for meeting these challenges are to strengthen capacities for efficient (and probably generally private-sector) provision of public transport (including, for example, use of bus ways) and to ready middle-class public opinion for the rising charges and taxes that will need to be levied for use of private vehicles in order to keep demand within limited road capacity.

⁷⁸ DFID Transport Resource Centre 2002. "Transport's Role in Achieving the Millennium Development Goals"

⁷⁹ Philip Amis illustrates the significance of such improvements from the viewpoint of slum residents, in the course of assessing the results of a UK-supported project of the early 1990s in Visakhapatnam, India. See Amis, Philip 2001. "Rethinking UK aid in urban India: reflections on an impact assessment study of slum improvement projects," *Environment and Urbanization* Vol. 13 No.1.

⁸⁰ Diaz Olvera, Lourdes and Didier Plat and Pascal Pochet, op. cit.

⁸¹ UN Commission on Sustainable Development 2004. "Human Settlements: Progress in meeting the goals, targets and commitments of Agenda 21, the Program for the Further Implementation of Agenda 21, and the Johannesburg Plan of Implementation – Report of the Secretary-General". UN document E/CN.17/2004/3.

5.10 The most useful indicator for measuring the performance of the transport sector in an African city would be one capturing trends in the affordability of transport for the poorer households and in the extent to which they are able to fulfill essential travel needs. The reason why major cities generate such high proportions of national incomes is that they are very large markets, including for labor, thus offering better possibilities than elsewhere for businesses to find quickly and cheaply the particular good or service needed, or a worker with particular technical skills and experience. Realization of the potential benefits obviously depends, however, on people being able to travel fairly widely so that they can access different opportunities – widest, no doubt, for the high-skilled and high-paid, but wide too (compared with smaller towns) even for less skilled laborers.

5.11 Data have been grossly lacking in the past on urban travel needs and practices of the poor (not only in Africa). Information needs to be collected on the time + money costs of access to standard key facilities for people of different income levels and different living places, and the extent to which they are able to fill felt travel needs. Interesting initiatives in this general area are being undertaken by the UN-Habitat Global Urban Observatory through its Monitoring Urban Inequities Program (MUIP). Transport issues are to be covered, and it is intended initially to complete surveys of 35 cities in Africa, Asia and Latin America. Surveys have already been conducted for Accra and Addis Ababa.

5.12 Given the high importance of travel and transport conditions to almost all residents of cities, the other type of indicator of transport sector performance which would be particularly valuable in towns is the 'Citizen Report Card', based on opinion surveys of representative samples of the public, as described in para 2.21 above.

VI. TRANSPORT AND THE LANDLOCKED COUNTRIES – MDG 8

6.01 MDG 8 concerns the broader framework of international cooperation in support of economic development. The specific objectives agreed include progress in addressing the “special needs” of the least developed and the landlocked countries. The needs of the latter are of particular importance in the present context because they relate so much to transport.

6.02 Africa has much higher proportions of landlocked and least developed countries than any other part of the world. One half of all landlocked developing countries, and two thirds of all the countries designated as least developed, are African. Only three of Africa’s landlocked countries (Botswana, Swaziland and Zimbabwe) have so far succeeded in achieving substantial sustained economic progress. The other twelve⁸² still belong to the ‘least developed’ group, and in fact account for three-quarters of all the world’s countries which are both landlocked and least developed.

6.03 In contrast to the situation in Europe, landlocked countries in the developing regions of the world tend generally to fall below their maritime neighbors in terms of per capita income levels and human development indicators.⁸³ This is particularly true in Africa, with some exceptions in the south mainly related to the benefits a few landlocked countries have been able to derive from proximity to South Africa.

6.04 Experience throughout the developing world shows that major factors in this weaker performance of the landlocked countries are high transport costs and the inadequacy of transport and communications infrastructure. Three independent sets of data on developing countries’ international trade flows and shipping costs were gathered and analyzed in a recent study.⁸⁴ The elasticity of trade volumes with respect to transport costs was found to be high, at around –3.0. The median landlocked country faced transport costs about 50% higher than the median coastal economy and hence had a trade volume 60% less. The same study found that transport costs for intra-African trade are well over twice what they would be for trade within other main regions of the developing world, and that nearly half of this cost premium was due to weaker infrastructure.

