

# **Wasted Time: The Price of Poor Access**

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## Chapter 1 - INTRODUCTION

### The Demands of Access on Time

1.1 This book is about the development of a rural infrastructure planning process which uses access as the main parameter. Access is an important factor in rural development because its existence or absence defines the opportunity that rural people have to improve their social and economic well being.

1.2 One of the important factors limiting access is the time spent by the rural poor in developing countries to meet their everyday needs. The amount of time they spend in collecting water, obtaining fuel, getting to the school, the clinic, the grinding mill or the market can be quite considerable. Not only this, but it is wholly unproductive time (however important getting to the supplies, services and facilities may be). And because it is unproductive, it is time that is wasted. The more inaccessible are the essential destinations, the more time has to be spent in reaching them. In this sense, inaccessibility has become a by-word for isolation - which Robert Chambers has noted is one of five core dimensions of poverty.<sup>1</sup>

1.3 The amount of time spent in merely obtaining access to supplies, services and facilities is a constraint to development. Efforts to reduce that time could have a significant impact on the prospects for improving the lives of the rural poor. Both for them and for development planners, the key issue and question is whether any time that might be saved through better access can be translated into better - materially higher - levels of living. In one sense, it is a matter of the opportunity costs of the (unproductive) time spent in travel and transport by the rural poor. Nevertheless, almost whatever may be the opportunity costs of this time, the **function** of providing shelter, clothing, water, food and fuel is absolutely essential to subsistence, hence it cannot simply be traded-off against activities which can contribute to a higher level of living.<sup>2</sup>

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

2 Of course, those who are better off - whose opportunity costs are relatively high - can simply employ others lower down the socio-economic scale to fetch and carry for them. In doing so, they create employment, the effect of which is to re-distribute a portion of their higher incomes. The question then becomes whether a development process which fosters the growth of a set of 'professional' fetchers and carriers is acceptable?

1.4 There is also the question of whose time. Most rural households have a division of responsibilities between men and women. In general, and certainly in Africa, it is women whose time budget is under the greatest pressure. It is women also who are responsible for many of the essential activities such as food preparation, water and fuelwood collection. Unfortunately, women also have the weaker voice in decisions regarding the household.

Women are therefore responsible for activities which are essential for survival but have little economic value. They are also in a disadvantaged position for making decisions which might reduce their burden.

1.5 At the aggregate level the issue is somewhat different. It is a matter of balancing the capital cost of providing better access to basic supplies, services and facilities against the contribution that might be made to the national economy from additional time available to the rural poor. In other words, development planners must look at two sets of opportunity costs - (a) the opportunity cost of the time of the rural poor, in relation to (b) the opportunity cost of capital.

#### **Box 1: Women & Transport**

**It is only in recent years that the extent of the burden of time and effort spent on transport has become more evident. For instance, on average, an adult woman in Africa transports the equivalent of 20 Kg. over 10 Km. every day of the year.**

### **Mobility or Proximity?**

1.6 The idea of reducing the time spent in obtaining access is not new. In more developed countries, access to water and fuel is usually a matter of turning a tap or flicking a switch. In developing countries, however, there seems to have been an assumption that access involves physical movement. Thus, providing intermediate means of transport; improving tracks and trails; or more generally improving the rural road network are all aimed at reducing the time and effort required in gaining access. Many such interventions have been successful. Nevertheless, they all approach the problem from the standpoint of increasing mobility. As such, they look at the problem as if it had to do with transport only.

1.7 Work undertaken in recent years has attempted to take a broader view. It has seen the solution to the 'transport problem' both in terms of (a) mobility (or transport), and (b) the proximity of supplies, services and facilities (or non-transport). This dual approach sees the solution to access problems in terms of:

- ▶ moving people more swiftly and easily to where they need to reach (i.e. improving their mobility);
- or ▶ bringing supplies, services and facilities closer to the people;
- or ▶ a combination of the two.

1.8 Any rural household has to take conscious decisions about the resources it devotes to different activities. First and foremost, of course, the household needs to sustain itself. This means that time must be allocated to ensure adequate shelter and clothing and in obtaining water, fuel and food. Only when these basic needs have been met can time be spent on other activities. And any such 'spare' time can be devoted to a variety of objectives or activities, including better family care, health, or education; more leisure; or cash crop production, marketing or other productive and income-earning activities to lift the level of living. But the one factor that affects all these decisions is the amount of 'spare' time that may be available after reaching the most fundamental supplies, services and facilities for basic subsistence.

1.9 The time spent in meeting subsistence needs is itself a measure of access. Yet the time 'budget' for the rural poor is already quite constrained. Most are actually quite busy: they are poor because the financial returns to their time and labour are so low. Such basic activities as collecting water and fuel; producing, preparing and cooking food; washing and cleaning; child care; cultivating, harvesting and marketing cash crops; as well as house repair and maintenance already account for the majority of their time. And if access is difficult, choices will have to be made between, say, the protected water source which may be 5 Km. away, or the unprotected (possibly polluted) source close by; between the local healer in the village, or the clinic, say 8 Km. away; between making five or more trips to the market (headloading the crops to be sold), or just one journey (but paying for the hire of an ox cart or other means of transport); between spending several hours collecting fuelwood, or purchasing it; and between children walking to a far-off school which actually has a teacher and books, or going to a nearby school with perhaps no text books and only intermittent teaching.

1.10 This suggests that the ability of the rural poor to pay for a service is mainly measured in terms of time. But this is where the opportunity costs of the rural poor come into play. Can we afford the time required to obtain clean water, to go to a proper health station or to send our children to a proper school? The amount of time involved in obtaining access to the supply or service - in relation to its opportunity cost - becomes the main criterion by which we will judge whether or not to do so.

### Accessibility in Local-Level Planning

1.11 It is for this reason that the concept of accessibility has been seen as a key factor in local-level planning. The concept of accessibility is also in tune with other developments that have taken place in rural development over recent years, as outlined below.

#### Box 2: The Widening Rich-Poor Gap

**The 1996 Human Development Report refers to 'spectacular growth' in some countries and 'unprecedented decline' in others over the past 15 years. The gap between rich and poor - both within and among countries and regions - has become greater. Thus, whilst countries in Asia, particularly East Asia, had spectacular growth rates benefiting the mass of their populations, more than one billion people actually saw their per capita income fall between 1980 and 1993.**

**In Latin America, some 18 countries have a lower per capita income than 10 years ago. In Africa, as many as 20 countries have a lower per capita income than 20 years ago.**

1.12 Some of the significant recent trends in rural development have been decentralisation, devolution and a more integrated approach to planning (including greater involvement and participation of beneficiaries) - all subsumed within an overriding concern for poverty alleviation. These trends are often interlinked.

1.13 Thus, decentralisation and devolution imply a more 'hands-on' involvement of those who both implement and benefit from rural development initiatives. At the local level, planning tends to be multi- rather than uni-sectoral. In addition, there has been a recognition that rural

development in many countries has been 'captured' by elites and those who are already better off, leaving most still poor.

### Box 3: Access to Basic Services in Developing Countries

Almost a third of people in developing countries live in poverty. And their poverty is reflected in some basic indicators of lack of access to basic services.

- ▶ **130 million children still do not attend primary school.**
- ▶ **Under 5 mortality rates are some 6 times higher than in more developed countries.**
- ▶ **Maternal mortality is 12 times higher than in OECD countries.**
- ▶ **In the 46 countries characterised by the UN as 'Least Developed' (and comprising some 550 million people), only 57% of their populations have adequate access to health services; 49% to safe water; and 36% to sanitation.**

Source: UN. *Human Development Report 1997*

1.14 The massive investments in rural development in the 1970s and 1980s have had little or no impact on the reduction of poverty. There are, of course, exceptions which deserve not only praise but also study to understand how success has been achieved. But the consensus has been that investments in rural development have neither been sustainable nor have effectively addressed the needs of the rural poor. The failure of many rural infrastructure projects - in particular rural roads - provides a good example of high hopes not being translated into achievements. It seems that whilst opportunities have been created for development, they have not been matched by an ability to grasp them.

## Recent Trends in Thinking About Rural Development

1.15 Three other factors have influenced recent trends in rural development, as outlined below.

- \* First, there has been a significant trend towards decentralisation of government in many developing countries. This has been partially a response to a sense of *realpolitik* that political centralisation and concentration have been linked with a centralisation of political competition, hence instability. It has also been part of the same *realpolitik* that central governments have seen the benefit to themselves of decentralising to the local level. The actual shifts have taken many forms. In some countries, it has meant genuine devolution of responsibility, authority, and the control of funds. The Philippines and Ethiopia are examples of this. In some other countries, it has been more restricted to organisational decentralisation to the local level without a corresponding devolution of authority, financial responsibility or accountability.
- \* The second factor has been the more restricted levels of aid funding. Official Development Assistance (ODA) to developing countries fell from \$62 billion in 1991 to \$57 billion in 1993. Aid to the Least Developed Countries (LDC) fell even more steeply, from \$32 per capita in 1990 to \$27 per capita in 1993. Clearly, developing countries have less money for rural development and this has led to more careful analysis of where available funds should be spent. It has also led to donor agencies being more concerned with the measurable benefits that will accrue from development projects.

- \* The third factor is a greater concern with the intended beneficiaries of development programmes. Community participation has become a slogan - even a *sine qua non* - in development. This emphasis has to some extent been used to pass an unwanted burden of responsibility to the beneficiaries. However, it has highlighted the fact that development programmes are unlikely to be successful if they do not involve the people who are intended to benefit from the programmes from the beginning.

1.16 The result has been that far greater responsibility for rural development has been placed on local authorities, local organisations and local people themselves. In one sense this has been a very positive move. Centralised planning systems have hardly been able to understand the web of factors perpetuating rural poverty, let alone make any difference. It makes sense, therefore, to focus on the potential of locally-available resources (from whatever source) and on people themselves to solve their own problems. On the other hand, the capacity of local government, organisations and individuals is usually quite limited. In short, devolution and decentralisation carry a price tag - a tag reflecting the need to enhance local-level capacity to conceive, plan, implement and maintain suitable development initiatives.

1.17 Involving communities so that they can take development into their own hands has received considerable attention over the last 10 years. One international development assistance agency<sup>3</sup> uses a motto emphasising this concept - 'give a man a fish and you feed him for a day, teach him to fish and you feed him for life'. The work done on community participation has resulted in a whole range of successful local projects and has spawned a new set of words for the development lexicon. It has even been suggested that the most effective means to provide development assistance is to by-pass government structures altogether and rely on local communities. However, this has been counterbalanced by a concern among most international development assistance agencies to promote 'good governance' - thereby emphasising the need to develop local government systems, procedures and capacity.

1.18 What has become increasingly clear is that local authorities and organisations require considerable support if they are to shoulder increased responsibility. This is true in all areas, from effective governance to development planning and financial management. Nor is it merely a question of transferring existing procedures and systems from the centre to the rural areas. Planning, for instance, has usually been undertaken on a sectoral basis from the centre through different line agencies. But at the local level, owing to more limited resources and the greater urgency for integration, planning needs to be done on a multi-sectoral basis. Herein lies both the challenge and the problem. To plan on a multi-sectoral basis implies the need to define common themes and objectives for different sectors. In planning the provision of physical infrastructure in rural areas, the time that people spend in reaching supplies, services and facilities is just such a theme.

1.19 Dealing with poor access is how this book becomes concerned with local-level planning. There is a need for guidance on how local-level planning procedures - in particular those associated with physical infrastructure - can relate more effectively to the demand for locally appropriate solutions. The aim, however, is not merely to describe ways of improving local-level planning. Rather, it is to draw together the themes referred to above, together with the crucial role that infrastructure can play in rural development, thus providing an overall framework within which local-level planning can respond to the real needs of the rural poor.



## The Meaning of Access

1.20 This book identifies access as being a key determinant both of poverty itself and of opportunities to escape from the poverty trap.

1.21 The Oxford English Dictionary lists some 11 meanings of the word access in four different categories. Those most relevant to this book are:

- \* coming to or towards; approaching - the action of going or coming to or into; coming into the presence of, or into contact with; approach, entrance;
- \* the habit or power of getting near or into contact with;
- \* the state or faculty of being approached;
- \* the action of coming towards, coming, approach, advance.<sup>4</sup>

1.22 These meanings - which we can pull together as **the ability to reach, visit or use** - effectively describe the potential that improved access offers for the rural poor. As already noted, isolation is a key characteristic of poverty. But being isolated does not just mean being remote: rather, it means being cut off (from supplies, services, facilities, even ideas). This is how poor access means isolation. And improving access therefore provides an effective entry point in the planning process if it can (a) alleviate the constraints on the rural poor, and (b) offer them new opportunities to lift their level of living. As such, improving access should be a major objective of rural development planning.

1.23 The concept of accessibility has been used extensively by geographers. In more developed countries, accessibility has been part of the planning process for many years. It is only in recent years, however, that it has been used by those concerned with the planning and provision of rural infrastructure, where it has focused on the location and siting of services, largely assuming that user mobility is unconstrained.

1.24 In summary, lack of access deprives people of the opportunity to improve their lives. Access is composed of two elements. Mobility, reflecting the ease or difficulty in travelling to a service or facility and Proximity, of those services and facilities.

1.25 Whilst access is not only a function of time required, it is true that rural households spend a large amount of time preparing food, collecting water and fuelwood - activities which are basic for survival. The economic value of reducing this time is hard to quantify. However it is arguable that it is not necessary as such a reduction is common sense and contributes substantially to their welfare. The fact that the benefits would be felt disproportionately by women is also a compelling argument given the weaker position of women in most rural societies. Clearly where access leads to economic benefits, the cost of providing the improvements can be effectively compared with the benefits produced.

1.26 Because access is seen as a key element in providing the opportunity for both social and economic development, it provides an entry point for local level planning. In particular planning which relates to the provision of services and facilities which the rural population require.

1.27 This emphasis on access in the planning process coincides with the parallel trends towards the decentralisation of decision making and the concern to involve the local communities in the decision making process.

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<sup>4</sup> Oxford English Dictionary (Compact Edition). Oxford University Press. 1971.

1.28 The use of access as a key parameter in the planning process is not new. However, until recently, it had not been applied in the framework of rural development in developing countries.

### **The Book in Outline**

1.29 With these issues and definitions in mind, in Chapter 2 the relationship between accessibility - or the lack of it - and poverty is explored. Chapter 3 reviews some of the theory and practice on the role of physical infrastructure in economic and social development. Chapter 4 looks at one aspect of access, mobility whilst Chapter 5 investigates the other aspect, proximity.

1.30 Chapter 6 describes the development and application of Accessibility Planning. Having described the accessibility planning process, Chapter 7 then looks at its potential applications - not only as a prioritisation tool but also as a means of target setting and the identification of indicators in monitoring effects. Chapter 8 contains a critical assessment of the present shortcomings of the process and how it might be improved.



## Chapter 2 - ACCESS AND POVERTY

### The Relationship Between Access and Poverty

2.1 It would seem self evident that the lack of access to health and educational facilities, to water supplies and to a source of fuelwood would contribute to the poverty level of a community. This is not to say that physical access to these facilities will automatically ensure improvements in their condition. Other factors clearly play a part. Nevertheless common sense would suggest that unless a community has access to these facilities it has little chance of taking itself out of poverty.

2.2 In addition to this feeling of an inherent relationship between access and poverty, concrete evidence now suggests that this association exists. Clearly access is not the only factor. However it is a key parameter.

2.3 At the macro-level, the World Bank has shown that access to safe water, electricity and the road network is associated with national per capita incomes.<sup>1</sup> Figure 2.1, derived from World Bank statistics, shows that there is a significant relationship between infant mortality and the access to health services.<sup>2</sup> Table 2.1 provides an overview of statistics on access-related factors for low-income countries. On the other hand Figures 2.2, 2.3 and 2.4 show that there is no statistically significant relationship between the levels of access to health, water supply and sanitation services and GNP per capita.

2.4 In other words, poor access is one of the characteristics of poverty. In the first place, it has its effect at the most basic level of living. If there is poor access to health services, people will remain unhealthy; children will die; and any epidemic will be likely to have catastrophic results. If there is poor access to clean water, again health will suffer. If there is poor access to basic information the household will be unaware of ideas and technology that might help them to lift their level of living. And if there is poor access to education, children will probably share in the future the limitations confronting their parents today.

2.5 Nevertheless, access to basic services such as health, water and sanitation is not necessarily reflected in increases in income. This reinforces the view that for subsistence economies access to basic services provides the foundation for development but does not contribute directly to economic development.

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1 World Bank. World Development Report 1994

2 The residual variance above and below the correlation line probably reflects a great many factors which actually determine levels of infant mortality, including differences in the quality of health services, as distinct from people's physical access to them.

The Price of Poor Access

Figure 2.1 Infant Mortality and Access to Health Services

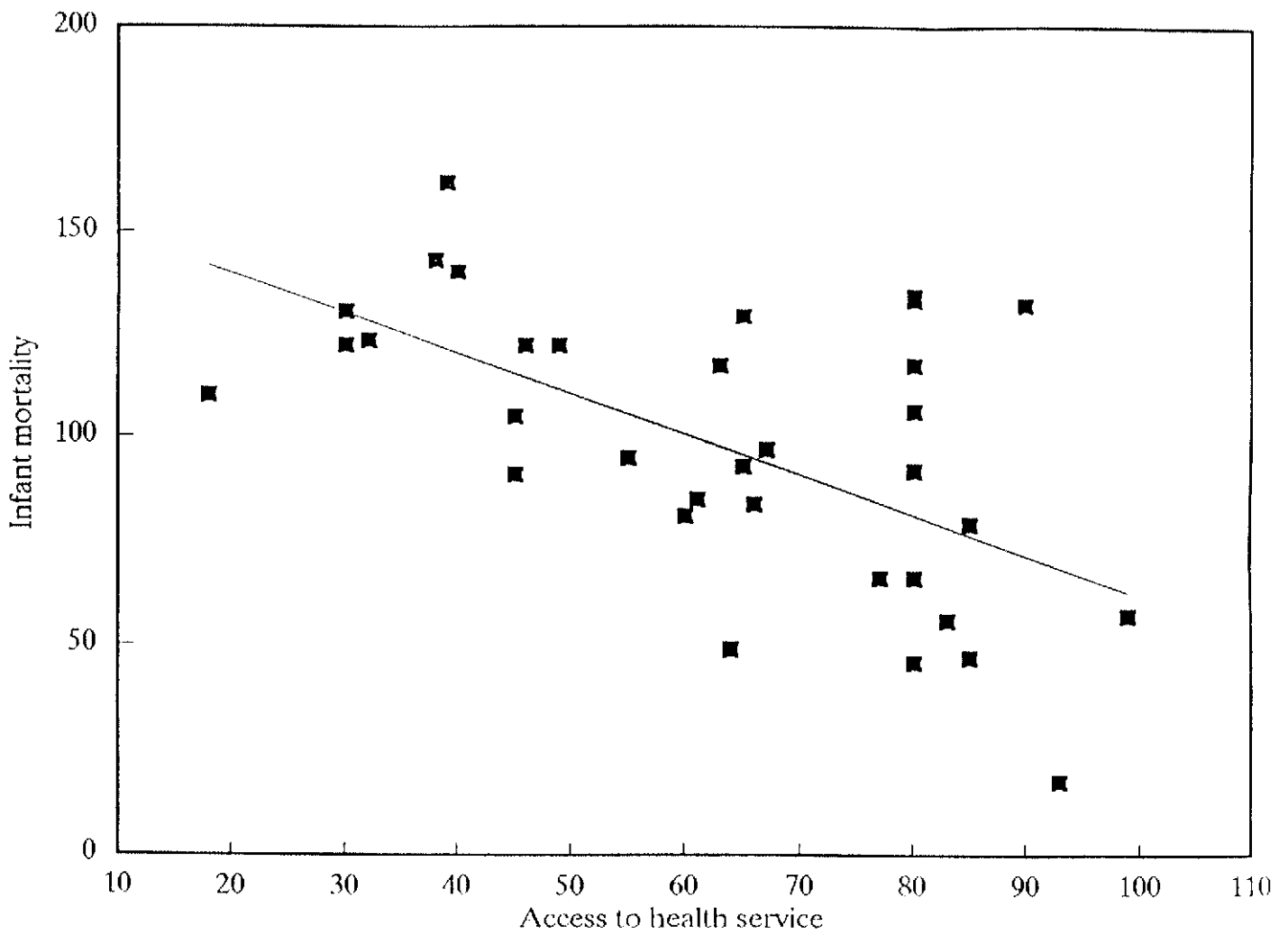
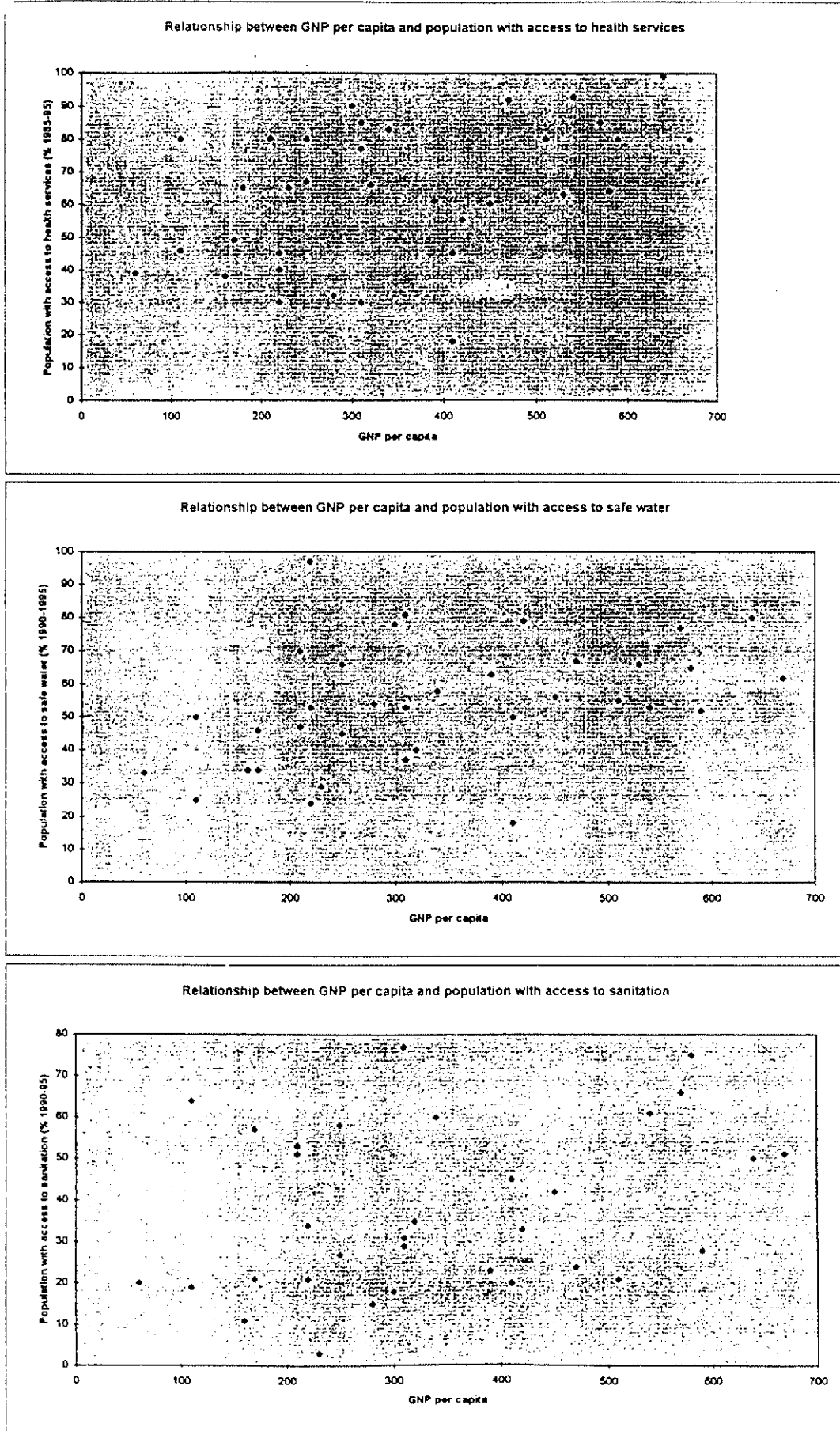


Table 2.1 - Access related statistics

COUNTRY	GNP per capita Dollars 1992	Adult literacy (%) 1990	Net disbursement of ODA from all sources Per capita (\$) 1991	Infant Mortality Rate (Per 1,000 live births) 1992	Population with Access to			Daily Calorie Supply Per capita 1992	Population per nurse 1988-91
					Health Services (%) 1985-95	Safe Water (%) 1990-95	Sanitation (%) 1990-95		
Mozambique	60	67	57.1	162	39	33	20	1680	5000
Ethiopia	110		20.6	122	46	25	19	1610	14286
Tanzania	110		42.7	92	80	50	64	2021	
Sierra Leone	160	79	24.7	143143	38	34	11	1695	
Nepal	170	74	23.4	99		46	21	1957	33333
Uganda	170	52	31.1	122	49	34	57	2162	7143
Bhutan	180	62	43.8	129	65				6667
Burundi	210	50	44.7	106	80	70	51	1941	
Malawi	210		56.2	134	80	47	53	1827	33333
Bangladesh	220	65	14.6	91	45	97	34	2019	20000
Chad	220	70	44.9	122	30	24		1989	50000
Guinea-Bissau	220	64	101.3	140	40	53	21	2556	
Madagascar	230	20	36.4	93	65	29	3	2135	9846
Lao PDR	250		30.8	97	67	45	27	2259	
Rwanda	250	50	49.1	117	80	66	58	1821	8333
Niger	280	72	47.6	123	32	54	15	2257	3846
Burkina Faso	300	82	44.1	132	90	78	18	2387	10000
India	310	52	3.2	79	85	81	29	2395	3333
Kenya	310	31	35	66	77	53	77	2075	9091
Mali	310	68	52.2	130	30	37	31	2279	5882
Nigeria	320	49	2.6	84	66	40	35	2125	1639
Nicaragua	340		219	56	83	58	60	2296	3125
Togo	390	57	54	85	61	63	23	2243	3030
Benin	410	77	52.4	110	18	50	20	2532	3226
Central African Republic	410	62	56.4	105	45	18	45	1691	11111
Pakistan	420	65	10.6	95	55	79	33	2316	3448
Ghana	450	40	47.2	81	60	56	42	2206	3704
China	470	27	1.7	31	92	67	24	2729	
Tajikistan	490			49					
Guinea	510	76	62.6	133	80	55	21	2390	
Mauritania	530	66	102.9	117	63	66		2685	2273
Sri Lanka	540	12	47.2	18	93	53	61	2275	1754
Zimbabwe	570	33	39.2	47	85	77	66	1989	1639
Honduras	580	27	52.2	49	64	65	75	2306	4545
Lesotho	590		67.9	46	80	52	28	2201	2000
Egypt, Arab Rep.	640	52	93.1	57	99	80	50	3336	
Indonesia	670	23	10.2	66	80	62	51	2755	2857

Source: World Development Report 1996

Access and GNP per Capita



Figures 2.2 - 2.4

2.6 Access is also related to poverty at a different level. Even if financial and physical access to the basic needs of life is assured, this is actually only a starting point in the development process. But if access to markets is difficult, farmers are hardly likely to diversify their production to include cash crops, or even to grow net surpluses of subsistence staples. And without such new ideas and opportunities where is there to go? This is how access and isolation are the two sides of the same coin - and why Robert Chambers focused on isolation as a key characteristic of poverty.

2.7 The distinction between economic and social services suggests that access to social services, which should be available to all, should be planned on the basis of equity. In contrast, access to economic services should be planned on the basis of potential and ability to pay. There is however a difficulty here in that the provision of education and of health and even of potable drinking water do have economic consequences. Should willingness to pay be part of the assessment of where to put these services? Certainly many of the programmes under the Social Funds of the World Bank and the Micro-Projects programmes of the EU assume that it should. This issue is revisited in chapter 8 where the question of applying cost benefit analysis in accessibility planning is discussed.

2.8 Poverty has many dimensions, of which lack of access is just one. Using the results of earlier work we will try to relate the lack of access to poverty. For it is important not only to define what improvements in access can do to alleviate poverty but also to understand the limitations of this approach.

2.9 Notwithstanding the many dimensions of poverty, a review of the literature on the subject suggests that the following factors are seen as fundamental:

- \* lack of skills
- \* low production
- \* low productivity
- \* low income
- \* poor health
- \* poor education
- \* low investment.

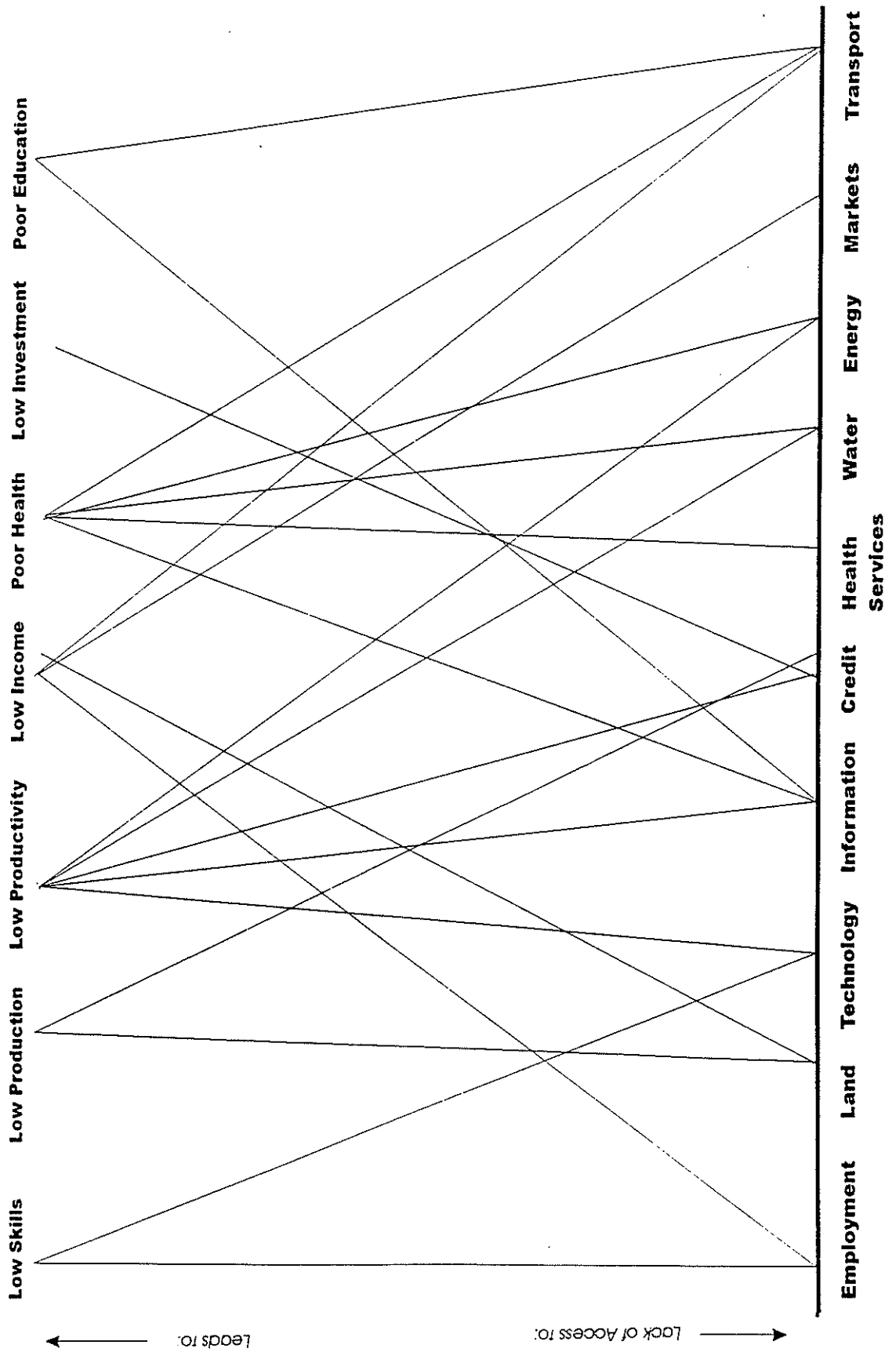
2.10 Figures 2.5 and 2.6 are an attempt to illustrate the relationship between poverty and access.

#### **Box 4: Problems of Poor Access**

- **Many farmers are reluctant to grow a marketable surplus second crop because it cannot be sold or because the difficulty and expense of transport significantly reduces the returns to labour.**
- **Agricultural productivity is low and there is a lack of innovation because extension information and inputs do not reach the farmers.**
- **School enrolment is low and absenteeism is high (often among teachers as well as children).**
- **Standards of health care are low because clinics are hard to reach and health workers cannot travel easily.**
- **Women's working days are long and arduous, largely owing to the time and effort required to carry water and fuel.**



**Figure 2.5: Access and Poverty Characteristics**



## Linkages Between Access and Poverty

2.11 The starting point is to identify the linkages between lack of access to basic supplies, services and facilities and the resulting causes of poverty. Figure 2.5 identifies the key things that people require to stand a chance of development. The linkage between the lack of access to these things and the seven characteristics of poverty already mentioned.

2.12 Lack of access to employment is an obvious contributing factor to low income and the lack of skills. Lack of access to land leads to low production and lack of income. Poor health is caused by the lack of access to (adequate) health services and lack of access to clean water. Access to information can help people in myriad ways, including a better understanding of the agricultural techniques which can lead to increased productivity even in subsistence agriculture. Clearly, access to information contributes to improved education and to better health standards being applied.

2.13 Figure 2.5 is merely a representation of how lack of access means isolation - which in turn means poverty. In Figure 2.6 the analysis is taken a stage further to explore whether a significant number of problems of lack of access in general are related to lack of access to physical infrastructure.

2.14 The list is by no means comprehensive. However the important point is that there are some factors which relate directly to physical access and others which do not. (The latter represent the so-called complementary activities which were deemed to be the reason for the less than successful outcome of many rural road projects.) Thus, lack of access to land is a factor in relation to poor production and low income. By itself, however, better access to land will not necessarily improve the situation. Other factors such as land tenure, soil fertility and crop prices will also affect what happens. Lack of access to health services comprises not only the physical access through the provision of a structure, the improvement of a track or the provision of a transport service. It is also a question of whether health personnel are available and drugs are in stock.

Figure 2.6: Factors Affecting Poverty

	<b>Factors Related to Access</b>	<b>Other Factors</b>
<b>Employment</b>	Physical Access to Job Locations Lack of Transport Services	Lack of Job Opportunities
<b>Land</b>	Distance/Time to Fields	Size of Holdings Cultivable Land Population Density
<b>Technology</b>		Not Known Not Understood Expensive Not Available
<b>Information</b>	No Radio No Telephone Poor Postal Services	Lack of Extension Workers
<b>Credit</b>	Location of Credit Facility	Poor Banking Services Strict Credit Regulations
<b>Health Services</b>	Lack of Health Centres Poor Access Lack of Transport Services	Limited Personnel Lack of Medicines
<b>Water</b>	Lack of Irrigation	Distance to Supply Lack of Wells
<b>Energy</b>	Limited Electricity Decreasing Supply of Wood	Distance to Source
<b>Markets</b>	Poor Transport Facilities Poor Location	Poor Marketing System Lack of Fertiliser, Seeds
<b>Transport</b>	Poor Tracks Poor Transport Services Lack of Roads Limited Number of Vehicles	
<b>Education</b>	Poor tracks Lack of Transport Facilities	Lack of Teachers Limited Educational Materials

2.15 What emerges from this type of analysis is that poor physical access can indeed be seen as a major constraint to poverty alleviation. However, it is still necessary to take account of the other factors affecting access in any setting so that these can be considered in the planning of any initiatives to improve access. Thus access to markets, for instance, will not result in improved and diversified production if there is little market integration and no effective marketing system, pricing policy or source of agricultural inputs.

2.16 It seems, therefore, that:

- \* lack of access to rural infrastructure is a major contributing factor to poverty;
- \* access - **the ability to reach, visit or use** - could provide an entry point into rural infrastructure planning.

### Box 5: Access in Lao PDR

Laos is a poor country and 80% of the population live in the rural areas. Its poverty is due to a variety of factors but one underlying cause is the lack of access of the rural population to basic services and goods, as outlined below.

Of the 11,795 villages in Laos, there are health centres in only 723. UNICEF reports that over half the villages are more than a day's travel from a health centre. This is a major cause of relatively high infant mortality (100 per 1000 births) and low life expectancy SAY WHAT FROM THE HUMAN DEVELOPMENT REPORT.

Access to elementary schools is difficult, particularly in the more mountainous regions. It is one of the underlying causes of the low enrolment rate of 60%. Of those who do enrol, only 30% complete 5 years of schooling. The average is less than 3 years. (In a recent survey, over 60% of parents cited distance to school as a reason for their children dropping out of elementary school.)

Access to agricultural inputs and to markets is difficult owing to the lack of roads and the poor state of the network that does exist. This is reflected in only 10% of the rice produced in the country being marketed. And only 10% of farmers use any type of fertiliser or other agricultural input. In addition, even though only a small proportion of the cultivable land is irrigated (3%), FAO estimates that only a third of irrigation schemes are operational.

Access to potable water is a major problem. At a conservative estimate, only one third of households have access to safe water. Diarrhoea contributes to a high mortality rate.

More extreme examples can be quoted of District Centres which are 3 days walk from the road network; of schools which have no teachers owing to their inaccessibility; and of health centres which are neither staffed nor supplied for the same reason of inaccessibility.

The important point here is that lack of access is a major factor perpetuating rural poverty. Major efforts are being undertaken to improve both the social and economic situation in the country. Nevertheless, it is vital that the problem of access is tackled in a comprehensive and integrated manner.

It has been suggested that one way to tackle the problem is to invest heavily in rural road improvement to provide better access for the rural population. There is certainly a need to improve the rural road network. Of the total provincial road network of 5,640 Km, it is estimated that fewer than 2,000 Km are passable in the wet season. The result is that half the nation's villages have no road access. Nevertheless, it would be unrealistic to expect that Laos will be able to afford to provide all - or even most - villages with all-weather road access in the near future. Apart from the capital cost of construction, there is the familiar problem of the recurring cost of maintenance.

Heavy investment in roads may in any case not be the only - or even a priority - solution to the problem of access. Few people either own a motor vehicle or can afford to pay for motorised transport services. Thus, in terms of improving individual access, roads are not enough. Roads have to be seen in the context of the daily transport needs of the rural population - needs relating to obtaining water and fuel and getting to health services, the school and the market. Roads are certainly part of the solution to the transport problem, but so are improved transport services; the wider availability of simple means of transport; improved village infrastructure and the more appropriate siting of services.

## Poverty and Access to Infrastructure

2.17 A focus on access is important as it is a common theme which can be applied to all kinds of rural infrastructure - from roads to water supplies, from schools to markets. Previous work on the relationship between rural infrastructure and poverty has concentrated on the contribution of each separate infrastructure element. Identifying access as the key element provides an integrating mechanism for multi-sectoral planning at the local level.

2.18 The literature is relatively scarce on the impact of infrastructure on poverty alleviation. In their synthesis of the literature, Ahmed and Donovan cite several examples of studies that have attempted to isolate infrastructure as a determinant of growth and/or economic development.<sup>3</sup> They point out that systematic research on issues related to development and infrastructure is limited as compared to many other branches of development economics. From their review, however, they see a positive correlation between investments in infrastructure - in particular roads - and economic development. Yet it is also worth pointing out that the research surveyed also identified other factors such as education and electrification as having similar or higher effects.<sup>4</sup>

2.19 The confusion of the relationship between the provision of infrastructure and poverty alleviation is well demonstrated in a recent report from ESCAP. Having analysed figures for several types of infrastructure, the report concludes that: 'a stock of infrastructure is a prerequisite to achieve economic growth and social development'. However, this assumes that the causal relationship is from infrastructure to economic growth. It is equally likely that it is the other way around. In addition, the ESCAP report quotes the World Bank that whilst a 1% increase in GDP per capita is reflected in a 1% increase in total infrastructure stocks, the effect on basic services is much less - an increase of just 0.3%, for instance - in access to safe water.

2.20 The most concerted effort to show positive relationships between infrastructure provision and economic development has been in the roads sector. This is partly because the relationships are easier to quantify. One of the most detailed analyses of the relationship between roads and poverty alleviation was done by Howe and Richards in the early 80s.<sup>5</sup> The book is in three parts - first a review of the literature on the subject; secondly a series of case studies; and finally an editorial summary.

2.21 The review is illuminating and the conclusions worth repeating here.

- i) The effect of social and economic change produced by roads is very location-specific and therefore difficult to standardise.
- ii) There is little clear evidence that road investment programmes have a direct effect on poverty alleviation.

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3 R. Ahmed & C. Donovan: Issues of Infrastructural Development: A Synthesis of the Literature. IFPRI, Washington, 1992.

4 ESCAP: Proceedings of the Seminar/Study Tour on Socio-Economic Impact of Telecommunications Development in Rural Areas. Shanghai, 1990.

5 J.D.G.F. Howe & P. Richards: Rural Roads and Poverty Alleviation. ITDG. London, 1984.

- iii) Changes from road improvement are significantly less than from making a route trafficable for the first time.
- iv) Appraisal methodologies for rural roads are simplistic and rarely attempt to capture either income distribution effects or, indeed, increased personal travel.
- v) Land tenure is an important factor in determining who benefits from roads.
- vi) Investments in rural roads rarely take into account the socio-economic framework into which they are interposed.
- vii) Because road investments are predicated on increases in agricultural production, they tend to reinforce existing social and economic stratifications.

2.22 The authors go on to say that road investments must be seen in a wider perspective. They must be concerned with transport in general and not merely with choosing one group of roads over another. They also note that in areas of economic dynamism the response to road investment is likely to be positive. In areas where the economy is at subsistence level, far too little is known or assessed regarding the potential of rural road investments. This is linked to item (iii) above and the fact that personal travel is rarely considered in road appraisal. This is particularly significant, given the work on rural travel and transport described in Chapter 4.