6.05 The transport costs of international trade depend, of course, on a wide variety of factors, including volumes and nature of commodities sent and distances involved, as well as fa-

⁸² Burkina Faso, Burundi, Central African Republic, Chad, Ethiopia, Lesotho, Malawi, Mali, Niger, Rwanda, Uganda and Zambia.

⁸³ Faye, Michael L. and John W. McArthur and Jeffrey D. Sachs and Thomas Snow 2004. “The Challenges Facing Landlocked Developing Countries,” *Journal of Human Development* Vol. 5 No. 1: 31-68.

⁸⁴ Limão, Nuno and Anthony J. Venables 2001. “Infrastructure, Geographical Disadvantage, Transport Costs and Trade,” *World Bank Economic Review* Vol. 15 No. 3: 451-479.

cilities available for carriage and the efficiency with which they are operated. But, as shown in Table 3, the best available information,⁸⁵ albeit approximate, indicates that Africa's least developed landlocked countries indeed face high costs, compared with other countries, for transport and insurance of international consignments.

Table 3: Transport/Insurance Costs for Exports and Imports as Percent of Respective Trade Volumes

	Sub-Saharan Africa			All land-locked developing countries	All developing countries	OECD countries
	Least developed landlocked countries	Landlocked countries	Coastal countries			
Exports	32%	20%	15%	13%	8%	6%
Imports	25%	21%	10%	7%	5%	3%

Analysis of figures for Uganda indicated that transport costs for exporters were equivalent in aggregate to about two-thirds of value added. For producers for the domestic market, transport costs of competing imports provided effective protection equivalent to about half of value added.⁸⁶ But of course even amongst the least developed landlocked countries themselves there are very big variations in costs. According to ERA's figures⁸⁷ the road freight price for the long haul from Mombassa to Kampala is US\$0.08 per ton-km., and for the even longer haul to Kigali US\$0.098 per ton-km. Compared with those prices the road freight rate of US\$0.049 per ton-km. from Djibouti to Addis Ababa appears favorable.

6.06 While landlocked countries are often far from the ocean, the feature, which distinguishes them from coastal countries' inland provinces which are equally or more distant is that movement is not under national control and depends significantly on neighbors. Work under the UN Millennium Project⁸⁸ has recently classified the problems that arise for landlocked countries into four groups: weaknesses in transit countries' infrastructure and in its manage-

⁸⁵ Faye, McArthur, Sachs and Snow 2004, op. cit. and UNCTAD 2003. "Challenges and Opportunities for Further Improving the Transit Systems and Economic Development of Landlocked and Transit Developing Countries" Document UNCTAD/LDC/2003/8. UNCTAD, Geneva.

⁸⁶ Milner, Chris and Oliver Morrissey and Nicodemus Rudaheranwa 2000. "Policy and Non-Policy Barriers to Trade and Implicit Taxation of Exports in Uganda," *Journal of Development Studies* Vol. 37 No. 2: 67-90.

⁸⁷ Ethiopian Roads Authority, op. cit.

⁸⁸ Faye, Michael L, John McArthur, Jeffrey Sachs and Thomas Snow 2004, op. cit.

ment; difficulties that result from broader political tensions with neighboring states; civil conflicts within transit countries; and slow and expensive border-crossing procedures. Information was gathered about the experience, in these respects, of all the landlocked developing countries.

6.07 The overall picture that emerges suggests that Africa's least developed landlocked countries suffer significantly more than landlocked countries in other parts of the world from problems that they can do little themselves to remedy. Transit-country infrastructure deficiencies are a much more major part of the problem than elsewhere, reflecting the generally poor state of African infrastructure and those countries' budgetary problems. Prolonged closures of major routes due to civil conflict in transit countries have affected many to some extent and some, such as Malawi and Mali, very seriously. En route costs and delays, especially at borders, seem typically to be greater in Africa than elsewhere, and may be somewhat more amenable than the problems just mentioned to alleviation by measures that landlocked countries can help to stimulate. Broader political tensions have generally affected transport in Africa less seriously than in other regions, especially Central Asia.

6.08 One important part of the solution to these problems is the improved management and maintenance of trunk transport infrastructure that is needed in most countries – whether maritime or landlocked – to strengthen their own economic growth, as discussed in Section II of this paper. The study of Uganda's high trade costs mentioned above emphasized the scope for reduction by better maintenance of infrastructure along the Kampala-Mombassa corridor, more effective axle-load controls, improved railway operations and reduction of gross port inefficiencies. As in other parts of the world, African countries that have experimented with competitive concessioning of major trunk facilities to the private sector – such as Cameroon and Côte d'Ivoire in railways and Mozambique and Tanzania in ports – have had generally good experience in terms of resultant efficiency improvements.

6.09 The 2004 edition of the Economic Report on Africa, a flagship publication of the UN Economic Commission for Africa⁸⁹ summarizes well the problems that most parts of the continent have to contend with:

“The movement of goods in Africa is rendered difficult by a host of different factors. The continent has a generally inadequate road and rail network, its transport services operate at a low level of efficiency, many routes are subject to official and unofficial roadblocks, and there are slow and cumbersome border-crossing procedures. Transport costs in many African countries have been recorded as the highest in the world, and many of the factors are attributable to unnecessary delays and corruption. The continental road network is not only poorly developed but also badly maintained. Very little of the network has been updated to accommodate larger vehicles, which can cause major damage on unsuitable surfaces. Inefficiency is equally manifest in the lack of care of vehicles, shoddy routine main-

⁸⁹ UN Economic Commission for Africa 2004. *Economic Report on Africa 2004: Unlocking Africa's Trade Potential*. Economic Commission for Africa, Addis Ababa.

tenance and poor operating practices. Vehicle operating costs are considerably higher in Africa than elsewhere in the world. Studies have shown, however, that allowing competition into transport services can lead to dramatic reductions in costs. Another contribution to Africa's high transport costs comes from the proliferation of rules governing road transport, and the wide variations in technical standards adhered to by different countries, leading to uncertainty and a multiplicity of forms at national borders.”

The report goes on to illustrate the problem of border-crossing delays with evidence from southern Africa: a survey undertaken in 2000 found that vehicles crossed in less than 10 hours at only five of the thirteen border posts studied, while at seven of them it took 24 or more hours to get across. As regards checkpoints (or roadblocks) the report quotes a 2003 survey of six major ECOWAS trade routes, each generally around 1,000 kilometers in length, which showed that the number of checkpoints averaged 4 per 100 kilometers, reaching as many as 7 per 100 kilometers on one major route.

6.10 Over the last decade there have been several international conferences – including one, in 2003, at Ministerial level⁹⁰ - to promote effective intergovernmental action steadily to reduce the serious problems faced by landlocked countries. As the report on the Ministerial conference emphasized,⁹¹ “bilateral, subregional and regional cooperation is the most important element in establishing efficient transit transport systems and must be promoted on the basis of the mutual interests of both landlocked and transit developing countries.” But even when agreements have been painstakingly worked out – as, for instance, the customs transit systems for trucks adopted by ECOWAS and COMESA, or bilateral agreements to establish joint border posts – governments have been very slow to take implementing actions. Despite the agreement reached in 1995 on the Global Framework for Transit Transport Cooperation, donors' aggregate capital support for projects which could ease the landlocked countries' problems appears to have fallen substantially since the early 1990s.⁹² That picture may hopefully now be changing, at least in Sub-Saharan Africa, with the special emphasis that NEPAD is giving to improvement of regional transport links, many of them of interest to the landlocked countries, and the increased efforts of the African Development Bank and other donors to help bring such projects to fruition.

6.11 One way of accelerating progress may be to aim less at achieving comprehensive agreements covering all trade or transport between two or more countries, and more at improvements on specific corridors. This should facilitate the introduction of many improved practices, such as recognition of through bills of lading, the creation of “single window” facili-

⁹⁰ International Ministerial Conference of Landlocked and Transit Developing Countries and Donor Countries and International Financial and Development Institutions on Transit Transport Cooperation, held in Almaty, Kazakhstan on 28-29 August 2003.

⁹¹ Report of the Secretary-General to the General Assembly on the Outcome of the Conference, UN Document A/58/388 dated 23 September 2003.

⁹² UNCTAD 2004. “The Least Developed Countries Report 2004”. UNCTAD, Geneva.

ties, establishment of “one-stop” inspections, and introduction of transparent Customs transit procedures. Establishment of one or two alternative corridors can create competitive pressures that stimulate further improvement of performance.