2.23 The authors conclude that 'the extent to which road investments will affect the distribution of incomes and people's response to new services remains essentially speculative'. The overall message of the book is that rural roads need to be considered as one of a set of investments that can assist in alleviating poverty; that they must be considered along with other investments and activities in an integrated approach which treats road access as just one element and not as a unique investment likely to have significant impact by itself.<sup>6</sup>

2.24 The book reinforces the notion that 'in many less developed countries there is a polarised disharmony in which modern methods of transport are available but only in limited areas and accessible to a minority'.<sup>7</sup>

2.25 A recent study in the Philippines attempted to relate access to basic services - water, health, education, transport and energy - to income levels. Based on data from 9 Provinces, the conclusion of the study was interesting. Whilst there was no significant correlation between income and access to the road network, there was strong correlation between income and overall access to the basic services.<sup>8</sup>

2.26 The other important conclusion of the research work is the assumption of economic dynamism in the planning of transport interventions. Very little is known about the effects of transport improvements in situations where subsistence is the predominant concern. In such

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<sup>6</sup> The uniqueness of roads investment is perpetuated by the fine tuning of appraisal methodologies to justify road investments in economic terms.

<sup>7</sup> G.A. Edmonds & Colin Relf: *Transport and Development*. 1985.

<sup>8</sup> G.A. Edmonds: *op. cit.*

situations, new or better roads may be regarded as providing new opportunities - but opportunities for what and for whom? If the first consideration is survival, it will obviously take priority. What role might a road or track play in this? Is a road or track even necessary at this level of development? The lack of differentiation between subsistence and more economically dynamic economies may explain the relatively pessimistic conclusions of the research work on roads and poverty.

## The Gender Gap

2.27 In discussing the relationship between access and poverty one has to be aware that obtaining access to different services is the responsibility of different members of the rural household. The total workload of a rural household is rarely shared equally among its members. The household is a social unit in which each member has different responsibilities and solutions have to take this into account.

2.28 Studies carried out over the last 10 years in Africa and Asia have provided detailed insights into both access problems and the corresponding magnitude and distribution of the transport workload among rural households.

2.29 Several points are worth mentioning.

- ▶ There is a big variation in the gender distribution of responsibilities between Africa, South Asia and Southeast Asia.
- ▶ In general, the transport responsibilities of women and men are quite separate, being influenced by culture, custom and their overall household responsibilities.
- ▶ Transport consumes a major portion of the household time budget and involves a major physical burden.
- ▶ Transport problems for women - such as water and fuelwood collection - are of little importance to men who tend to relate transport more to such problems as access to markets, lack of transport services and overall economic development.

2.30 There is a major distinction between the transport burden falling on women and men. In brief, women are particularly involved in transport related to domestic subsistence - water and fuelwood collection, grain milling, food processing and the like. Men are less concerned with these domestic activities and are more involved in transport related to agricultural production, including obtaining agricultural inputs and marketing crops and transporting building materials for the construction, maintenance and repair of houses.

2.31 In Africa in particular, women's traditional role as the bearers of loads often means that they are saddled with a huge transport burden. This is particularly evident in female-headed households (which tend to be the poorest). It is also suggested as one of the reasons for young girls dropping out of school in higher numbers than boys. Tables 2.1 and 2.2 present some data on the gender distribution of transport.



2.32 One of the solutions to this transport burden would be for women to have better access to some means of transport. Yet women's access to any form of intermediate means of transport (IMT) is limited by their role in the household, their lack of access to money and often by cultural restrictions. Where IMTs have been introduced for economic reasons - such as ox carts in Malawi or Zambia or cycle trailers in Sri Lanka, they have been used predominantly by men.<sup>9</sup> Where IMTs have been used to a significant extent by women - as with bicycles in both Malawi and India and even the introduction of mopeds among female extension workers in Bangladesh - it has reflected a concerted effort on the part of programme implementors to target and support women. And this targeting and support is needed until women themselves come to appreciate (a) the benefits of using IMTs, and (b) the feasibility of their doing so.

2.33 In the case of improving tracks and trails which might respond to women's transport problems, the results have been mixed. On the one hand, such work is often carried out on an unpaid, self-help basis. The result is often that women themselves have to do the work. In addition, the maintenance of these tracks is often left to women - in addition to their already heavy workload.

2.34 Interventions which reduce the transport burden by bringing services closer to the users are much more likely to benefit women. Water supply projects and health services are good examples of this.

2.35 This suggests that planning improved access has to take account of the clear distinction between the sexes in terms of transport needs and patterns. Previous attempts to improve mobility have generally not favoured women as the facilities provided were (a) not accessible to them, and (b) irrelevant to their needs, such as water collection. The more general emphasis on access allows planning to take account of the sexual division of labour in transport and plan for improvements which might alleviate the burden for both sexes.

2.36 As Doran says 'there is a wealth of gender-disaggregated data on transport patterns but far less on gender-responsive transport interventions. It is clear that women need to be more involved in the planning and implementation of the transport interventions so that their perspective and needs are more central to the initiative'.<sup>10</sup> These conclusions echo those of both Malmberg-Calvo (whose study summarised the gender aspects of studies in four countries in Sub-Saharan Africa) and Irena Urasa (who was one of the first to look in detail at

**Box 6: Makete - An Early Attempt to Intervene**

**In the Makete Integrated Rural Transport project in Tanzania, attempts were made to increase the mobility of rural people - especially women - by making IMTs available.**

**Locally-made wheelbarrows were introduced principally on the assumption that they would be used by women for transporting water and fuelwood. In fact, they were mainly purchased and retained by men. Many stood idle next to the homestead as a symbol of the comparative wealth of the household. On the rare occasions that they were used, it was for the transport of building materials - a male activity.**

<sup>9</sup> M. Dalton, G.A. Edmonds & J. Sadalaki: Evaluation of the Pilot Integrated Rural Transport Project, Malawi. UNDP. December 1996.  
M.M. Anyabandu: Gender and Technology. ITDG, Colombo. 1994.

<sup>10</sup> J. Doran: An Imbalanced Load - Gender Issues in Rural Transport Work. ITDG. 1995.

the issue of women's transport burden).<sup>11</sup> The data in Table 2.1 are drawn from the World Bank's Sub-Saharan Africa Transport Programme.

2.37 Table 2.2 shows data on women's contribution to household transport from three Sub-Saharan African countries compiled by Malmberg-Calvo.

**Table 2.1: Female Transport Inputs in Africa**

Female Transport Inputs	Kasama, N. Zambia	Lusaka, Rural Zambia	Uganda	Kaya, Burkina Faso	Dedougou, Burkina Faso
Hours spent per day on transport	2.67	2.05	2.71	1.26	0.98
Share of total active time (% per 12 Hrs)	22%	17%	23%	11%	8%
Share of total household time spent on transport (%)	56%	28%	42%	41%	28%
Kg-Km moved per day	97.8	83.0	106.8	28.2	56.4

Source: Rural Travel and Transport Project, SSATP. World Bank. September 1993.

**Table 2.2: Female Contribution to Household Transport Time and Effort**

Female Contribution to:	Ghana	Tanzania	Zambia
Total Household Transport Time (UNITS)	63%	67%	66%
Total Household Transport Effort (UNITS)	66%	84%	72%

Source: C. Malmberg-Calvo: Case Study on the Role of Women in Rural transport: Access of Women to Domestic Facilities. SSATP Working Paper No.11. World Bank. 1994.

11 C. Malmberg-Calvo: Case Study on the Role of Women in Rural Transport - Access to Domestic Facilities. World Bank. 1994.  
I. Urusa: Women and Transport - An Assessment of Their Role in Sub-Saharan Africa. ILO. 1990.



## **Chapter 3 - RURAL INFRASTRUCTURE AND DEVELOPMENT**

3.1 Chapter 1 began by talking about the time - the unproductive time - spent by the rural poor in getting to where they need to reach for their everyday needs. It went on to show that the amount of time involved in such travel and transport is itself an indicator of access. From a planning perspective, accessibility comprises two elements (a) mobility, and (b) the location of supplies, services and facilities. In this sense, transport represents the mobility aspect - the 'coming to or towards' aspect of access. Physical infrastructure represents the facilities to be accessed - the 'power of getting near or into contact with' aspect. This and the two subsequent chapters look at these two aspects and the role they have played and have been perceived to have played in economic and social development.

### **Transport and Development - Evolution of the Conceptual Framework**

3.2 The role of transport in development has occupied researchers over the last 40 years or more, yet there is still hardly a consensus. Research on the relationship between investments in roads and development has been quite comprehensive. Indeed, as suggested in Chapter 1, roads have sometimes been seen as the key to development. Hence, it is worthwhile to look at the results of research in this area.

3.3 There is no doubt that transport is a key element in the process of economic and social development. Nevertheless, there is a great deal of misconception regarding the form in which transport should be made available - to whom, by whom and the extent that it should be integrated into the development process. To understand why there is confusion we have to look at the historical development of the theory surrounding the role of transport and development.

3.4 Certainly we have come a long way from the simple, if deterministic, conclusion of Lord Lugard that 'the prospects for development can be summed up in one word, transport'.<sup>1</sup> It is now certainly accepted that transport is, in the customary phrase, necessary but not sufficient for the development process.

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<sup>1</sup> F.D. Lugard: *The Dual Mandate in British Tropical Africa* (Edinburgh, Blackwood, 1922).

3.5 Nevertheless, the attitude to transport still reflects an understanding that it is in some way indispensable for development. There are really two issues here:

- ▶ First: **to what extent is transport a catalyst for development?**
- ▶ Second: **is our definition of transport appropriate in the context of rural development?**

3.6 It was in the 1950s and 1960s that the first real assessment was made of the role of transport in development. Until that time, Lord Lugard's view had largely prevailed - transport improvements brought about development. The work of A.O. Hirschmann<sup>2</sup> and G.W. Wilson provided the first real objective studies of this theory.<sup>3</sup>

3.7 Hirschmann's thesis was based on the idea that economic growth was not created but was a process of change. He agreed with the concept of transport as a facilitator. But he argued that changes in one productive sector lead to changes in another and that transport is often the means whereby such changes take place. Transport was therefore viewed as a promoter of change: it did not itself initiate change. In economic terms, Hirschmann saw transport infrastructure as just one part of Social Overhead Capital (SOC). And in his view, investment in SOC was costly and unpredictable. The most effective way of promoting economic growth would be through investments in directly productive activities. These in turn could lead to increases in SOC when it was clear that such investments were necessary. This view has come to be known as development by shortage (of SOC). Whilst the validity of his thesis has generally been accepted, the implications in the transport sector have not. Transport is a part of the Social Overhead Capital and it has been the conventional view that it is investments in transport which lead to increases in productive activities such as agriculture or rural non farm activities.

3.8 At about the same time Wilson - working from the Brookings Institution - analysed the economic and social impact of the massive investments in transport that were already taking place in many developing countries. His conclusion was that 'the role of transport investment in economic growth is not unique. *Transport is no more an initiator of growth than any other form of investment*' (Author's italics).

3.9 This conclusion was important because it derived from an exhaustive study of actual highway investment projects in developing countries. Further work by the Brookings Institution - notably by Wilfred Owen - supported the contention that the influence of transport on development was no stronger than other factors and indeed may not have played the catalytic role that had previously been assumed.<sup>4</sup>

3.10 The evidence on which Wilson reached his conclusion came mainly from major highway programmes. At that time most developing countries and their international development assistance agency partners were directing their efforts - on quite a massive scale - to the development of such primary physical infrastructure.

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<sup>2</sup> A.O. Hirschmann: Strategy of Economic Development. Yale University Press. 1958.

<sup>3</sup> G.W. Wilson: Case Studies of the Effect of Roads on Development. Highway Research Record No. 115. 1965

<sup>4</sup> Wilfred Owen: Strategy for Mobility. The Brookings Institution. 1964.

## **The Shift Towards Rural Development**

3.11 In the years that followed, the focus of development financing moved away from primary infrastructure towards rural development more generally, including rural transport (the latter being seen synonymously as rural roads). In the 1970s and 1980s, integrated rural development became the key thrust of international assistance. Not only did most people live in the rural areas but there was a general belief that rural areas represented a vast, largely untapped, potential for generating agricultural surplus and foreign exchange.

3.12 Thus, rural development came to be seen as the key issue in tackling poverty and the major international development assistance agencies adapted their policies accordingly. Robert MacNamara's speech to the World Bank Conference in Nairobi in 1970 marked a new approach in the focus of Bank lending. Not only this, but 'Planning for Basic Needs' launched by the ILO at the 1976 World Employment Conference and the creation of the International Fund for Agricultural Development in late 1977 also signalled a common concern that the focus on rural development and on the rural poor was to be a guiding principle for development planners and financiers.

3.13 In turn, this meant that the discussion became more complex. Aggregate growth in per capita incomes was no longer the key concern. In many parts of the world people were - indeed, still are - living barely at subsistence level. Even internationally-agreed basic needs were not/are not being met. It hardly seemed sensible to discuss 'economic development' as the priority issue if people had no food security, no water supply, limited health services and pitifully poor education. Rural development was no longer to be defined in terms of output, income and other 'hard' economic indicators but in terms of human development.

## **The World Bank and Rural Roads**

3.14 Transport, however, was still seen as a key feature in releasing of the 'rural potential' in developing countries. Between 1977 and 1984, World Bank lending for transport almost doubled. More specifically, in 1966 only 38% of roads financed from Bank loans and IDA credits were classified as rural. By 1977 rural roads represented over 93%. Lending from the Asian Development Bank showed a similar trend.

3.15 The shift to investment in rural roads was not, however, accompanied by an equal shift in emphasis on the role of roads in economic and social development. This was somewhat surprising given the results of the (theoretical) work of Hirschman and (the more empirical) work of Wilson. Their scepticism regarding the catalytic role of transport in the development process were largely ignored. This was perhaps the more surprising given the more complex framework in which rural roads were operating. Spending money on the improvement of a main highway with a high level of traffic can always be justified in terms of vehicle operating cost savings, constituting a vigorous stream of benefits as soon as work has been completed. In the case of rural roads, however, traffic levels are usually quite low, hence 'hard' economic benefits may take some time to appear, depending on many other factors than the provision of a road itself. It is the social benefits that are often more important.

3.16 Current thinking of the time was reflected in a series of World Bank Staff Working Papers on the economic appraisal of rural roads.<sup>5</sup> This work was still clearly rooted in the uniqueness of the road and its **independent** effect on development. One of the papers states that 'the central problem in the evaluation of road projects is to forecast economic activity and the associated demand for transport' and 'the economic merit of the road will depend on whether large increases in future economic activity will occur'. It seemed that Wilson's central conclusion - that transport infrastructure was permissive and responsive, not causal, had been overlooked.

3.17 Whilst the Staff Working Papers became the basis for the Bank's appraisal process, there were also those in the Bank who had certain misgivings. As early as 1977, a less formal paper by the Transportation and Water Department stated that 'making health, education or other public services much more accessible or accessible for the first time would seem to have benefits much greater than the sheer passenger cost savings on travelling to and from the service and much greater than marginal improvements to the accessibility of such services in more developed areas'.<sup>6</sup>

3.18 Wilson and Hirschman in the 1960s had criticised the then current approach to transport not merely on theoretical grounds but also from the actual results of the massive investments in highways in developing countries. The same causative theoretical approach that they had criticised was now being applied to rural roads, tempered it must be said with some concern for the provision of complementary activities which might help to realise the potential opened up by the provision of a rural road. The emphasis however was still on the road as the prime mover of development. The other activities were seen as supplemental.

## Other Perspectives

3.19 Since the early 1980s there has been a great deal of evidence to suggest that the major investment programmes in rural roads have not achieved the hoped-for increases in either agricultural production nor more generally in the living standards of the rural population. Uma Lele in her detailed assessment of agricultural and rural development programmes in Africa concluded that rural roads have been neither a positive nor negative influence.<sup>7</sup> Post-completion evaluations of World Bank rural road projects in Africa in the 1980s found that rates of return on the investments were generally less than predicted.<sup>8</sup> A series of studies by USAID showed that roads were hardly motivators of development and in some cases were positively detrimental. Road projects provided the **opportunity** for benefits from reduced transport costs, better transport services, better access to markets and social services. But the accumulation of such benefits depended on the ability of the beneficiaries to pay for them. And in general it was the

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5 C. Carnemark et al.: The Economic Analysis of Rural Road Projects. IBRD Staff Working Paper No.241 1976  
H.L. Beenhakker: Identification & Appraisal of Rural Road Projects. IBRD Staff Working Paper No.362 1979  
H.L. Beenhakker & A.M. Lago: Economic Appraisal of Rural Roads. IBRD Staff Working Paper No.610 1983

6 World Bank: Note on Rural Road Lending. December 1977.

7 Uma Lele & R.Christiansen. Agricultural Growth, Domestic Policies, the External Environment and Assistance to Africa: Lessons of a Quarter Century. MADIA Discussion Paper 1. World Bank 1989

8 It is interesting to note that some 25% of rural roads financed by the World Bank have been part of agricultural and broader rural development projects. Whilst in infrastructure projects roads have been regarded as economic assets, in agriculture and rural development they have generally been treated as a form of social overhead capital.

better-off who obtained the benefit.<sup>9</sup>

3.20 As early as 1982, the Executive Director of the UN Commission on Human Settlements (Habitat) reported that '....the ability of the poor to engage in economic activity is limited by inadequate facilities and services and is generally hindered rather than helped by current transportation policies. .... Current rural transportation policy .....should be reformulated'.<sup>10</sup>

3.21 Another ramification of the heavy investment in rural roads was the maintenance burden that it was creating for recipient governments. So great has been that burden that road maintenance has now become a crucial issue - indeed, road programmes nowadays rarely use the word construction for fear that this suggests irresponsibility. 'Do not build what cannot be maintained' and 'rehabilitation is nothing more than a reward for lack of maintenance' have become themes of donor policy in the 1990s.

3.22 Thus, by the mid-1980s there was growing concern regarding the impact of rural roads. A 1984 World Bank Staff Working Paper summarised some of them:

- \* Only slow progress can be expected in extending the scope of motor vehicle transport services.
- \* Even where rural roads are provided, the services are not accessible to the poorer sections of the population.
- \* Many basic means of transport are not known, accepted or taken into account by transport planners.
- \* There is a failure to recognise the diversity of demand for transport and there is a *road orientation* in existing planning processes. (emphasis added)
- \* Little progress is being made in addressing the problems both on the part of planners and financial agencies.<sup>11</sup>

3.23 This assessment became more and more prevalent. Basically, it held that the lack of success of rural road projects was due to an over-emphasis on roads and motor vehicles, a lack of understanding of the nature of rural transport demand and an inability to provide a better framework for rural transport planning. This was indeed a change of perspective. Whilst it still did not diminish the role of rural transport it did accept that the concept of rural transport might need to be redefined and that this might lead to a more rational transport planning strategy. This belief was echoed in work that emanated from field studies.<sup>12</sup>

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9 USAID: Project Impact Evaluation Reports No.7 (Sierra Leone); No.11 (Jamaica); No.13 (Thailand); No. 17 (Honduras); & No.18 (Philippines). The argument should not be interpreted to mean that investments in transport and communications are not correlated with growth. Other research has shown that they are. The question at issue is whether investments in rural transport (mainly roads) have **alone** brought (a) significant, and (b) equitable benefits in rural development?

10 UN Commission on Human Settlements: Report of the Executive Director. Fifth Session, Nairobi, 1982.

11 S. Carapetis, H.L. Beenhakker & J.D.G.F. Howe: The Supply and Quality of Rural Transport Services in Developing Countries. World Bank Staff Working Paper No.654. 1984.

12 G.A. Edmonds: Towards More Rational Rural Road Transport Planning. International Labour Review, Vol 121 1982.



3.24 In the mid-1980s a series of studies was initiated which was to transform the way in which rural transport was seen and to effectively link the provision of transport and other rural infrastructure into a single framework.

3.25 Concern about the utilisation and role of roads had been articulated by Robert Chambers in 1980, suggesting that neither governments nor international development assistance agency staff have the time or inclination to go to the off-road areas where really poor people live.<sup>13</sup> The result was that rural transport had been viewed and analysed - almost entirely - from the perception of outsiders. Hence, there was a bias in development planning towards roads and motorised vehicles. Very few, if any, studies had been done to assess (a) the actual nature and volume of the transport workload of most people, or (b) how that workload might feasibly be reduced.

3.26 The results of the work carried out in several countries in Africa and Asia under the ILO programme showed a rather different picture than the one hypothesised by transport planners. The studies took the household as the generator of travel patterns. It was concerned not with transport demand as seen from the outside but with transport need as seen by household members. The results of these studies were illuminating. They showed that the reality of the transport problem for a rural household is quite different from what most transport economists would consider, say in planning a rural development programme. In sum, the studies showed that:

- ▶ transport in the rural areas is generally carried out on foot;
- ▶ most journeys involve carrying small loads over short distances;
- ▶ the majority of journeys are for purposes which do not involve buying or selling anything;
- ▶ vehicle ownership of any sort is very low;
- ▶ the transport burden falls disproportionately on women.
- ▶ the majority of journeys are to meet basic needs such as water, fuelwood and food;
- ▶ the amount of time and effort spent by households on transport is considerable amounting to several hours and Kg-Km per day.<sup>14</sup>

3.27 The results suggested that if transport was to contribute more effectively to rural development it would have to move away from the view that the transport need should be solely dictated by market forces. It would also have to more selectively address the actual needs of the rural population. And those needs could only be identified by focusing on the household.

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13 Robert Chambers: Rural Poverty Unperceived. op.cit.

14 To quote a simple example: households in south-western Tanzania have been found to spend up to 6 hours a day on transport, carrying the equivalent of 30 Kg. over 10 Km.