6.12 The Economic Commission for Africa report quoted above outlines the main elements of the comprehensive strategy that is needed to deal with the trade and transit problem, combining actions by transport infrastructure agencies, customs authorities, police, freight transport companies, the services involved in vehicle supply and maintenance, freight forwarders and national competition authorities. ECOWAS has given great attention to trade and transport facilitation in recent years, identifying a series of key steps, including establishment of joint border posts, harmonization of procedures and inter-linkage of information systems, creation of corridor management committees and introduction of observatories of the functioning of the corridors, speedily to identify bad practices that may be emerging and to get them rectified. In January 2005 the ECOWAS Council of Ministers agreed on a new structure of national, regional and corridor committees, with joint public-private participation, with a mandate to pursue these steps.

6.13 To help identify where problems are occurring, and to measure progress in their solution, some regions of the world have applied, for certain periods of time, systems for gathering and disseminating data on key indicators – as, for instance, lorry waiting times at border crossings in south-eastern Europe when delays were widespread. It is hard, however, to identify universally applicable indicators that would be worth the cost of collection in all circumstances. What does need to be done – and this was strongly endorsed by the 2003 Ministerial conference – is to establish joint public-private mechanisms for regular review and monitoring of the implementation of transit agreements and of progress in easing the flow of trade more generally. The conference gave much emphasis to the contribution that private operators, who live with the problems on a day-to-day basis, can make to ensuring an accurate picture of what is actually happening, identifying solutions to particular problems and establishing priorities for further action. Such consultative mechanisms, whether facilitation committees or other bodies, should be expected to identify key indicators responsive to the prevailing situation and possibilities – and they should be assisted with arrangements to gather high-quality data in timely fashion.

6.14 Effective inter-governmental action to identify, agree and fulfill the measures needed to achieve good transport services for the landlocked countries to the sea must be a high priority within the framework of the MDGs. Joint efforts between a landlocked country and relevant neighbors are the sine qua non of progress. But in Sub-Saharan Africa the obstacles, and often the resources required, are sufficiently great that the countries cannot always be expected to achieve a solution on their own. Implementation of sound actions agreed between the countries directly concerned therefore becomes a high priority for assistance from the international community.

VII. CONCLUSIONS

7.01 The basic thrust of the MDGs is to make economic growth more inclusive than it has been in the past and to bring all the world's people to basic standards of health and education that modern technologies make readily feasible. Better health and education, besides directly improving people's welfare, will also strengthen their capacities to contribute to, and participate in, the growth process. Because the large majority of poor people live in rural areas often far distant from growth centers, a more pro-poor pattern of growth and development will necessarily involve higher investment in infrastructure, and in transport, than would be required for growth without particular priority for poverty reduction.⁹³

7.02 In Sub-Saharan Africa the need for infrastructure investment (as a proportion of incomes) is, and will remain, greater than in any other of the major developing regions, because of the wide spread of its population – and even its nations – across a large land mass with very limited ocean-navigable rivers. In identifying the special characteristics of Sub-Saharan Africa which have made it most vulnerable to a persistent poverty trap, the final report of the UN Millennium Project⁹⁴ puts in first place “Very high transport costs and small markets.” Extensive comparison a few years ago⁹⁵ of the development and trade experiences of the world's various continents, more developed as well as less developed, suggested that the distribution of population in Africa is likely to continue gradually shifting toward the coasts, consistent with patterns in the other relatively sparsely inhabited and land-abundant continents. Agriculture and mining occupations will dominate in the interior, manufacturing towards the coasts. Nonetheless, as compared with low-income Asia, whose current income levels are most similar to those of Sub-Saharan Africa, the African countries will need to invest at least twice as much of their GDPs in infrastructure, in addition to meeting higher recurrent charges for operation and maintenance.

7.03 This review of the MDGs in Africa has shown that transport is important to all of them. It has also illustrated ways in which transport sector performance can be expected to make a bigger difference to MDG attainment than in other parts of the world. It showed, however, that transport is rarely the sole effective constraint on progress towards an MDG. Ex-post evaluation studies are particularly subject to the risk of attributing too much of the development that ensued to the particular investments under focus. In connection with any MDG, instances can arise where relief of a transport bottleneck is alone sufficient to release some progress. But in the vast majority of cases, even where transport may account for a large part of the

⁹³ Willoughby, Christopher 2004. op. cit.

⁹⁴ UN Millennium Project 2005. *Investing in Development: A Practical Plan to Achieve the Millennium Development Goals*. United Nations, New York.