3.28 The studies were brought together in a book published in 1985.<sup>15</sup> As Howe has pointed out in a recent assessment of transport policy and strategies over the last 30 years, the book was important not only because it highlighted the real role of transport in rural areas but also because:

- \* it demonstrated that significant numbers of people were disenfranchised from any form of travel and transport, other than walking;
- \* existing transport planning and policy did not acknowledge the existence of transport unrelated to roads and motor vehicles.<sup>16</sup>

3.29 The studies indicated that rural households faced major transport constraints owing to poor transport infrastructure, the unavailability of simple forms of transport and the lack of transport services. In addition, they showed that the primary reasons for travel in the rural areas are for activities which are not given any significance in conventional planning procedures.

## Rural Infrastructure and Development

3.30 Whilst work on rural infrastructure has been more limited than on roads, there has also been a shift in the perception of the role of rural infrastructure in development.

3.31 The 1994 World Development Report (WDR) on infrastructure discussed the magnitude and nature of the impact of infrastructure on growth, cautioning that 'results are neither specific nor solid enough to serve as the basis for designing policies for infrastructure investment'. The WDR also pointed out that there is a clear correlation between per capita GDP and per capita availability of major infrastructure, suggesting that as an economy grows the amount of infrastructure increases. Nevertheless, it points out that 'past investments in infrastructure have not had the development impact expected'.

3.32 The Bank blames this poor impact on inefficient service provision (mainly by the public sector) and praises the positive impact of more effective (generally private) provision of infrastructure services. But the argument seems somewhat simplistic given the number of factors involved. Nevertheless, two aspects are worthy of comment in relation to this book:

- \* an almost exclusive concern with major infrastructure works to the detriment of rural infrastructure;
- \* a concentration on institutional and managerial issues in the development of infrastructure and a lack of attention to the issue of its planning.

3.33 What is clear is that this is a very complex problem. There is always the danger that the conclusions reached depend to a great extent on the direction from which the problem is viewed. A concern with economic viability tends to ignore the social aspects of improved infrastructure. It also leads to a concentration on big projects such as major roads and irrigation schemes, where benefits (a) can be more easily predicted, (b) are generally higher, hence (c) give a more 'healthy' rate of return. If, on the other hand, poverty alleviation is a principal objective, the focus will be on subsistence economies, where marginal improvements in levels of living might make a significant difference and where improving access to adequate health and education services can

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15 I. Barwell, G.A. Edmonds, J.D.G.F. Howe & J. de Veen: Rural Transport in Developing Countries. ITDG. 1985.

16 J.D.G.F. Howe: Transport for the Poor or Poor Transport? IHE, University of Delft. 1996.

have hard economic as well as social benefits.

3.34 In fact, most physical infrastructure is a response to both economic demand and social needs or targets. The construction of a power station in response to the demand from industry is a clear example of what the Bank refers to as economic infrastructure. Yet electricity supplies are also used for lighting and other purposes with clear social dimensions. Safe, reliable supplies of drinking water in rural areas are normally regarded as social infrastructure, justified in terms of social targets or norms. Yet safe water and adequate health and education services reasonably accessible to the rural poor have a hard economic value in terms of a healthier, better educated population. This economic dimension of the benefit may be difficult to quantify. It raises again the question of opportunity costs, as indicated in Chapter 1. To what can the time saved in not having to collect water; the time saved in not being sick from drinking polluted water; the time available to a better-educated labour force actually be devoted. In these terms, it is a matter of balancing social norms against hard economic returns.

3.35 In both cases of 'economic' or 'social' infrastructure, one of the key parameters is their accessibility. Adequate access to energy or water, and to transport services for supplies of raw materials and getting output to market is likely to be a sine qua non for industrial production. Similarly, if a household has no access to clean water, health services or agricultural markets and inputs, it will hardly be able to lift itself above bare subsistence. However, whilst the issue of access to supplies, services and facilities is predominant in the aggregate development of national economies, it is treated as marginal in the case of household access to 'social' infrastructure. The unproductive - wasted - time that households spend gaining access to essential supplies, services and facilities is treated solely as a mobility issue to be solved by better roads and, more recently, by the improved provision of some means of transport. However, the provision of 'social' infrastructure such as schools and clinics improves access to them - especially if their locations are well chosen to reduce travel time.

3.36 At this stage it is useful to summarise the main arguments that have been presented:

**Box 7: Summary of Main Arguments**

- ▶ **Causative models of rural transport have generally been shown to be unsatisfactory both in describing the nature of rural transport and in predicting responses to transport interventions.**
- ▶ **Rural transport is now recognised as comprising more than roads and motorised vehicles and has to include the whole variety of travel and transport that takes place in the rural areas.**
- ▶ **Transport demand defined in economic terms (i.e. related to the ability to pay) is an insufficient concept in the rural areas of many developing countries, particularly where people may be living at a level of bare subsistence.**
- ▶ **If transport demand is defined at the household level, it may better be defined in terms of access.**
- ▶ **Transport in rural areas is still dealt with in the classical sense as a sector, whereas its multi-sectoral role as facilitator is fundamental.**
- ▶ **There is a need to develop a planning system which acknowledges this facilitating role of transport.**



## Chapter - 4 MOBILITY: THE VIEW FROM THE HOUSEHOLD

### Saving Time

4.1 Mobility relates to the ease and speed with which one can transport oneself and one's goods. Mobility can certainly be improved by making a path or track more easily passable. However the major improvement will be in terms of the reduction of time and effort spent on transport.

4.2 For small farmers in developing countries - farmers with small plots of land and limited access to capital, credit and technology - the major determinant of agricultural productivity is labour. And the supply of available household labour varies throughout the year depending on the agricultural season and the sexual division of labour.

4.3 If the supply of household labour is a key determinant of output, the amount of time spent on unproductive activities is an equally key determinant of people's ability to take advantage of development opportunities. Reducing unproductive time spent will not of itself lead to time spent on productive activities. The opportunity to participate in economically productive activities must exist. However reducing the time spent permits the possibility of taking advantage of the opportunity.

4.4 The studies referred to in Chapter 3 indicated that rural households spent many hours per day on transport. Clearly, therefore, the reduction of this time could make a significant contribution to the potential for increased productivity.

**Table 4.1: Time Spent on Transport at the Household Level**

Household Transport	Philippines	Ghana	Tanzania
Time spent on transport per household per year (hours)	736	4,832	2,475
Household size (persons)	5.6	11.9	4.5
Time spent on transport per person per day (hours)	0.36	1.11	1.51

Source: I T Transport Ltd, Rural Transport and Accessibility - A Synthesis Paper 1996.

4.5 Household time budgets vary throughout the year depending on the agricultural seasons. In peak agricultural periods, labour demand is high and falls more equally on males and females. During slack agricultural periods, the major time burden for household activities falls on women.

4.6 The time spent on access, however, is relatively constant throughout the year, relating as it does mainly to meeting recurrent basic needs.<sup>1</sup> The transport time associated with agriculture is relatively small except at peak times of the year.

4.7 The fact that so much time is spent in gaining access to basic needs means that it is not available for other productive or income-earning activities. For rural households to be able to move from subsistence to higher levels of production and earnings, they must first be able to meet basic needs - ideally spending less time and effort in doing so. This is a strong reason to concentrate on rural producers rather on rural production when designing programmes of rural development. If time and labour are at a premium, it is unlikely that rural households will be able to take advantage of new opportunities for increased agricultural activities or other income-generating activities.

4.8 This burden of transport falls particularly heavily on female headed households which represent a significant proportion of households in many countries. The time spent by women on transport for basic activities is considerable. This leaves little spare time for agricultural activities. Consequently the agricultural production of these households is particularly low.

4.9 The studies showed, therefore, that conventional transport planning with its assumptions of increased agricultural production were based on a premise that rural households had sufficient labour time available to take advantage of the opportunities provided by improved transport. This now seems rather ill-informed. First, the rationale for infrastructure was predicated on the concept of vehicular traffic - which is actually both inaccessible and unaffordable to most rural people. Secondly, transport in its broader sense uses a major part of the household time budget for activities which are not related to either a road or the use of a motorised vehicle. Thirdly, there has been the more general question of whether public investment in transport improvements should be directed to reducing the unproductive time spent by households on meeting basic needs.

4.10 The initial studies of the mid 1980s were followed by a more detailed analysis of rural transport in Sub-Saharan Africa. This work was based on detailed assessments of transport in Uganda, Zambia and Burkina Faso, complemented by data from other countries.<sup>2</sup>

4.11 The study confirmed and expanded on the earlier work. Total household time spent on transport varied between 1,100 Hrs. and 2,700 Hrs. per annum or between 3 and 7 hours per day. The transport burden was equivalent to the movement of 20 Kg. over a distance of 1.0 Km. to 3.5 Km. every day for every adult member of the household.

4.12 The study also emphasised the importance of IMTs in (a) reducing time spent in travel, and (b) effort expended in agriculture. Where there was some disposable income, IMTs were used to move agricultural inputs and outputs, to facilitate local crop marketing, to support small

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1 The time spent, however, is disproportionately female.

2 I.Barwell. Village level transport studies in Sub Saharan Africa. World Bank. 1996

enterprise activities and to provide access to employment. Nevertheless, there were also considerable constraints to the wider use of IMTs, including lack of familiarity, shortage of spare parts, non availability of credit and difficult terrain conditions.

4.13 They also showed that, as much of rural transport was on foot, footpaths were more important than roads for the rural household. Until recently very little attention has been paid to the planning, design and improvement of footpaths. Literature on the subject does exist but, in general, it relates to leisure activities in the industrialised countries or to very specific situations such as human portage in Nepal. There is very little mystery about how to develop a good footpath system. Nevertheless a footpath is not a small road and needs to have a similar level of attention paid to it. What is important here is to recognise the importance of footpaths in the daily life of the households.

4.14 These studies illustrated, for the first time, the broader context in which rural transport should be seen. It noted that 'the efficient planning and siting of services complements and for some facilities is more effective than measures to improve mobility. *This extends the subject outside the transport sector to encompass broader rural planning issues and argues the case for an integrated approach to rural transport planning.*' (emphasis added)

4.15 These studies are of importance because they give an insight in to ways in which transport can be seen as a facilitating rather than a causative mechanism in the context of rural development. Transport cuts across sectoral boundaries and is both a constraint to and means of improving health and education services as well as improving agricultural production.

4.16 In the light of these findings a series of studies and projects were developed by the ILO and the World Bank. The ILO initiated several field projects, in Malawi, Tanzania and the Philippines, to explore how these findings could be developed into a rural access planning framework.

4.17 The emphasis of work therefore shifted away from transport to access; from the theoretical towards the more practical. As we shall see in the following section this has been productive. Nevertheless, and with few exceptions, there have been only limited attempts to put the work into a theoretical context.<sup>3</sup> The result has been that rural access is still subject to a wide variety of interpretations and no fully conceptualised system has been elaborated.

## **Mobility and Access**

4.18 Faced with the unsatisfactory results of investments in rural transport, the tendency has been to argue that transport interventions should be accompanied by other 'complementary activities'. These include, *inter alia*, IMTs, extension services, transport services, and transport pricing policies. In themselves they are welcome. However, this still reflects the view that transport is the engine of development. Whilst the process and theory has become more sophisticated it is still based on the 'Lugard Principle' outlined in Chapter 3. This is in no way to deny the importance of transport in the development process. But experience and research evidence show that transport has to be seen as part of a coherent and integrated set of measures to promote economic and social development.

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3 See J.D.G.F. Howe: op.cit.1996 & G.A. Edmonds et al: Guidelines for Integrated Rural Accessibility Planning. Manila. 1994.



4.19 The emphasis should be on access. There is a danger that, having defined rural transport in a broader sense to encompass the overall concept of mobility, we concentrate on improving mobility as the solution. One of the seminal works of the early 1990s on rural transport was entitled 'Roads Are Not Enough'.<sup>4</sup> Equally, it would be dangerous to assume - in a flurry of enthusiasm for our new-found understanding of transport and travel patterns in the rural areas - that 'mobility is enough'. It is evident that getting to supplies, services and facilities faster, more easily is important. The other side of the same coin, however, is bringing those supplies, services and facilities closer to the people. This is not a transport problem in the conventional acceptance of the term. It is an access problem.

4.20 The emphasis on an improvement in mobility is an extension of the concept of roads as a facilitators of development. Certainly this emphasis recognises that the main means of transport in the rural areas is on foot or other simple means of transport along tracks and trails. Nevertheless it still concentrates attention only on the improvement of the ability of the people to reach services. If there is no government policy concerned with providing basic social services to the people and they are supposed to obtain these services as best they can, this approach would be viable. It fits well with the "ability to pay" argument. Put simply this says if you want access to basic services then you have to pay for it in some way. This could be in the form of investments in IMTs, paying for transport services, or providing labour and materials for the construction and maintenance of roads, tracks and trails. This totally free market approach to the provision of social services is not the norm. Most governments feel that they have a responsibility to provide a basic minimum level of services in particular, water, health, schools and security.

4.21 Even if the local community was expected to provide a contribution to the provision of these basic services, they would need some guidance on how they should be located. Moreover the government will still have an involvement in the sense that schools have to be provided with teachers and books and health centres still need drugs and health workers.

4.22 Mobility is extremely important. However as with roads if mobility is improved the opportunity for access is improved, not access itself. Mobility deals with the ability to reach or visit a service not the possibility to use it. Even if one had roads to every village and IMTs were available in large numbers this does not mean that people will have access to services. As Nutley has pointed out<sup>5</sup>, access has three components the originating household or community, the service or facility that is required and the linkage between the two. The detailed studies on rural travel and transport patterns provide an understanding of the needs of the community or household, the work on mobility helps to define more appropriate mobility enhancing interventions. The final element is to bring in the siting of the services or facilities that are required. In total then we have access as the overall goal not just the improvement of mobility. If mobility is improved people may still not have access. Provide the facilities desired in every village and access is assured.

4.23 A further point is important here in relation to the level of economic development one is dealing with. In subsistence economies, provision of improved mobility through the improvement of tracks and paths will be of assistance because they do not require a financial

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4 I. Barwell & J. Dawson: Roads Are Not Enough. IT Publications. 1993.

5 S D Nutley: Planning for Rural Accessibility Provision. Environment and Planning. Vol 16. 1984.

input from the users. However the provision of IMTs and transport services is unlikely to have much effect in an economy which has extremely limited disposable income. In these economies the important point is the provision of basic services at low cost in terms of both operation and use. The focus here is to bring people up to ascertain basic level of social development in order that they can then begin to benefit from economic opportunities.<sup>6</sup> The general concept is reflected nowadays in poverty monitoring exercises, in target setting for rural development projects and in the figures put out by the World Bank and the UNDP on an annual basis.

4.24 In economies with prior dynamism, the ability to pay concept becomes more valid, to the point where in industrialised countries it is presumed. Where the economy is developing and there is a cash surplus, IMTs become affordable as do other transport services and the community has more time to contribute to the provision and maintenance of roads, tracks and other infrastructure.

4.25 The concern and emphasis on mobility stems from the recognition of the enormity of the rural transport burden. The solution however is not only improving transport/mobility. It has to be a combination of the improvement of mobility and the location of services. The emphasis placed on the two will be governed by the existence or not of prior dynamism in the economy, the overall policy of the government to service provision, naturally the funds available, the level of community participation and an effective planning system which can bring all these diverse factors together.

4.26 The way forward could therefore be to redefine rural transport in terms of the provision of **access**.

4.27 The Oxford English Dictionary defines access as *the ability to reach or use or visit*. This therefore encompasses two aspects of rural travel - mobility and proximity. Transport permits the movement of people and goods to a destination - mobility. Access also involves the possibility of moving the destination closer to the people - proximity.

4.28 This is important as it brings in the concept that the solution to a transport problem may not be the provision of transport as such but the better location of the service. The provision of a road allows a trader to come into the area, on the other hand the provision of a simple means of transport provides the farmer the opportunity to use the track that already exists to sell his produce in the market. Improvement of the track to the water source eases the burden of water collection, provision of a well in the village drastically reduces the time and effort involved.

4.29 From the economists point of view it means that the evaluation of transport interventions *per se* is too narrow. The return on the investment in a transport solution has to be weighed against that of a non-transport solution to the problem. **This implies a more open approach to rural transport planning which does not assume that the solution of the transport problem is necessarily, or uniquely, a transport intervention.**

4.30 Such an approach comes closer to the actual situation in the rural areas. Whereas planning at the central level is done on a sectoral basis, at the local level it is multi sectoral. At

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<sup>6</sup> The concept of basic needs was developed by the ILO in connection with the World Employment Conference of 1976. Much work was done to define economic and spatial access to such key needs as food, health, education, water supply and the like. Whilst this work has taken different forms, all of it has been based on the premise that there is some minimum acceptable level of living, however poor people may be.

the centre the allocation of resources to health centres will depend on criteria related to the number of people served, the prevalence of disease and the availability of staff. At the household level the choice to use that service will depend on the access that the household has to that service and what price the household is prepared to pay either in time or in money on the transport service in order to reach the clinic. The provision of a road into an agricultural area will only increase production if parallel investments are made by the agriculture sector in extension services and pricing policies.

4.31 Access therefore is a much more comprehensive approach to the problems of transport in the rural areas. On the one hand it places transport where it should be as a facilitator of development whilst at the same time recognising that there are alternative non-transport solutions to transport problems.



## **Chapter 5 - PROXIMITY: PLANNING RURAL INFRASTRUCTURE**

5.1 Proximity - the other element of access - relates to the physical location of the facility to be accessed. Until recently this has been divorced from the issue of mobility.

### **Conventional Approaches to Planning**

5.2 Whilst economists may lump all types of physical infrastructure together in analysing their effects on economic growth, in practice the administration and planning of infrastructure has conventionally been dealt with on a sectoral basis. Most governments allocate administrative authority and responsibility for infrastructure to different ministries according to category or sector - Power; Roads and Highways; Water; Irrigation and Flood Control and the like. At the national level, infrastructure investments are similarly planned on a sectoral level. In practical terms, of course, this makes sense in that the amounts invested in each sector are often so large that it would be impractical for one ministry to deal with more than one or two categories. Equally, the sheer size and cost of many infrastructure projects - such as main highways, power stations, telecommunications systems - mean that their impact on other sectors can be identified and planned for.

5.3 Nevertheless, the result of this sectoral approach has been that water supply, irrigation, roads and other infrastructure have been tended to be planned in isolation from each other, or at best within the confines of centralised, sectoral planning. In mitigation, there is usually some form of central planning agency whose role it is to ensure that sectoral plans do not contradict or duplicate each other. Yet we only have to look at the Beeching plan for railways or the planning of rural bus services in the UK to see the effect of a centralised sectoral approach to planning on rural areas. In the industrialised countries today, those without a car have limited access.

5.4 This conventional approach to infrastructure planning has also tended to be top down and non participatory. In general this has not presented problems in relation to major infrastructure programmes, especially those of general public utility. However, turning to rural infrastructure, this approach is neither appropriate nor successful. There are a variety of reasons for this, as outlined below.

- \* In the first place, the funds available for rural roads, health clinics, primary schools and local markets are, and will always be, limited. Indeed, much of the

basis for planning is that needs always outstrip funding, irrespective of level of development. Planning, therefore, involves ranking priorities among candidate projects and among the benefits each may bring, then making decisions among and between them. Thus, the number and quality of schools and health centres have to be compared with levels of road access to assess how much will be allocated to each. Not only this, but at the local level there is often quite close interdependence among different types of infrastructure. For example, there may be a choice between providing road access to an existing school or building more schools.

- \* Secondly, the location of infrastructure calls for close consultation with those expected to benefit. This is not - or not only - in the interests of equity, accountability and democracy. It is also because the operation and maintenance of many local-level facilities often depend on contributions - in cash and/or in kind - from the beneficiaries.
- \* Thirdly, resources are also usually limited even for the planning and design, let alone the construction of rural infrastructure. Value for money in planning and design can best be obtained by drawing on local knowledge and insights as inputs to the planning process.
- \* Fourthly, as mentioned, planning for many types of rural infrastructure involves responding to both economic and social needs. A top-down approach concentrating on economic criteria alone is out of place. Economic analysis tends to concentrate on concrete outputs whilst the equally important social services require a concentration on people. Thus, economics (tempered hopefully by aesthetics) are of critical importance in making decisions on the physical design of the fabric of a health centre. But ordinary people need to have a say in where a new health centre should best be located and what type of service they want it to provide. And in the latter aspect of the planning process, ideas about the likely return on investment will have little meaning. Irrigation schemes identified on the basis of potential agricultural increases would also depend on proper pricing policies and transport services being available.

5.5 It is not only in relation to roads that the sectoral approach has led to inappropriate choices. Rural health programmes are in practice closely interlinked with the quality and quantity of water supply. Many common diseases in the rural areas - such as diarrhoea and dysentery - are in large part caused by poor water supply. In recent years - and in particular with the impetus provided by the United Nations Water Supply and Sanitation Decade - water and health programmes have been seen to be interdependent.

### **Efforts Towards Local-Level Planning**

5.6 Over the years some attempts have been made to provide a more practical, down-to-earth approach to the planning of rural infrastructure. Much of this work has been based on the equity approach to planning. Thus, the massive experiment with Block Level Planning in India, which started under the Sixth Plan in the late 1970s, tried to set criteria for the provision of different

types of service provision for a defined area (the Block - an existing administrative unit). The approach was developed from central place theory and from scalogram techniques.<sup>1</sup>

5.7 Other approaches to the provision of rural services have developed around the Growth Centre concept which tried to incorporate the provision of both social and economic services, thereby bringing into play concepts of efficiency as well as equity.

5.8 The much-criticised integrated rural development projects (IRDP) of the 1970s and 1980s attempted to take a multi-sectoral approach. However, this tended to be in terms of integrating several different types of infrastructure into a single project. Moreover, the approach was often compromised by (a) the inherent weakness of local government, and/or (b) the nightmare of seeking inter-departmental cooperation, coordination and collaboration among specialised line agencies (whose individual objectives were often quite different from each other, as well as from those of the IRDPs).

5.9 The blossoming of the free market philosophy in the 1980s, coupled with a general disaffection with government implementation led many agencies to concentrate on the involvement of NGOs and of communities themselves. This ensured that local projects involved local people. It also meant, however, that the emphasis was placed at the village level and even on individuals. This tended to ignore the issue of how these development initiatives fitted into a more general economic and social development of rural areas as a whole. Thus whilst participating villages developed thanks to emphasis on community involvement, they did so in isolation from the outside world. Another result was that the processes used tended to be location- or group-specific, making them more difficult to replicate elsewhere.

5.10 As mentioned in Chapter 1, the factor that has tended to provide a compromise between centrally-planned sectoral programmes and community-oriented ones at the local level has been the trend towards decentralisation, even devolution. Amongst other things, this has meant that local government officials need to develop their planning skills. Not only do their jobs demand effective planning but the usually very limited resources of time and money available to them call for them to be as efficient as possible. The Accessibility Planning process, described in detail in subsequent chapters, was developed as part of a programme to build the capacity of local-level officials.

5.11 One other factor is important here. We must attempt to differentiate between demand and need. The emphasis on the free market has seen a tendency for planning to rely on the effective demand for a service, reflected in willingness to pay and such like. This has moved the planning process away from the more supply-oriented policies of the 1970s and 1980s. At those times, development aid was more readily available than it is today. Infrastructure planning was generally based on an assessment of what it was felt a community or area required. Rural roads for instance were (and to a great extent still are) planned on the basis of derived demand from assumptions of growth in agricultural productivity and output. Apart from the fact that this approach could only work in areas of prior economic dynamism, it also assumes that roads (and motor vehicles) are the solution to the accessibility problems of farmers.

5.12 Where farmers want to sell some of what they produce (whether it may be (a) a net surplus, or (b) a seasonal need for cash, implying that they will become buyers of the same

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1 P P Sangal. How well connected are our villages? Kuruikshetra. April 1981.

produce later on in the year), they will look for ways to maximise their returns. Roads may form part of the strategy if they facilitate both the provision of inputs such as fertilisers and the evacuation of what is to be sold by motorised transport. It is equally possible that crop evacuation may be more effectively done through the use of intermediate means of transport (IMT). In many parts of the world, the volume of crops available for sale from individual farms is small. The farm households themselves are likely to be principally concerned with subsistence than commerce. As such, transport planning oriented to a dynamic economy is likely to have only limited application. Hence, roads capable of carrying motorised traffic are hardly likely to promote conventional 'development' objectives.

**5.13 The emphasis at the local level on effective demand for services can be unproductive because it assumes certain levels and patterns of travel and transport. In general, it assumes that transport serves a wholly economic purpose. In addition, it assumes that the provision of transport infrastructure and services will elicit a rapid response in terms of demand. Studies over recent years have shown that both assumptions are at best optimistic.**

**Box 8: Effects of Adequate and Poor Access**

**In the Philippines, studies carried out as part of an ILO programme have shown that though there is no correlation between income and specific access to roads, there is a correlation at a higher level between overall access to social and economic services and income level.**

**In Lao PDR, research by UNICEF has shown that levels of health and education are directly related to access. In the case of health care, there is a clear association between levels of infant and child mortality and distance to health services. Moreover, the major cause of drop-outs in primary education is the distance that children have to walk to reach their schools.**

5.14 At the local level, people's attitudes, social customs, gender-divisions of responsibility, agricultural practices and social behaviour become more important factors. A focus on the purely economic response to the provision of transport infrastructure is too simplistic.

5.15 At this level, therefore, it is necessary to understand the **need** for access to infrastructure - not just the demand for it. This is not to revert to an egalitarian or socialistic approach to the provision of services. It reflects an appreciation of the actual level of access of different members of the rural community. In industrialised countries, accessibility problems are

related to the lack of public transport and/or car ownership. The situation in the developing countries is very different in that access to facilities is much more related to (a) the quality and distribution of infrastructure and services, and (b) levels of personal and household income.<sup>2</sup>

5.16 For a rural household, the choice is often not related to how they will spend their money but how they will spend their time. Choices are still made not but in a conventional economic sense that has an easily identified monetary value.<sup>3</sup>

<sup>2</sup> R. Tolley & B. Turton: Transport Systems Policy and Planning. Longman (UK) 1995.

<sup>3</sup> The valuation of time is discussed in more detail in Chapter 8.



5.17 Rural infrastructure planning which emphasises the need for and the accessibility of supplies, services and facilities is in keeping with current ideas on participation and decentralisation. Local-level planning has to involve local people - not only in providing a description of their needs but also in designing appropriate solutions.



## CHAPTER 6 - ACCESSIBILITY PLANNING: DEVELOPMENT AND PROCESS

### Background

6.1 The concept of access has been applied to regional and rural planning for some years now. It is a concept that has been used by geographers and a considerable body of literature exists on the subject in the developed countries in relation to the provision of transport services.

6.2 The accepted theory is that accessibility has three elements:

- i) the location of the individual;
- ii) the location of the supply, service or facility to which the individual needs access;
- iii) the link to bring the two together.

6.3 Mathematically, these three elements can be expressed in a variety of different ways and over the years this has been done.<sup>1</sup> However, all these measures relate to the impedance in the link - in terms of time, distance or cost, the number of facilities that can be accessed, or the 'opportunities' there may be to do so. The intention of all these models was to define an overall measure of access of an individual to a range of services and facilities at increasing distances away from the point of origin of the individual.

6.4 Leisegang has grouped these models under three headings, empirical (or common sense) - these would include gravity models, distance decay indicators and cumulative opportunity indicators; Behavioural indicators - those based on the attraction of different activities; Micro-economic indicators - generally based on a consumer surplus approach.<sup>2</sup>

6.5 The concept of accessibility and the use of such mathematical modelling allowed transport planners to consider non-transport solutions to transport problems. This is particularly important in relation to rural transport planning in developing countries. Conventional transport

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1 See Hansen (1959), Jones (1981), Vickerman (1974), Gutierrez (1993) et al.: See the Bibliography at the end of this book.

2 Paul Leisegang. Accessibility in the Rural Areas of Developing Countries. M.Sc. study presented to the University of London Centre for Transport Studies. September 1994.

planning - anchored in the gravity model of the 1960s - assumes that a transport system exists and that the objective is to satisfy the need to travel from an origin to a destination.

6.6 Consequently, in the urban areas of developed countries the emphasis is to improve the transport system so that people can get to the facilities they wish to visit more easily and more economically. It is assumed that the necessary transport system can be provided and that the public will be prepared to pay for it, whether by public or private means. It is therefore largely a question of improving people's mobility.

6.7 These assumptions do not apply in the rural areas of developing countries, where there is often no transport 'system' as such and where transport is a physical and temporal burden to be reduced. In urban areas, the problem is perhaps getting quickly to work, to the hospital, getting the children to school or going to the shops. In rural areas, children often do not go to school at all; it may be out of the question to get to the hospital; and even getting to a basic health clinic - at least, one that is staffed and supplied - may be extraordinarily difficult. Hence, the problem can be quite fundamental. Many rural households may not even be aware of the location of different types of service, let alone how to get there. In other words, their lack of access to information may exacerbate lack of physical access.

6.8 In the rural areas of developing countries the question of improving transport has to be seen in a much broader context of improving the overall access of the population to goods and services. In affecting access, mobility is certainly an important dimension. But easier, cheaper, faster transportation is only one means of improving access. And as we have seen in Chapter 3, trying to overcome the transport problem by means of building more or better physical infrastructure has been a severe disappointment over the last 20 years or more.

## Access in the Industrialised Countries

6.9 In the 1970s the concept of accessibility was approached in terms of the analysis of networks and the consideration of travel times (or costs or distances) between different locations. In the early 1980s, Nutley<sup>3</sup> and Mosely<sup>4</sup>, among others, suggested that accessibility should be approached from 'the position of specific groups in specific locations (such as a set of villages) and postulate the means by which they might communicate with a set of services or facilities'. In his study on transport in rural Wales, Nutley used the presence or absence of bus services as his measure of accessibility. In the context of a society which can be presumed to pay for a bus service, this seems quite reasonable. As we shall see, accessibility planning uses distance or time on the grounds that time rather than money is more readily available to rural people. Nevertheless, the basic principle remains the same and Nutley was able to draw a set of accessibility maps related to work, shopping and social journeys which classified the groups of villages (parishes) in Wales in terms of their accessibility.

6.10 In subsequent work, Nutley took the argument further. He pointed out that previous studies on accessibility had shown it to be low in rural areas. The conclusion drawn had been 'the encouragement of unusual methods of transport operation and general appeals for more

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3 Nutley S.D. *The Evaluation of Accessibility Levels in Rural Areas*. Welsh Office. 1981

4 Moseley M.J. *Accessibility: The Rural Challenge*. Methuen. 1979

resources'.<sup>5</sup> He went on to say that 'analysis never seems to be followed by a systematically planned solution which raises accessibility to an optimum level'.<sup>6</sup>

6.11 Nutley also identified three groups of accessibility planning techniques:

- i) the 'classical' approach, which generally followed the gravity model techniques of urban transport developed in the early 1960s;
- ii) the 'aggregate' approach which identified access to facilities in successive distance bands (this approach was the basis of the Nagpur Plan in India and relates to the scalogram technique);
- iii) what has been described by Jones as 'personal accessibility' (based on the identification of specific groups of people and the means by which they might reach a set of services or facilities).<sup>7</sup>

6.12 We shall see later that it is this third approach which fits more effectively into the context of rural areas in developing countries.

6.13 The upsurge in interest in a more equitable approach to the provision of access in the late 1970s and early 1980s was swept away by the tide of free market transportation policies that flooded the developed world in the 1980s. With few exceptions relatively little research on access has been done since then.

## Developing Countries

6.14 The work on accessibility planning described in this book grew out of the studies and projects on rural transport in the 1980s. Initially the concern was to identify the actual transport demands of rural households. The feeling being that there was a huge area of rural transport, that which was non motorised and did not necessarily involve a road, that being ignored in transport planning.

6.15 In fact the first studies, such as those in Makete in Tanzania, were initiated in order to identify interventions which would increase the mobility of the rural people, in terms of IMTs and track and path improvements. The results of the studies however were then recognised as having a broader application. Not only did they show why people travelled and by what mode they also showed what the destination of the trips were and how long it took people to reach the particular destination. Thus not only were the mobility problems of the people identified but also their level of access to the different types of services they required.

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5 It is interesting to compare this with the general enthusiasm for IMTs and additional local funding of the road network now prevalent in development planning.

6 Nutley suggested that such planning would be dependent on decisions regarding accessibility targets, cost limits and criteria related to the distribution of benefits both from the point of view of socio-economic and spatial distribution.

7 P.M. Jones: Accessibility, Mobility and Travel Need. Institute of British Geographers. Birmingham. 1975.

6.16 The work that derived from the project in Tanzania was, of course the first that had tried to address the problem of rural access. The 1943 and 1958 national plans of India attempted to define a minimum level of access to which communities were entitled. Howe, as early as 1983, had suggested both criteria and indicators for the provision of the basic level of access to social and economic services.<sup>8</sup> More recently Gaviria has suggested that an accessibility index should be used in the allocation of resources to the rural transport sector.<sup>9</sup> Work to (a) define accessibility, and (b) translate it into a planning process had its origins in the work of the ILO in Tanzania and the ITDG in Ghana in the 1980s.<sup>10</sup> This was then expanded in Malawi where an attempt was made to develop a prioritised system of planning interventions based on the access of rural households to basic, economic and social services.

6.17 The major development of the process however took place in the Philippines between 1990 and 1995. The Dutch funded, ILO executed project developed a prioritisation process which was based on the time that people took to reach specific services. It used both the time and the number of people involved in accessing these services as a measure of the need for access to that particular service.

6.18 Accessibility Planning (AP) uses a simple measure of accessibility, it defines the access needs of rural households in relation to the basic supplies, services and facilities that households need. The procedure is based on the assumption that the level of accessibility - the ease or difficulty of gaining access - is a key constraint to rural development.

6.19 It is important to recognise that the process was developed empirically and in response to a perceived need for a simple process to prioritise interventions in rural infrastructure. It was, and still is, seen as a **tool** in the planning process. In this it differs considerably from the work carried out in the developed countries. In the first place they were developed academically and, in certain cases, then tested out in practice. In addition they were concerned to develop a unified theory of accessibility.

6.20 The process of accessibility planning developed in the Philippines, Laos and Malawi was designed to work in an overall planning framework. This has certain repercussions. The results are not absolute in the sense that they recognise that overall targets, budget levels and benefit impact relate to the overall planning framework into which the process is being integrated.

6.21 Because the process is empirically based it is not yet fully developed. In particular issues of planning for equity or economic services has not been fully addressed. These issues are discussed further in Chapter 8.

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8 J.D.G.F. Howe: Conceptual Framework for Defining and Evaluating Improvements to Local Level Rural Transport in Developing Communities. ILO (CTP 19), Geneva. 1983.

9 J. Gaviria: Analyses of Rural Transport and Economic Development in Less Developed Areas of Sub-Saharan Africa. Unpublished Dissertation. University of California. 1974.

10 The ILO project - funded by the Swiss Development Cooperation - in Makete, SW Tanzania, was interesting from the point of view that the major problem identified by local people, as shown from a detailed household survey, was the difficulty in obtaining water - a problem that the project had not specifically been designed to overcome and was only in a limited position to address.

6.22 The process that has evolved focuses on the household as the unit of generation of transport journeys. This is the standard procedure that has been used in urban transport planning for many years since the pioneering work on the Chicago mass transit plan in the 1960s. Accessibility Planning takes this focus on the household and applies it in a rural context.

6.23 Data is collected at the household level on time taken and manner in which households obtain access to services and facilities. The analytical procedure results in a demand-oriented definition of access or transport need. This uses numbers of households and the time they take to obtain access as a basic indicator of the need for better access.

6.24 The data are used to identify a set of interventions which would most effectively reduce the time and effort involved in obtaining access to supplies, services and facilities. These interventions could be either transport (in terms of rural infrastructure, the means of transport or transport services), or non-transport (in terms of the better distribution or the most appropriate siting of services).

6.25 AP covers several sectors. In particular, it provides detailed data on the access that rural households have to services and facilities. These are:

- \* **water,**
- \* **energy,**
- \* **health,**
- \* **education,**
- \* **markets,**
- \* **agricultural inputs,**
- \* **agricultural outputs,**
- \* **crop marketing**
- \* **and post-harvest facilities.**

6.26 AP has been designed to assist local-level planners to make appropriate investments of the almost certainly limited funds likely to be available to them. This concentration on the local level has several advantages, not least because primary data are collected by local people at the village level and are then analysed to identify priority improvements. The AP procedure, therefore, also provides a basis for developing the capacity of local-level planners.

6.27 Two points are necessary to raise here. The AP procedure is not planning system. It provides a basis for establishing priorities for access improvement in the sectors that it deals with. It is a tool in the planning process and, while some interventions have been predicated on the use of the process, the process results in identification not implementation.

6.28 To the extent that the AP programmes have been evaluated, this shows that it does provide an effective local-level planning tool which can identify and define access improvement initiatives in several sectors.<sup>11</sup>

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11 It should be noted that the process has been used both by international aid agencies and local government in the Philippines to define the allocation of resources for investing in rural infrastructure. However, this has not yet been done in a comprehensive and coherent manner. Based on a limited sample from the Philippines and Malawi, the indications are that the interventions defined do accord with local preference but that the major problem is the integration of the decision-making process in local government systems and procedures.

6.29 AP is important not just because it provides an effective local planning tool. Its real importance lies in its potential to bring together the two aspects of accessibility- mobility and proximity- in a sensible manner. It suggests that access, rather than transport, should be looked at as the facilitator of development.

6.30 The Accessibility Planning procedures developed in recent years for rural infrastructure have much in common with those developed by transport geographers in the industrialised countries in the late 1970s and early 1980s. The major difference between the two themes of work is the (largely correct) assumption in the former of an ability and willingness to pay. Nevertheless, the accessibility planning work now being developed and applied in several countries is a natural extension of the earlier work of the transport geographers.

### **The Process of Accessibility Planning**

6.31 The first Accessibility Planning project was carried out in the Philippines, implemented by the Department of Local Government with technical assistance from the ILO. It has certain key features:

- > it is integrated in that it considered all aspects of household access needs, subsistence, economic and social;
- > it is based on a thorough data collection system;
- > it uses the household as the focus of the planning process;
- > it develops a comprehensive set of information on almost all aspects of rural infrastructure, supplies, services and facilities;
- > it identifies interventions both to improve the local transport system (roads, tracks, IMTs and local transport services) and for the most appropriate siting of services;
- > it is simple to apply;
- > it is a genuinely bottom-up approach to planning.

6.32 The end result of AP is a set of defined and prioritized interventions to improve people's access. These can be used:

- > by local governments in the allocation of their own resources;
- > for the development of project packages for external funding;
- > by NGOs or line agencies for specific projects relating to a particular sector such as water supply or for more generalised area development projects.

6.33 Figure 6.1 illustrates the AP cycle. Data is collected at the household level using a simple questionnaire and a key informant approach. Data is then encoded using a simple spread

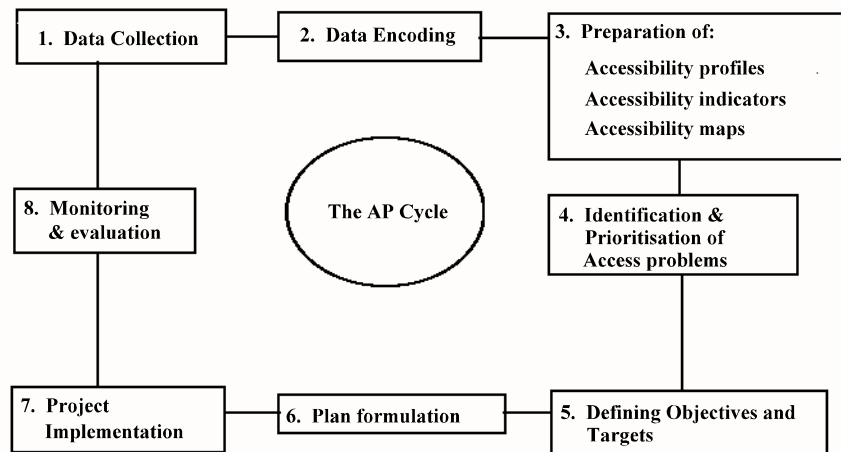


sheet programme. Overall accessibility profiles of the area under consideration defining overall access to the different services are developed. For each sector, accessibility indicators are prepared for each village. In addition accessibility maps are prepared.

6.34 The accessibility indicators are then used to define the access priority of each village by sector.

6.35 It is at this stage that the AP process needs to be integrated into the overall planning system as the next stage involves setting both objectives and targets in for improving access in each sector. Clearly in the health sector for instance physical accessibility is one criteria or the siting of health centres. However other factors come into play in terms of the availability of health personnel and drugs and the cost of maintaining and operating the health centre.

**Figure 6.1: The Accessibility Planning Cycle**



6.36 AP makes available a comprehensive data base providing information on access for villages in a defined local government area. The base data collected can be grouped in five categories:

- \* background information on economic, geographic and demographic characteristics;
- \* access to services and facilities;
- \* physical distribution of services and facilities;
- \* access and agro-economic activities;
- \* quantity and quality of transport facilities.<sup>12</sup>

6.37 One of the main outputs of the AP exercise is a profile of accessibility . This profile consists of aggregated data on access in each of the sectors covered by the AP.

6.38 The planning process relies on two main tools for analysis. First, there is the use of **maps**, providing a visual presentation of the location of services and facilities. Accessibility Maps are prepared during the second workshop for each of the supplies, services and facilities. Collected data are displayed on base maps and - by means of overlays - a clear presentation can be given of the overall level of access.<sup>13</sup>

6.39 There are basically two uses:

- \* to illustrate the geographical distribution of supplies, services and facilities services, including their catchment areas;
- \* to identify priorities for interventions to improve access.

6.40 Maps prepared during the workshop show the following detailed information:

- \* commercial agricultural production and location of farm input supply sources, post-harvesting facilities and crop marketing facilities;
- \* location of educational institutions and health facilities and a representation of the population distribution;
- \* road and main footpath network, distances and public transport services.

## Accessibility Indicators

6.41 The second planning tool comprises the Accessibility Indicators. Accessibility indicators show relative degrees of difficulty in gaining access to specific supplies, services and facilities.

### Box 9: Example of an Access Indicator

**In the case of water supply for instance the Access Indicator would be the number of households not having direct access to potable water multiplied by the time, on average, it takes for those households to reach the source of water in the dry season.**

6.42 The AP process uses a simple expression of accessibility to define the level of access of households to different supplies, services and facilities. This expression takes the number of households affected multiplied by the time taken by those households to reach the service. This product is called the Access Indicator (AI). An example, for water supply, is outlined in Box 9. An AI is calculated for each

village in relation to each supply, service or facility - including water, fuel, health or education services, markets and whatever the households identify as being important destinations. Each sector is then prioritised by village.