⁹⁵ Wood, Adrian 2002. “Could Africa Be Like America ?” in Proceedings of World Bank Annual Conference on Development Economics 2002, World Bank, Washington D.C.

investment required, initiatives by various sectors have to be planned and activated in a coordinated way in order to secure the MDG outcomes sought. In localities where transport investment has been very lacking, as in much of Sub-Saharan Africa, the impact of such combined actions can then be quite dramatic, as illustrated in previous sections.

7.04 In Sub-Saharan Africa the transport sector is clearly one of those that needs to be enabled to achieve the quantum leap in scale and ambition that was called for by the UN Secretary-General for the making of “focused investments”. This review suggests that the top priorities for increasing the sector’s contribution to attainment of the MDGs are:

- Increased efficiency in management of infrastructure and services for trunk transport – main roads, ports and railways – with judicious, selective expansion to prevent bottlenecks arising, and particular attention to the transit needs of landlocked countries and to trade-related regional links.
- Increased effort on rural infrastructure and services, to raise the overall level of maintenance and hence reliability (requiring in many countries improved arrangements for regular financing of such work) and, simultaneously, to strengthen and extend the network in close coordination with emerging agricultural potentials.⁹⁶

7.05 Progress toward the MDGs would benefit from more explicit consideration and specification of the role that transport needs to play in the ‘production function’ and implementation strategy for each. A good opportunity for thorough work of this nature presents itself in the current effort to generate more national versions of the MDGs, developed by each country in light of its own local realities and priorities. It could be expected that many of the Sub-Sahara African countries would decide to include transport-related objectives or targets in the specification of most of the MDGs, as Guinea has done.

7.06 Our review suggests that the outcome indicators which would be useful for targeting and measuring transport’s ultimate contribution to the MDGs (on national and within-country regional bases) are basically of four types. We classify and list them below, giving a reference to the relevant paragraph in this paper in the case of those that have been discussed here more specifically.

Broad indicators:	Rural access to all-season roads (1.06)
	Rural road condition survey: passability standard (2.14)
	Rural public transport fares (4.17)
	Main road condition survey: surface quality (2.14-2.15)
	Unit costs of road freight transport (2.18-2.19)

⁹⁶ Jean-Philippe Platteau gives an interesting review of Sub-Saharan Africa’s combined transport and agricultural experience and possibilities in “Resource Endowments and Agricultural Development,” published as chapter 2 in Platteau, Jean-Philippe 2000. *Institutions, Social Norms and Economic Development* Harwood Academic Publishers, London.

- Specific indicators: HIV/AIDS infection of sector staff and affected communities (4.17)
 Unskilled labor days paid for construction/maintenance (2.20)
 Time from arrival of container in harbor to release through port gate
 Transport-related fatalities from obstetric complications (4.17)
 Road accident fatalities (4.17)
 Urban Poor travel indicators and affordability (5.10-5.11)
- Reform indicators: Contributing to education/health facilities planning (3.12-3.13, 4.10, 4.18)
 Facilitation of trade flows and transit (6.13)
 Participatory planning for community priorities (3.13, 5.07)
 Implementation of environmental standards (5.03)
 Linking road and land-use planning for cities (5.08)
 Systems for assuring due process in expenditure choices and contracting
 Road Fund and Road Board development (2.16)
 Types of operation newly contracted out/concessioned
- User opinion indicators: Citizen Report Cards (2.21, 5.12)
 DHS questions on access to health (4.05-4.06)

This list is illustrative rather than complete. As stated in the previous sections of this report, indicators relating to the specific issues prioritized in connection with a particular MDG should be identified by the institutional and consultative mechanisms suggested.

7.07 The above list is intended to capture the main ‘outcomes’ of transport sector activity that would be highlighted by Results-Based Management in pursuit of the MDGs in a Sub-Saharan African country. These broad outcome indicators would of course be backed by more numerous intermediate indicators regarding aspects such as staff trained, kilometers of road of different classes built and maintained, and unit costs of works. Both outcome indicators and intermediate indicators would also be used in designing ‘performance-based contracts’ under which the contractor is rewarded according to the standards (e.g. of road-surface condition in a maintenance contract) actually sustained over the years of the contract.

7.08 Development of a national set of MDG-related transport outcome indicators/targets, and adjustment of transport agencies’ management systems in such a way as to focus effectively on their accomplishment, should greatly facilitate transition in foreign assistance for transport from project financing to budget support. This in turn would significantly increase the feasibility of channeling into the sector the appropriate part of the much enlarged foreign aid flows that Sub-Saharan African countries need to help attain the MDGs.