6.43 The result is a prioritized list which allows the planner to identify where a particular service is most needed. The choice can then be made whether access will be improved by locating a service closer to the people or by improving a road (or track) or the means of transport to improve their mobility and thus reduce the time taken to reach the destination.

6.44 **Access Indicators are at the core of the analysis of the AP process.** They are simple yet effective means of identifying access problems. The Access Indicators are not supposed to reflect absolute values of accessibility. Indeed, there are few absolutes of any sort surrounding the concept of access: it is more a matter of different degrees of difficulty in terms of the time, effort and sometimes cost of actually gaining access to somewhere someone or something. For this reason, AIs are used to reflect relative levels of accessibility. Certainly, it is possible to refine or modify the indicators. What are presently being used are those that seem to best reflect the actual situation, whilst at the same time remaining simple to calculate and to use.

6.45 The existing accessibility data base is used during training to establish the Profile of Accessibility for a given administrative area. A Profile of Accessibility is an overview of the overall level of access for a community as a whole and consists of a number of accessibility indicators.

6.46 By translating the level of access into numerical values the trainees develop accessibility indicators for different sectors. Accessibility indicators are defined for the following sectors:

- water
- firewood
- health
- education
- fields for crop production
- post harvesting facilities
- markets
- agricultural inputs and support services

6.47 Accessibility indicators describe the relative level of access and are used to:

- \* categorize or rank villages or groups of villages according to their level of access;
- \* compare the level of access to a supply, service or facility among different administrative areas;
- \* relate the level of access to defined national, regional or local standards;
- \* monitor improvements in access within or between administrative areas.

6.48 The indicators are originally derived and defined at the village level. At this level they relate to the number of households seeking access to a certain service and the time it takes them to obtain access. From this it is possible to identify those villagers which should have priority in interventions in each sector. It is at this level that they are the most innovative as they rely solely on primary data developed at the household level.

6.49 Indicators are also developed at the more aggregated levels, in the first place at the next level of administration, for example the District, Municipality or Province. At this level they are used to define which administrative unit are more disadvantaged.

6.50 At the national level, assuming full coverage of the country, it is of course possible to define which parts of the country should be targeted for interventions in different sectors.

6.51 Because they serve different purposes the indicators are different at different levels. This is illustrated in the table 6.1.

6.52 Clearly there can be a variety of indicators. The important point is that they are based on primary data collected at the household level and that they incorporate the measure of time to obtain access.

**Table 6.1 Examples of Accessibility Indicators**

	<b>Village</b>	<b>District</b>	<b>National</b>
Water	Number of households X Ave. collection time in the dry season	1. %age of households with no direct (1) access to a water supply 2. Average collection time in the dry season	1. %age of households with no direct^ access to a water supply 2. Average collection time in the dry season
Health	Number of households X time to a health centre or clinic	1. %age of households living in villages with no health centre 2. Ave.time to a health centre (2)	1. %age of households living in villages with no health centre 2. Ave.time to a health centre (2)
Education	Number of primary school age children X time taken to get to the school	1. %age of households with no primary school in their village 2. Pupil/classroom ratio 3. Pupil/teacher ratio	1. %age of households with no primary school in their village 2. Pupil/classroom ratio 3. Pupil/teacher ratio

1 Direct access means that water is available in the immediate vicinity of the house

2 Other health indicators would be regular visits by a Midwife and Physician

6.53 In practice AP it begins with a training programme explaining the concepts of AP and training staff in the procedures for data collection.<sup>14</sup> Training leads straight into data collection, followed by analysis of the data and the development of a draft action plan. This is then discussed in a second training programme, where the data are validated and the process of prioritising investments is explained.

6.54 During the last part of the workshop, participants use the planning tools to define sectoral objectives for access improvements. Where they exist, national targets will be used to define overall objectives. In the Philippines, the Ministries of Health and Education do define overall national targets for the provision of basic facilities. These can be used as the overall

14 See IRAP Manual on T-1 Training.

sectoral goal - in general terms over whatever time horizon, to outline what the concerned local government would eventually like to achieve. An example might be: 'all households in the area should have direct access (i.e. within their house) to potable water all year round'.

6.55 In addition, the participants should try to set realistic and attainable targets to be achieved in the short term based on their own knowledge of the available budget. An example might be: 'in three years time, 70% of the households will have direct access to potable water all year round'. Table 6.2 indicates one way in which targets could be set in the absence of any official ones and using the data from the AP process.

**Table 6.2: Examples of Access Targets**

Facility	Existing Situation	Five-Year Target	Implications for Action	\$?	Org.
Health Station	1 per 8,000 people	1 per 2,000	45 new Health Stations	No	MOH
Primary School	1 per 250 children	1 per 150	100 new Primary Schools	No	MPW
Crop Marketing	30% villages no roads	reduce by half	100 Kms. of local road	Yes	MPW
Water	70% h/h > 15 mins.	100% < 15 mins.	supplies for 150 villages	Yes	MPW
Fuelwood	30%h/h > 30 mins.	100% < 30 mins.	50 wood-lots	No	Local

6.56 The question of setting priorities among sectors is more complex. If the process is truly participatory, priorities can be expected to come from the communities themselves as they define their own most serious access problems. In more centralised administrative systems, priorities may be set by pre-defined budgets available to sectoral line agencies.

6.57 The AP process can also assist in fixing priorities between sectors. The present process does not do this directly. However the facility to compare average accessibility in a particular sector to regional or national averages, does provide the potential for deciding in which sectors the priority should be given.

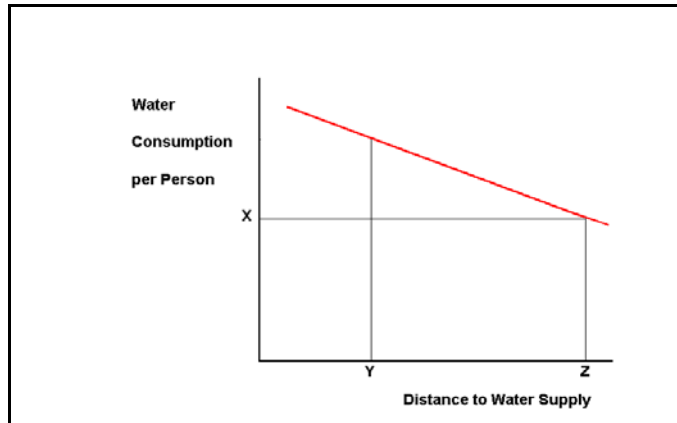
6.58 The process can also be used to help local planners to set local targets. Clearly these should relate to overall national targets, if they exist. However the local targets can reflect the actual situation in the area.

**Box 10: An Illustration of Local-Level Target Setting**

It is reasonable to expect that the consumption of water will increase as access improves. The relationship is therefore likely to be of the general form shown in the accompanying graph.

There are two key points on the graph:

- X a normatively set minimum level of water consumption;
- Y a normatively set minimum distance for access to a water supply.



Three time-bound targets might be set:

Immediate: provide communal supplies to households currently further from water than distance Z;

Medium-Term: provide communal supplies within Y metres (or minutes) of all households;

Long-Term: provide direct house supplies.

Assuming that the planning emphasis is on the immediate and long term, National Level Indicators might be expressed along the following lines:

- a) the share of households more than Z metres (or minutes) from a water supply;
- b) the share between Z and Y metres (or minutes) of a water supply.

A Planning Indicator can then be put forward as follows:

Number of Households X (distance to water - Y)

6.59 The question of allocation of budgets is, of course, dependent on cost and potential benefit. Annex 1 provides some suggestions on the way in which overall costs for each sector should be developed. Equally the question of benefits has to be addressed in order that different options can be evaluated. This is discussed more fully in Chapter 7.



## **Chapter 7 - ACCESSIBILITY PLANNING: WHAT IT CAN ACHIEVE**

### **Accessibility Planning - From Its Origins to Its Application in Developing Countries**

7.1 Accessibility Planning forms part of the personal accessibility techniques which were developed in the late 1970s and early 1980s in the industrialised countries. At that time, it was felt that these techniques - whilst being very appropriate at the local level - had limited relevance at higher levels of administration. The argument was that personal accessibility was a useful indicator at the local level but had limited application for multi-sectoral planning.

7.2 In the context of a developed economy, where the key factor may be the availability or non-availability of transport services, this may be correct. In economies where the key constraints are the basic lack of physical infrastructure of any sort and an inability to pay for transport services even if they existed, accessibility planning takes on a rather different role.

7.3 Accessibility Planning emphasises one resource that is available to rural people - disposable time. It focuses on lack of access which implies a significant use of this disposable time on an activity - transport - which is totally unproductive, however vital the purpose might be. One of the underlying principles of accessibility planning is that the reduction of this 'wasted' time should be a major objective in the design of the location of water and fuel supplies, schools, health services and transport infrastructure. In this Chapter, we look at how accessibility planning has been applied and discuss its potential for further application. The examples presented are from the three countries - Malawi, Lao PDR and - where AP has been extensively applied.

7.4 AP is a planning tool which has to be seen as part of an overall framework of local level planning. Figure 7.1 shows a typical local level planning cycle and indicates where AP relates to this framework.

7.5 AP can assist at various stages of the process.

### **Situational Analysis**

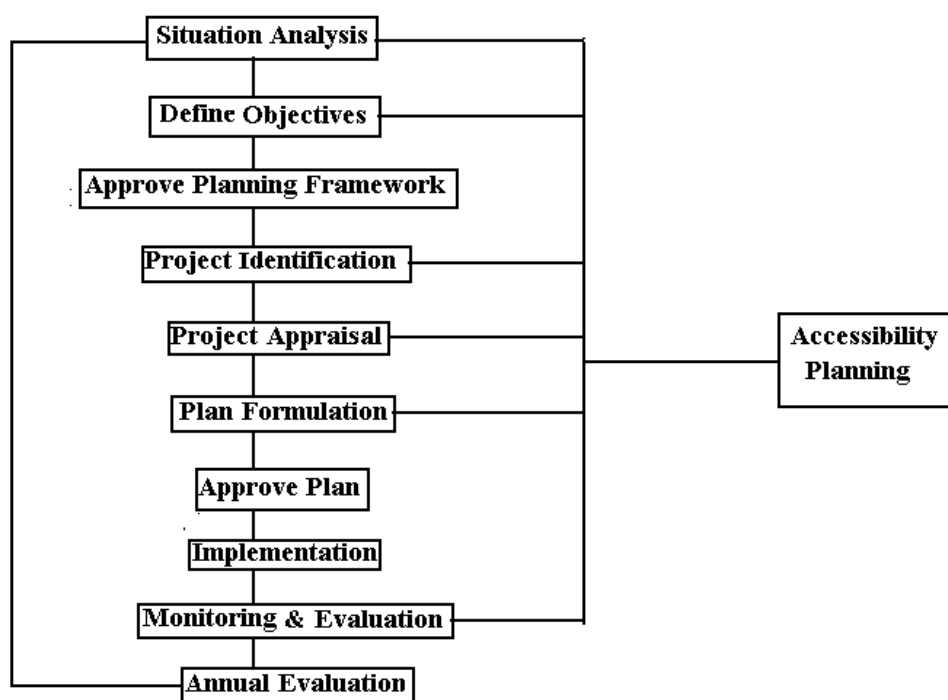
7.6 This is the first stage in the planning process, the identification of the characteristics and problems in the area concerned. Clearly this covers far more than household access. However



the AP process provides a set of basic information both on the location of the services and the difficulty with people have in gaining access to them. This information is contained in the accessibility profile, which is the summary of the data that is collected at the village level. Figure 7.2 is a simple example of this from the Philippines whilst Figure 7.3 is a more comprehensive version from Lao PDR.

7.7 Accessibility Planning has so far been applied fully in only three countries- the Philippines, Malawi and Laos.

**Figure 7.1: AP linkage to The Planning process**



7.8 The accessibility data can also be used to define more clearly the problems at the sectoral level. The examples in Tables 7.1 and 7.2 come from Lao PDR and describe the health and road network characteristics in one District. This can of course be done for each of the sectors with which the AP process deals.

7.9 At this stage of the planning process the planners are looking for a general impression of the nature of the problems in each sector and the areas that need particular attention.

**Figure 7.2: Municipal Profile of Laua-An - Antique Province - the Philippines**

<b>Population:</b>	<b>19,865</b>	<b>Number of Households:</b>	<b>4,288</b>
<b>Number of Villages:</b>	<b>40</b>	<b>Number of Sitios:</b>	<b>82</b>

**MUNICIPAL INDICES****(Number of Households Affected in between Brackets)****WATER:****% of households not served by a water supply in or near the house:****31% (1,328)****average water collection time:****dry season: 18 minutes****wet season: 14 minutes****FUEL:****number of villages without a source of firewood within 30 minutes travel:****6 (692)****% of villages not electrified:****79%****EDUCATION:****% of villages without complete elementary schools:****80% (1,676)****students/classroom ratio: 36****students/ teacher ratio: 31****HEALTH:****% of villages without a health clinic:****83% (2,880)****% of villages not regularly visited by:****- midwife: 15% (469)****- physician: 73% (2,640)****CROP MARKETING:****% of villages where households market their main product only outside the village:****95%****ROADS:****% of sub-villages without some road access:****61%****% of villages without all-year round road access:****57% (1,692)**

## Figure 7.3 DISTRICT ACCESSIBILITY PROFILE, Lao PDR

District Name: SING	Province: LUANG NAMTHA
<b>GENERAL CHARACTERISTICS</b>	
Number of Villages: 112	
Total Number of Houses: 4,510	
Total Number of People: 23,510	
Percentage of Villages with a Source of Electricity: 0%	
<b>TRANSPORT</b>	
Percentage of Villages with All Year Road Access: 12%	
Percentage of Villages with Dry Season Only Road Access: 52%	
Percentage of Villages with No Road Access: 37%	
Percentage of Villages with All Year Round Transport Services: 13%	
Percentage of Villages with Dry Season Only Transport Services: 21%	
Percentage of Villages with No Transport Services: 66%	
<b>HEALTH</b>	
Percentage of Villages with Health Centre: 0%	
Percentage of Villages with Nurse: 4%	
Percentage of Villages with Regular Visits of Medical Staff: 99%	
Average Travel Time Pharmacy: 247 mins.	
<b>ECONOMIC ACTIVITIES</b>	
Percentage of Villages Marketing at Least One Crop: 65%	
Percentage of Villages Marketing at Least One Non-Food Item: 15%	
Percentage of Villages Never Self Sufficient in Rice: 22%	
Percentage of Villages with a Rice Mill: 54%	
Average Time to Market: 254 mins.	
<b>WATER SUPPLY</b>	
Percentage of Villages Using Improved Only: 3%	
Percentage of Villages Using Traditional Sources Only: 83%	
Percentage Villages where Water Quality is Satisfactory (Dry): 50%	
Percentage Villages where Water Quality is Satisfactory (Wet): 53%	
<b>EDUCATION</b>	
Percentage of Villages with a Complete School: 6%	
Percentage of Villages with an Incomplete School: 50%	
Population/Classroom Ratio: 174	
Population/Teacher Ratio: 175	
Grade 1 Pupil/100 Population Ratio: 6.9	
Grade 5 Pupil/100 Population Ratio: 0.9	

**Table 7.1: Access to Health Services - Selected Characteristics**

Subdistrict	Percentage of Villages without any Medical Staff	Average Travel Time Pharmacy (min)	Average Travel Time Hospital (min)
Thong May	85%	130	146
Nam Keo Luang	100%	67	77
Xieng Chay	86%	65	78
Na Kham	94%	68	60
Mom	100%	393	382
Xagn	100%	632	632
Xieng Kheng	100%	629	629
<b>District</b>	<b>94%</b>	<b>247</b>	<b>251</b>

**Table 7.2: Access to Road Network - Selected Characteristics**

Subdistrict	Number of Villages	Percentage Villages with All Year Round Road Access	Percentage Villages with Dry Season Road Access (including villages with all year access)	Average Travel Time to Road Network (Min)
Thong May	20	0%	80%	127
Nam Keo Luang	13	38%	92%	93
Xieng Chay	21	14%	90%	76
Na Kham	18	28%	89%	50
Mom	15	0%	53%	400
Xagn	13	0%	0%	632
Xieng Kheng	12	0%	0%	703
<b>District</b>	<b>112</b>	<b>12%</b>	<b>64%</b>	<b>282</b>

## Defining Objectives

7.10 Because the AP process provides a detailed description of the existing access situation, it can be used in defining objectives for the sector concerned by providing a overview of the situation in any sector. Figure 7.4 shows the share of villages (barangays) in each Municipality

of one Province in the Philippines that has no direct access to an elementary school. The AP process provided the opportunity for the Provincial and Municipal authorities to examine their investment strategies for education in relation to primary data showing numbers of barangays without elementary schools. The process also provided greater transparency to the decision-making process.

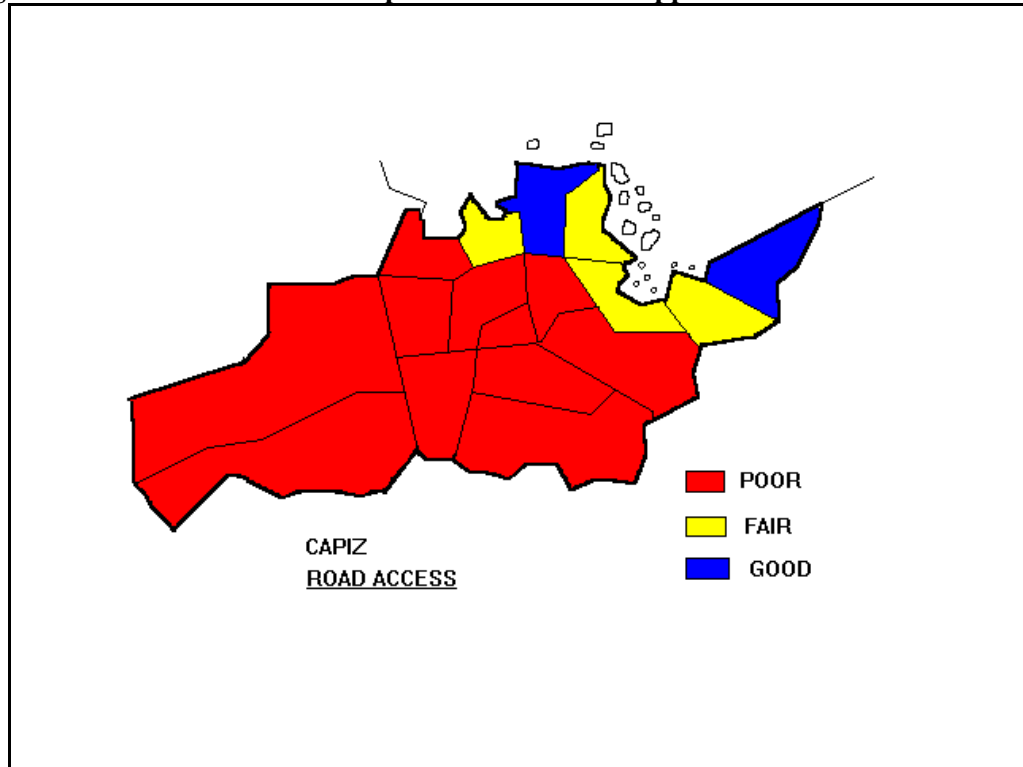
7.11 Two more examples from the Philippines serve to illustrate the way in which AP can be used at the initial planning stage. This time the example refers to the Province level. By using the accessibility indicators referred to Chapter 6 it is possible to present a simple graphical representation of accessibility, in this case in Figures 7.5 and 7.6 to roads and education, for the whole Province. Clearly this does not serve to define investments. What it does do is to point the planners in the direction of those municipalities which are the most disadvantaged

7.12 At the local level, therefore, the AP process provides a logical assessment of how resources should be allocated in the sectors covered, also giving planners a basis for drafting and validating a development plan.

7.13 A note of caution should be added here. Accessibility Planning only considers access to physical infrastructure and services. There are, of course, other factors and issues to be considered. Naturally, physical access to a health centre is important. Yet the centre must be staffed and it must have basic medicines if physical access is to be at all useful. Similarly, physical access to a school building must be matched by a reasonable quality educational service. As mentioned, Accessibility Planning is a tool to be used in deciding what investments should be made where: it is not a complete planning system in itself.

7.14 Local politics have also been mentioned - particularly in relation to the need for transparency. There is, however, another issue - that of equity. It may be that some communities - perhaps owing to some extreme disadvantage or isolation - can put forward a powerful case for quite a wide range of investments. Yet for two main reasons it may not be possible to respond to a request for a concentration of development expenditure. First, as already noted, it can be regarded as axiomatic that requests for investment will always exceed available resources. Secondly - and against that background - local politics will probably demand some evening in the spread of investment. After all, the distribution of benefits from government expenditure can directly affect the distribution of political votes.

**Figure 7.4: Access to Education in Aklan Province - The Philippines**

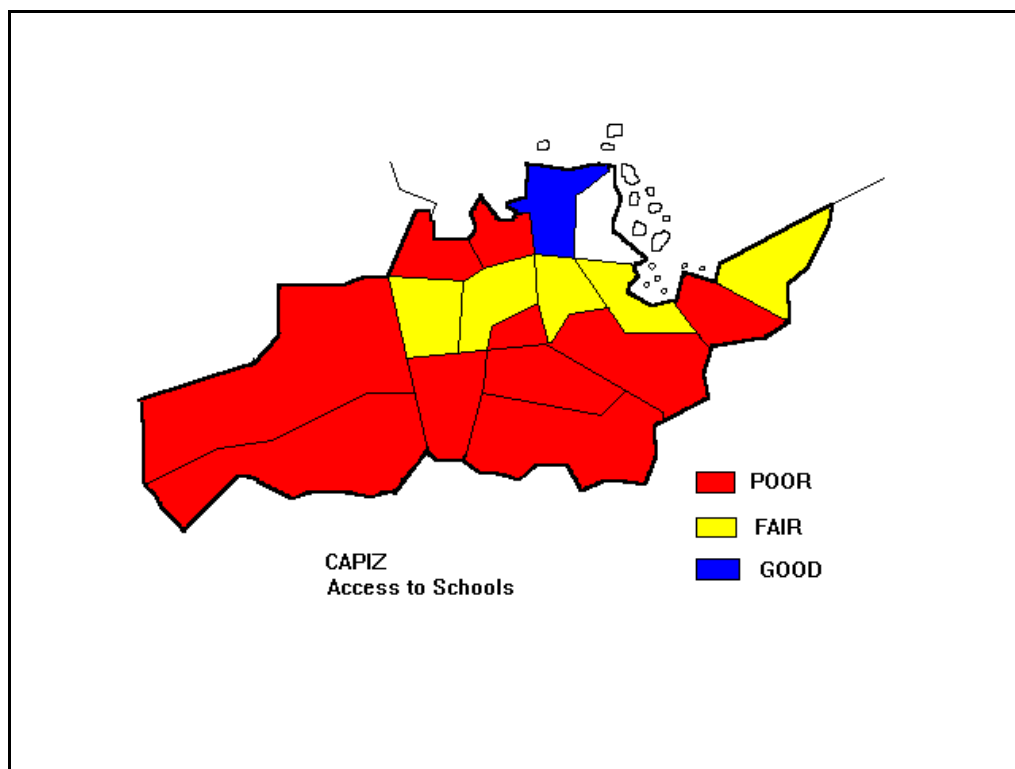
**Figure 7.5. Access to Roads in Capiz Province the Philippines**

7.15 The definition of objectives at the local level is, of course dependent on a whole variety of factors, many of them non-technical. The overall budget available, equity between different parts of the District, Municipality or Province, political concerns all play a part.

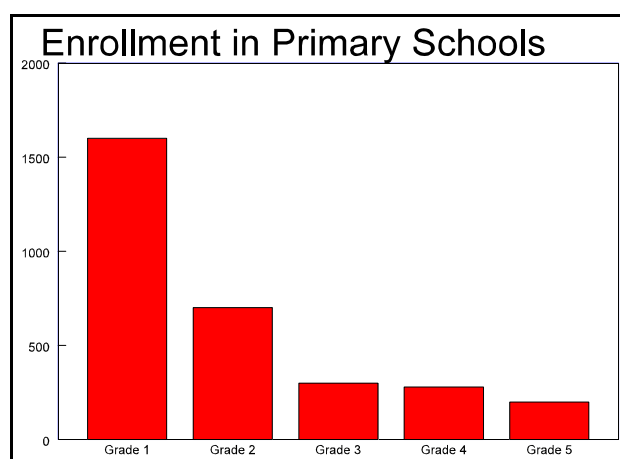
7.16 In the sectors that AP deals with however it defines the existing standard of accessibility. This can be used in the definition of objectives in a variety of ways:

- \* it provides the benchmark from which to work
- \* it can be used to compare with national targets or averages
- \* it identifies the more disadvantaged parts of the area under consideration

7.17 Figure 7.4 for example shows the access to education in the 16 municipalities of Aklan Province in the Philippines. The national average is that 40% of the villages in the country have no elementary school. In the first place therefore a development objective for Aklan in the education sector could be to bring the 10 Municipalities that are below the national average up to that level.

**Figure 7.6: Access to Education in Capiz Province, the Philippines**

7.18 In Oudomxai Province in Lao PDR, one serious problem is the drop out rate in education (see box) caused by the distances that the children have to walk to get to school. There is a need for more schools but what would be a reasonable District objective? Naturally this could be put in terms of reducing the drop out rate. Another alternative is to specify a reduction in the percentage of children that would have to travel more than one hour to a complete primary school.



7.19 Access to water is a problem in most parts of the Philippines. In the 15 Provinces for which AP data is available, an average of only 40% of households have direct access to a water supply. A development objective for those Provinces that have an average less than 40% would therefore be to attain this level.

7.20 These simple examples the way in which the AP process can be used to help define local planning objectives.



## Project Identification

7.21 At the local level most projects should and often do emanate from the communities. For the local planner therefore, the process of selection of projects must start from the defined requests from the communities. Nevertheless this should not mean that this selection is done in isolation. The needs of the communities must be put in the context of the overall requirements of the District or Municipality of which they are part. One community may feel that their need for an improved water supply is their most urgent one. However this need must be related to the overall need of the other communities in the planning area.

7.22 Accessibility planning can be particularly useful in this process in relation to the planning of rural infrastructure. The accessibility indicators can provide an objective way in which to choose between competing demands. In addition it is a simple process which is easily understood and therefore can be seen to be transparent. In Figure 7.4 it is clear which municipalities should benefit from improved educational facilities. The AP process provides a process which allows the local planner to explain, for instance why the municipality of Madalag should take preference over Altavas.

7.23 Table 7.3 shows the access indicators for water supply and other sectors in selected villages in Santa Fe municipality in Nueva Viscaya Province in the Philippines.<sup>1</sup> The numbers in parentheses relate to their location on Figure 7.7. The higher the indicator, the greater is the need for better access. In planning water supply schemes at this very local level, for instance, the specific Access Indicator can be used as a first indication of priorities among villages. Thus for water supply Bacneng has the greatest need, whereas for education the village of Unib should be given priority.

7.24 Clearly, the indicators themselves would not be the only factors to be considered. Maps would be used to indicate, in the case of water supply, the catchment areas of existing safe water supplies and also the location of the tracks, paths and roads on which people move. In addition, consideration would have to be given to the cost of the installations both in terms of their initial cost and their operation and maintenance costs.

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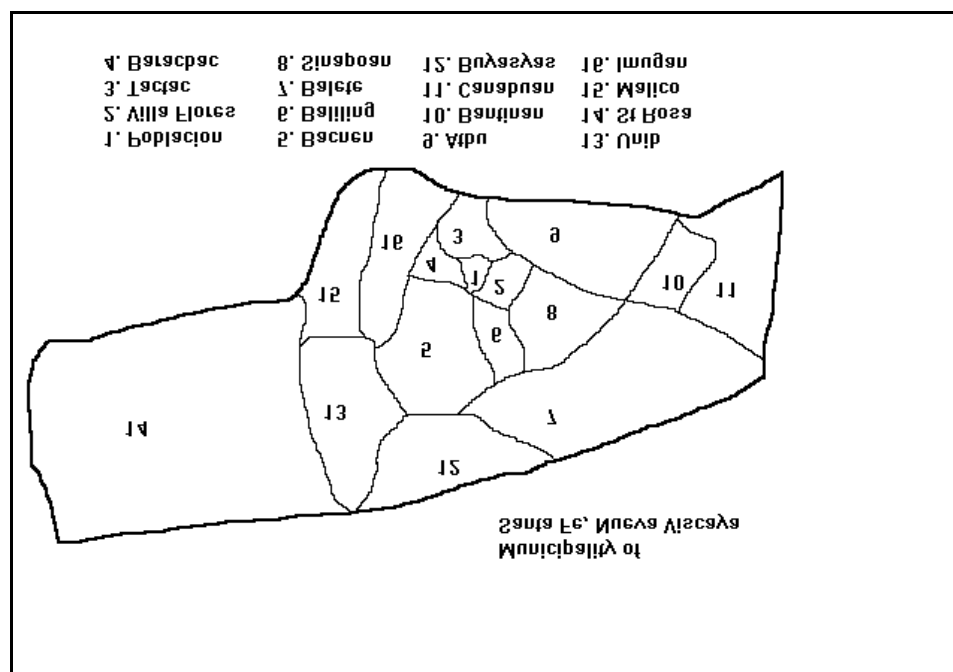
<sup>1</sup> The product of the number of households and the time taken to reach a water supply.

**Table 7.3: Access Indicators for Different Sectors**  
- household-hours -

Village	Access Indicators for Santa Fe Municipality			
	Water	Fuelwood	Health	Education
Atbu (9)	96	112	94	146
Bacneng (5)	120	60	100	114
Baracbac (4)	90	134	90	102
Unib (13)	80	72	72	160

7.25 Figures 7.7-7.9 provide a further illustration of how the process can be used. The municipality of Santa Fe in northern Philippines contains some 16 village clusters. Of these, three have no school at all; four have schools up to Grade 2; three up to Grade 4; and five have full-Grade schools. The full-Grade schools naturally act as a catchment for the other villages in the area. The thick lines in Figure 7.8 are a diagrammatic representation of the roads system. The numbers in Figure 7.8 represent the number of children of primary school age in the villages. The accessibility planning process provides detailed information on where the children of each Grade go to school, how they get there and the distance they travel.

**Figure 7.7: Administrative Map of Sante Fe Municipality**



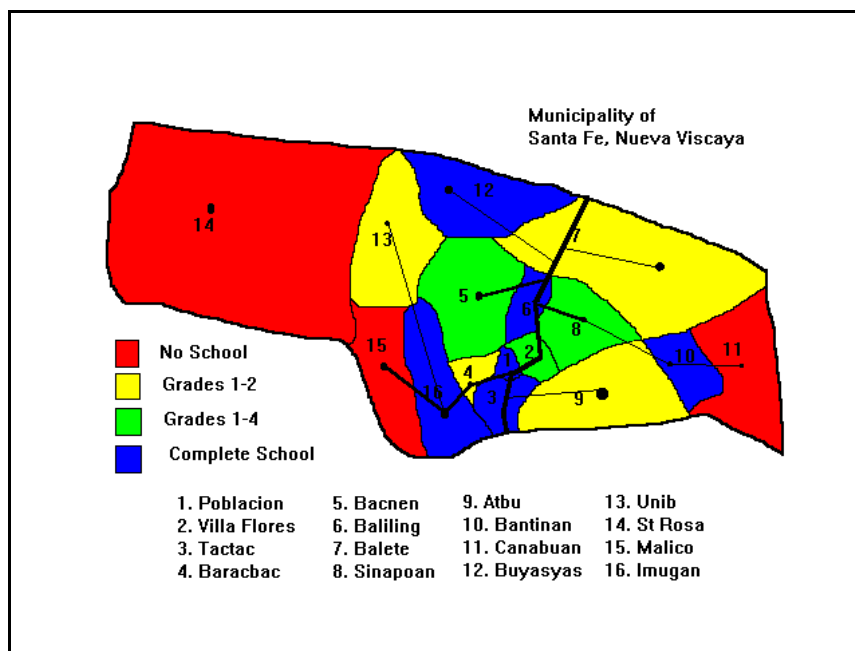
7.26 The national target in the Philippines is that each village cluster should have a full-Grade primary school. However, in the short term this is unattainable. With the limited resources available to the Municipality, decisions have to be taken on how to ensure that investments should be made to improve the access of the children to schools. This is not merely a question of building more classrooms. It has to be looked at in parallel with improving the transport system. To take an example: Village 11 has no school at all, though an adjacent village has a full-Grade school. Thus, the accessibility of the children in village 11 can be improved either by building classrooms in the village or by improving the transport system to village 10. The total costs of both options (construction, maintenance, provision of teachers, materials and so on) have to be compared in relation to the per capita benefit.

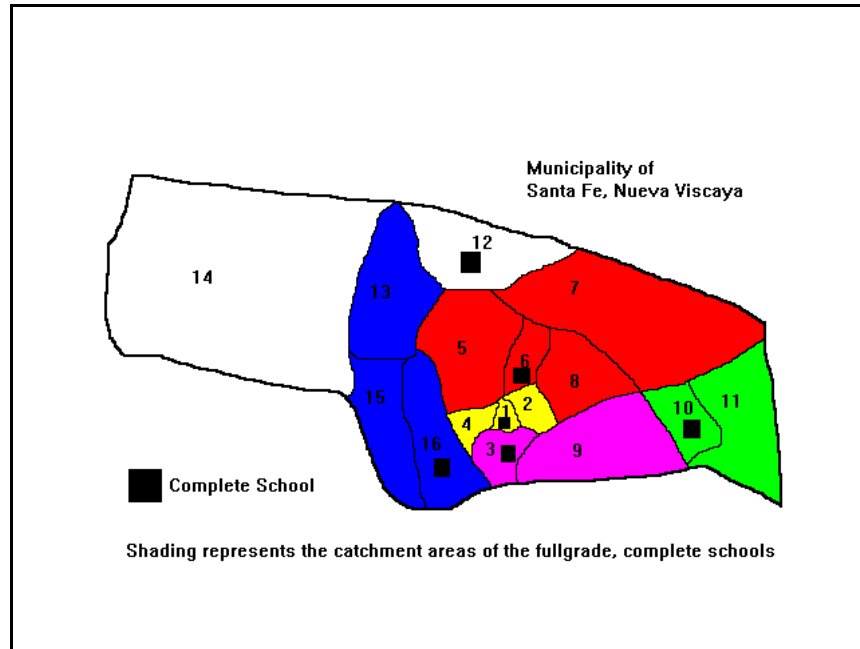
7.27 Other options begin to emerge. Children from village 13 are travelling to village 16 for Grade 5 and 6. It seems easier to travel to village 12, which appears to be under-utilised. Would it not make sense to improve the transport system from village 13 to 12 to make better use of the existing resources?

7.28 Figure 7.9 shows the catchment areas of the schools which draw children from other villages. The shaded areas are the catchment areas of the 6 full-Grade schools in villages 1, 3, 6, 10, 12 & 16.

7.29 Using these types of maps with the data from the accessibility planning process provides a basis for the selection of appropriate solutions.

**Figure 7.8: Classroom Needs in Santa Fe**



**Figure 7.9: Catchment Areas of Schools in Santa Fe**

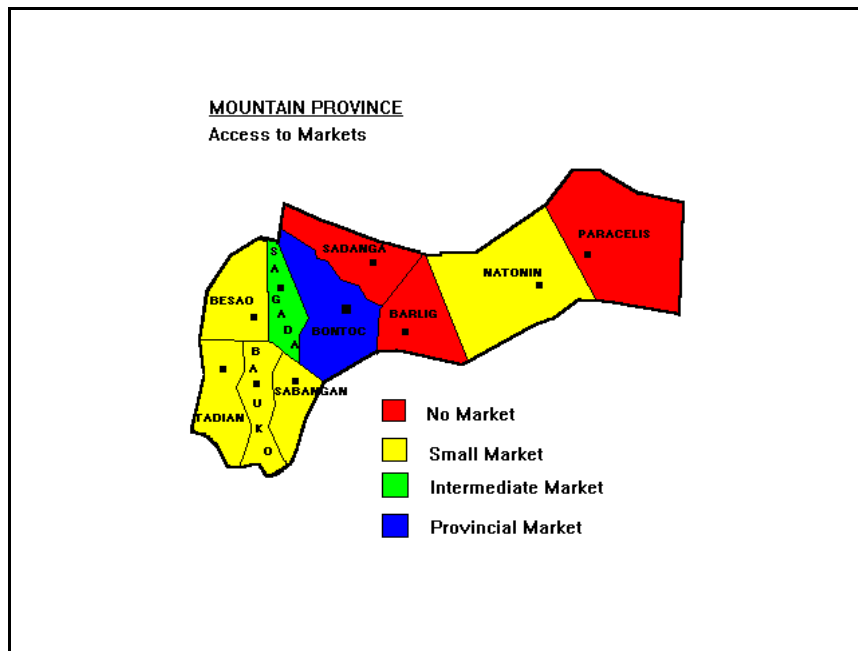
7.30 Clearly, at this level, Accessibility Planning is not dealing with sophisticated numerical analysis. It is more concerned with using simple accessibility indicators to provide a basis for informed judgement on the appropriate use of resources. It is related to a participatory approach where all the stakeholders can be involved in the decision-making process.

7.31 By producing the accessibility ratings in a graphical manner, the process is also made transparent - a significant factor in relation to local politics.

7.32 Returning to our previous example on education in Oudomxai Province in Laos, the data can be used to define where, based on levels of accessibility, priority should be given to the construction of new primary schools.

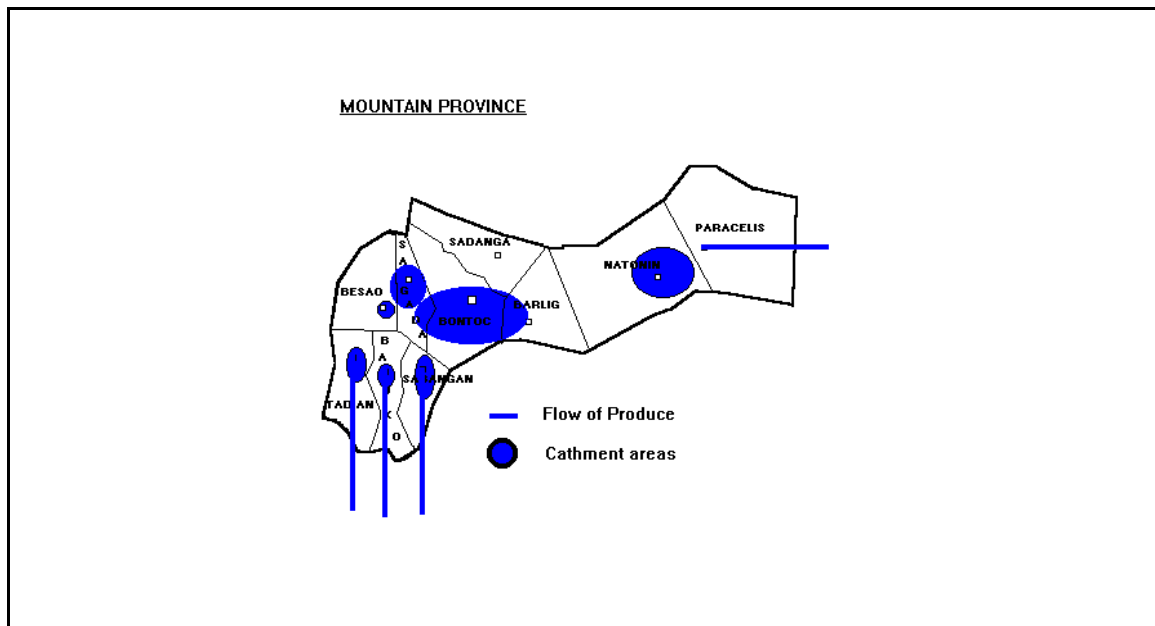
7.33 In one of the 5 Districts, only 6 % of the villages have complete, grades 1-5, schools in the village. In deciding where to locate new classrooms in this District the local planners decided to concentrate on those villages where the children had to walk more than one hour. The access indicator then used by the local planners was the number of households in each of these villages multiplied by 5 minus the number of grades that were available in the village. This meant that the bigger villages where there was no school of any sort obtained priority

7.34 We have concentrated so far on the use of accessibility planning in the social sectors. However, whilst the experience to date is more limited, it can also be applied to economic sectors, even at the local level. Figures 7.10 and 7.11 show Mountain Province in Northern Philippines.

**Figure 7.10: Mountain Province - Availability of Markets**

7.35 The Province comprises 10 Municipalities, of which three have no market, six have small markets, and there is one large market in the Provincial capital, Bontoc. Figure 7.11 shows the catchment areas of each of the markets, as identified through the Accessibility Planning process. This shows the small markets as having catchments which do not even cover the whole Municipality. The Provincial market draws from parts of three surrounding Municipalities, but no further. In the east of the Province - despite its proximity to the market at Natonin - people travel to the adjoining Province to sell their produce. This also applies to the three Municipalities in the south.

7.36 The local planner will be concerned over the lack of an effective marketing mechanism. Clearly, further information would be needed on the types and volumes of crops to be marketed. Nevertheless, Accessibility Planning data have provided information on (a) where crops are presently being marketed, and (b) how long it takes the farmers to reach those markets. In addition, the available data base provides information on the state of the road network and the level of the transport services in each municipality. Thus, much of the data necessary to the planning of improvements in the marketing system is already available. And the options could range from improving existing markets or constructing wholly new ones. They could also involve improving critical sections of the road network and encouraging improved transport services.

**Figure 7.11: Catchment Areas and Flows of Produce**

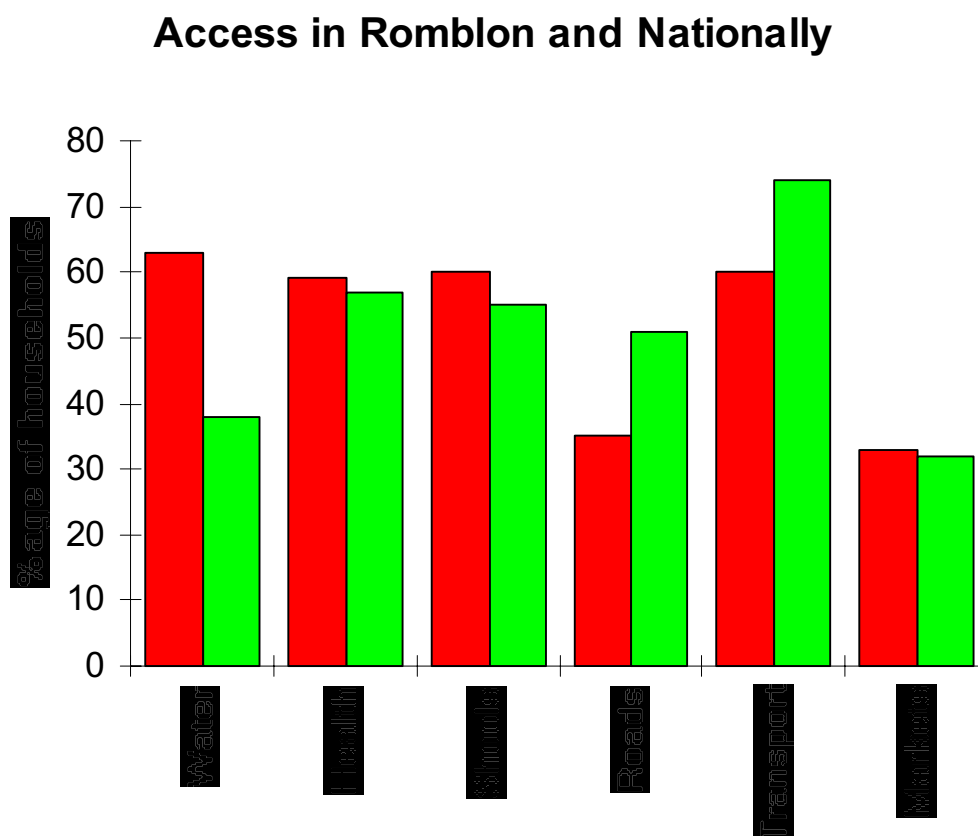
7.37 Conventional transport planning would assume that if roads were provided, farmers would take advantage of the opportunity of selling more crops - as if transport would be both readily available and affordable. Experience shows that this is too simplistic an argument. The means of transport have to be available, appropriate and affordable; markets have to be within a reasonable distance; and prices have to be attractive. Approaching the issue from the point of view of access - not merely from a road perspective - permits the consideration of a range of alternative solutions to the problem.

## Project Appraisal

7.38 At this stage of the planning process the planner is mainly concerned with assessing the costs and benefits of the proposed projects. However even before carrying out this analysis he needs to put the proposed investments into a broader context. This is especially true if some of the money for the investments will come from central government funds rather than from local taxes and revenues. In seeking those funds he will need to convince the central government that his area is in particular need. In the case of the sectors covered by AP he can do this by comparing his area with others.

7.39 Figure 7.12 shows the levels of access in the Province of Romblon in the Philippines and compares these with the national average for each of the sectors. This provides useful ammunition to the local planner in the sense that it will be easier to request central funds for investment in roads, where the Province is relatively poorly served, than for water supply where the Province is relatively well served compared with the rest of the country.

Figure 7.12 -Related Access



7.40 In assessing the viability of individual projects at the local level, again a variety of factors come into play. In general economic analysis of the costs and benefits at this level is the exception rather than the rule. More qualitative criteria are generally used. In the case of access, these will be based on the overall reduction of time to the largest number of people. This can be derived from the accessibility indicators.

7.41 The process does lead to defining investment options and eventually project proposals. For planning purposes, however, it is necessary to have indicative cost figures for the types of interventions that are being proposed. It is not necessary to know how much a particular road from A to B might cost. But it is necessary to have some idea how much a certain type of road is likely to cost in a certain terrain type.

7.42 This aspect is relatively poorly developed but an initial assessment would follow the lines set out in Annex 1. This is an example of cost guidelines for AP in Lao PDR.

- 7.43 There are principally two benefits from improved access:
- \* The improved quality of life that comes from better access to health services, education, water supply, markets etc.
  - \* The reduction in time in obtaining access to the required services

The first benefit cannot be solely ascribed to access improvements. Improved health certainly requires access to the service but it also depends on there being medical staff at the facility, medicines available and funds for the maintenance of the facility. In fact the provision of access would be just one part of the cost of improving health services and the benefits would be defined in terms of the improvement in health standards. Just as in the case of roads therefore access would be necessary but not sufficient to improve living standards.

7.44 The second benefit, reducing time, can however be solely ascribed to improvement in access. Improving access and thereby reducing time spent does have an economic value. Until now this aspect of accessibility planning has been explored only in a limited manner. In Chapter 8 this issue is discussed in more detail.

### **Project Monitoring**

7.45 Accessibility Planning is seen as a dynamic process which can be used to monitor changes in access at all levels of government administration. Updating the information - say, every three years - can provide both local- and national-level planners with a clear picture of relative priorities. The data base itself can also be useful in assessing the achievement of national targets.

7.46 With a modest expansion of the extent of enquiry, a regularly up-dated data base could also be used to monitor the impact of specific programs such as water, health, education or rural infrastructure. It could be written into programs as a monitoring tool to be used not only in baseline surveys of the effects of poor access and subsequently to measure impact. Such baseline surveys would also permit the more effective targeting of program interventions.

### **More General Applications**

7.47 The previous sections have concentrated on the role of AP in the local level planning system. This is the main application of AP planning. However the results of AP do have a use at the more general level.

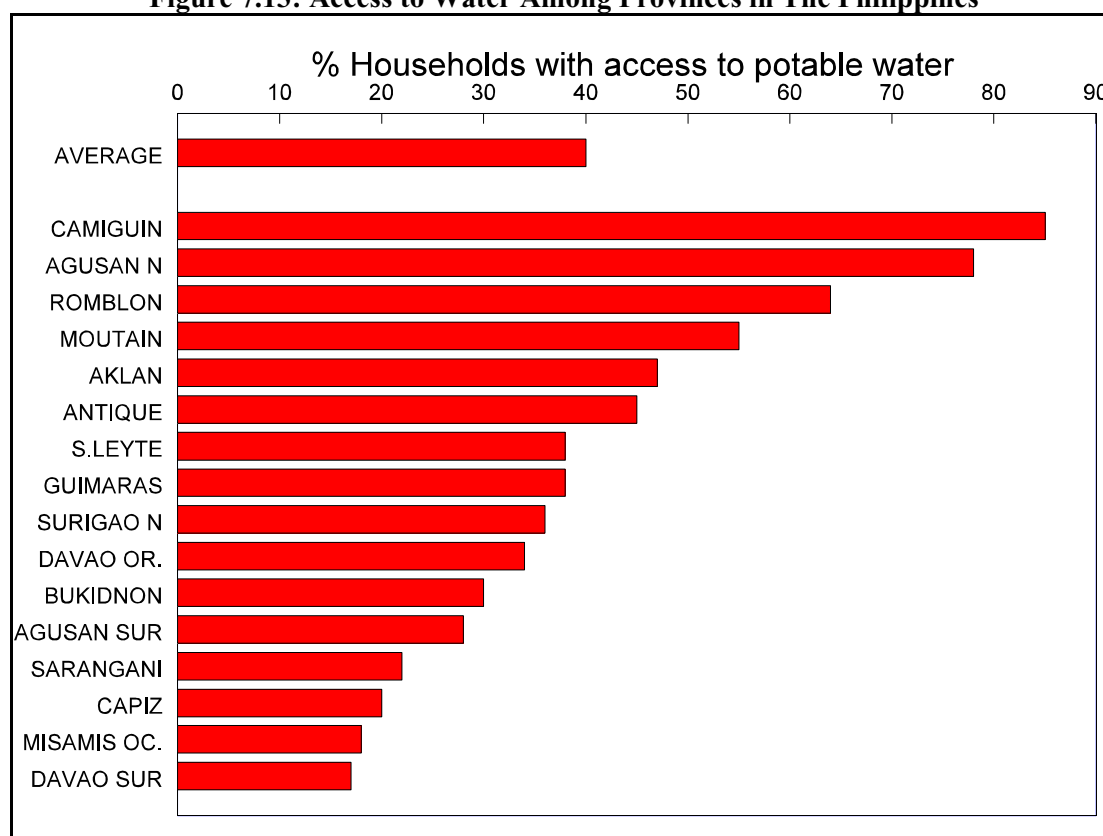
### **National Target Setting**

7.48 So far, Accessibility Planning has been described in terms of (a) its roots at the local level, and (b) its rationale as a tool in the planning process. Nevertheless, it also offers considerable potential for guiding some aspects of both planning and investment decision-making at higher regional or even national levels. Generating as it does a local-level data base, it can feed into geographical comparative analyses of relative advantage and disadvantage. At regional and national levels, such analyses are most likely to be feasible on separate sectoral bases - in terms of access to education, health, agricultural extension services and so on. Its power in this respect depends, of course, on how widely it is practised.



7.49 AP can be used to inform choices at the national level. Figure 7.13 shows the access of households to potable water by Province, in the Philippines. The national average is shown at the top. As can be seen, there is a huge variation among Provinces. The Government has already signed up for the targets of the UN Water Decade. That is to say, it intends to reach a target of 90% coverage of potable water by the year 2000. Clearly it may be better to concentrate on bringing Provinces at least to the national average of 40% in the first place.

**Figure 7.13: Access to Water Among Provinces in The Philippines**



7.50 In many countries a major share of the development budget is provided from external aid. Whilst donors will, of course, follow the general development objectives of the country, being accountable to their own constituents, they also have their own priorities. They may wish to concentrate on certain sectors such as water supply, or functions such as training. In the absence of any clear understanding of the relative need either among sectors or geographic locations, the decisions are often influenced by donor preferences. This can, where there are many donors, lead to duplication or even over-investment in particular sectors or regions. Equally, if the national government has limited data on the sectors, it is not in a strong position to be able to give concrete arguments regarding specific locational or sectoral priorities.

7.51 The importance of Accessibility Planning at the national level is not in terms of providing an overall planning system. It is its ability to provide planners - in this case in the water sector - with a benchmark in terms of the existing situation. This allows planning of programmes in the water sector to be based on the actual situation and permits planners to concentrate their effort where it is most needed.

## Poverty Monitoring

7.52 One of the problems for very poor countries is that it can be extremely difficult to set targets for programmes such as water supply, health services or education. Whilst governments can be expected to be well aware that major problems exist in these sectors, they may not have hard data on the extent of the problem. Maps may say where there are boreholes. What they cannot convey is whether such sources are in working order or the catchment area that each may serve.

7.53 Accessibility Planning data can be used to try to explain **specific poverty indicators**. Thus, is the level of infant mortality correlated with access to health clinics? Is the cohort survival rate related to access to elementary schools? Finally, the figures and the data can be fed into other national programmes in order to refine their respective targets and outputs.

7.54 As we have seen in Chapter 2, accessibility is related to poverty. Many countries now in the process of trying to define poverty alleviation programmes need data to develop realistic estimates of both the depth and geographical distribution of poverty. The data developed from the Accessibility Planning process can therefore be fed into this analysis. Research already suggests that income levels are related to overall levels of access; that child mortality is related to access to health services; that diarrhoeal disease incidence is related to access to potable water; and that enrolment in schools is related to the distance children have to travel. These accessibility factors can thus be proxy indicators of poverty.

### Box 11: Primary Education in Malawi

**In 1993, the new Government abolished all charges for primary education. The result was that school enrolment increased from 1.9 million to 3.2 million. This increase was estimated to require as many as 20,000 new teachers and 38,000 additional classrooms. The Government is now making strenuous efforts to achieve these targets. Its efforts are hampered, however, by the lack of inventory data on the condition of existing classrooms. For planning purposes, there are also no data on the catchment areas of the existing schools.**

**A UNDP/ILO project on accessibility planning is starting to provide this information. As the coverage of this project expands, it is expected to be possible to plan the construction of classrooms in relation to relative need.**

## Planning for Equity or Economic Growth?

7.55 Perhaps because the planning process was developed in generally subsistence economies, it has tended to concentrate on the social sectors. The emphasis has therefore been on equity of service. In more dynamic economies, however, there is a need to look at access in broader terms. Indeed if the time saved is to be put to good use, part of it could be used for economic activities. So far, the work in this area has been limited.

7.56 The process elicits answers on the main crops produced, what percentage is marketed, where, whether inputs are used, the extent of cottage industry, the extent of post-harvest facilities. What is presently missing is the more detailed data on volumes and value of both agricultural inputs and outputs, the value of cottage industry inputs and outputs and the like.

7.57 In terms of data collection, the extension into the economic sectors is not seen as a problem. The more difficult issue is in data analysis. The process is presently based on an equity principle in terms of access. Dealing with the economic sectors involves providing access to allow better opportunities for economic development. This relates to potential, not equity. Moreover, in the free market, where the government's role (unlike in the social sectors) is as facilitator, not instigator. Moreover, the ability and willingness to pay becomes a key issue.



## **Chapter 8 - THE WAY AHEAD**

8.1 In previous chapters it has been argued that AP is a substantial addition to the planning 'tool-box' - especially at the local level. The process is simple, effective, easy to use and inexpensive. It has also been argued that the process addresses the real needs of the rural population as against the perceived demand.

8.2 In Chapter 7, certain additional benefits of the process have been suggested - in particular, the way it can link in to higher levels of planning and targeting in the infrastructure sector. The major issue, however, is that it provides a solid basis for local level planning of rural infrastructure based on actual need.

8.3 This Chapter looks first at some of the key issues in the further application of AP and concludes by identifying some of the areas where additional research is required.

### **Planning for the Public and Private Sector**

8.4 The work on Accessibility Planning in the industrialised countries was rooted in transport policy being motivated by market and performance approaches. One of the advantages seen by the proponents of Accessibility Planning in the 1970s and 1980s was the move away from the strictly market approach to a needs-based approach.

8.5 In the work on Accessibility Planning in the developing countries, the emphasis has been on the planning of public investments that would improve access. Thus, the programmes in the Philippines, Laos and Malawi have all been concerned with developing an effective, needs-based approach to the siting of services to be provided from the government budget - mainly water supplies, health centres, classrooms and roads.

8.6 Whilst the work on access has derived from different standpoints and disciplines, in all cases there is a distinction between access needs that are met through the market mechanism and those that are met from public investment. The latter is well covered under the AP, the former less well.

8.7 One of the challenges facing Accessibility Planning in developing countries is how to deal with the non public sector investments or more precisely the market system. If access of farmers to market inputs is poor, or if it is difficult to market crops, how are these to be improved? Road infrastructure will be predicated on economic analysis and should therefore respond to the potential of the area - a potential

which is an access need by the farmer. But what of the transport services? Should they also be regulated only by the market mechanism or should they be treated partly as a public service which encourages development? AP can identify the need for a market centre but it is often the private sector that will be required to invest in such a facility.

8.8 The issue therefore reverts to a familiar one. To what extent can a planning system respond to a private sector issue? Take the case of agriculture, for instance. Certainly, the Accessibility Planning process can collect detailed information on the existing cropping and marketing patterns. It can also assess the potential for the development of agricultural production. It can even feed this information into cost-benefit analysis of road infrastructure. In a free market approach how much further can it go? Should support to local bus services, credit schemes for IMTs, provision of crop storage and other post-harvest facilities enter the public domain?

8.9 The simple answer is that it depends on each government's approach to public service provision. In a centrally-planned system as in Lao PDR, the government may feel it to be a responsibility to stimulate economic development by means of directly providing such services. In the Philippines, the government is more likely to feel that these should come from private initiatives.

### **Assessment of Benefits**

8.10 The theme of this book is that transport has to be seen in its broadest sense as in providing access. Equally, it has to be seen in relation to the demand for access as expressed through a planning process such as AP.

8.11 We can have some confidence that conventional approaches to rural transport provision will not guarantee success in terms of economic and social development. On the other hand, we have no solid empirical evidence to show the impact of a more integrated, holistic approach.

8.12 In the first place, it is now recognised that for real benefits to accrue the whole process has to involve the beneficiaries. Whilst community participation has become a development slogan, in the case of AP it is actually a vital part of the process. Until now, most of the experience with AP has been through the government structure, particularly at the local government level. Certainly, there has been involvement of the people in the sense that they are involved in identifying access problems and in data collection. Nevertheless, there is room for development of the process in terms of the involvement of the people in the identification of solutions.

8.13 The interventions that would emanate from the AP process would be concerned with improving both the mobility of the rural population and their access to services. They will be identified through a process which will combine the AP process and a community based participatory approach to project identification and implementation. Working at the village level, the AP process uses a Rapid Rural Appraisal technique to develop the data. The data are then analysed at the local level and priorities identified with the villages through participatory workshops. The process would need to both extend and develop the AP process. It would involve the communities from the start of the process. It would work with them to define their priorities and, by providing them with a series of alternative solutions, give them the opportunity to make their own decisions. Such issues such as marketing and agricultural potential would need to be the subject of detailed investigations.

8.14 The AP process is important in this regard as it provides the opportunity to put transport into a broader category of access provision. It allows the identification of the access problem and then permits alternative solutions which may be transport related or not. It also allows local people to set targets for achievement. Thus, if presently the average time for people to obtain water is 30 minutes, say, a target can be set (at the community, district or provincial level) for this to be cut by half over, say, a two year period. Such targets can, of course, reflect those that might be set at the national level.

8.15 In their review of rural transport planning in Sub-Saharan Africa, Connerley and Schroeder emphasise that the direction in which this should be going relates to a broader definition of transport; an involvement of all the stakeholders; and a recognition that transport is merely one element in a complex process.<sup>1</sup> They point out that it is not possible to define a detailed check-list or highly structured set of tasks for rural transport planning at this stage. This is partly because there is no hard evidence or experience on which to base such a list. In addition, however, it may be that such a structured approach already limits the possibility of alternative solutions to what are seen as transport problems. It is evident that for Accessibility Planning to be comprehensive, it will need to integrate these economic aspects if for no other reason that the provision of a road from public funds actually is predicated on private sector benefits.

## The Value of Time

8.16 The one obvious economic benefit of access improvement is time saving. As has been shown in previous chapters the amount of time spent by rural households on obtaining access even to the most basic services is substantial. If, as has been argued, this expenditure of time is a serious burden and limits the potential for social and economic development, then it would be sensible to put a value on the time that is saved from the improvement in access.

8.17 Time saving is, of course, a significant element in the economic appraisal of transport programmes in the industrialised world. The application of the same logic in developing countries has been less successful.

8.18 In the first place there is a reluctance to accept that time savings in the developing countries are significant in economic terms.<sup>2</sup> There are several reasons for this:

- \* the argument which states that savings in time are only of value if they result in productive use of that time
- \* the difficulty of differentiating between trips in "working time" and "non-working" time in the rural areas.
- \* the framework in which the value of time is assessed relates to motorised vehicles and roads. Looking at time saved into the framework of the rural areas where most trips are on foot, are multi-purpose and are generally not on a road requires a change of approach.

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1 E. Connerley & L. Schroeder: Rural Transport Planning. Sub-Saharan Africa Transport Programme Working Paper No.19. World Bank. 1995.

2 J.Howe. Valuing Time Savings in Developing Countries. Journal of Transport Economics and Policy. Vol.X No.2 May 1976.

8.19 It is not difficult to define a value of time spent on transport. The use of the agricultural wage rate or the marginal productivity of labour or some other value related to rural income may be open to academic argument but the fact is it is possible to derive a figure which reflects the opportunity cost of time spent on transport.<sup>3</sup> The more important issue here is gain acceptance of the idea that time spent on obtaining access is a significant restriction in the daily lives of rural people. If this is accepted then the way that time is valued becomes an issue for transport planners.

8.20 One suggestion has been that, rather than valuing time, the emphasis should be on the willingness to pay. If rural people put a value on the time that would be saved in having a water supply system in their village that will be reflected in their willingness to contribute to the cost of the system. This is of course implicit in many rural development programmes where a commitment by the community to provide labour and local materials is a condition for the government or a donor to provide the facility whether it be a clinic, water supply or even a road. The difficulty here is that often the initiative comes from the funding agency rather than the community. Nevertheless this is a possible way forward in that in defining projects for a community their willingness to be involved in the cost of the facility would be a representation of their need for the project.

8.21 At this stage therefore there is no clear solution. However, in defining appropriate interventions to improve access some measure of the value placed by the community on the time saved has to be part of the evaluation process.

8.22 Accessibility is, as Jones has stated, a more complete measure of transport system performance, bringing together the transport system with location of facilities - linked by the concept of mobility.<sup>4</sup> However, if one is to proceed with accessibility as a basis for planning there will have to be an assessment of the benefits of improving accessibility.

8.23 The attempts that have been made to date have been piecemeal and not very structured.<sup>5</sup> The attempts, for instance, to compare the benefit of the provision of a footpath with that of the introduction of IMTs seem to lead up the same blind alley that has dogged rural road evaluation. Certainly the costs of interventions have to be calculated. However, how do we assess their benefits?

8.24 If the emphasis is on looking at the time saved and trying to place a value on it, other problems arise. In the first place, time may not actually be 'saved' by means of improving access. Studies have shown, for example, that the provision of potable water in more easily accessible positions actually results in greater volumes being collected, hence more time spent in collecting it, even over shorter distances. In the second place, time can only be valued if it can be put to 'productive' use. Thirdly, for women in particular, any time saved may be devoted to better child care, for housework or for resting (thus perhaps improving their own health). What value should be put on such things?

8.25 In any case, this may not be the correct direction. Access, like transport, is a facilitating mechanism. We should not therefore fall into the same trap as the roads lobby and try to ascribe benefits to access as such. At one level the improvement of access is part of the process of improving health,

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3 N.Sieber. op.cit.

4 P.M. Jones: Mobility and the Individual in Western Industrial Society - in P. Nijkamp & S. Reichmann (eds.): Transportation Planning in a Changing World. Gower Press. 1987.

5 Farhad Ahmed: Rural Transport Planning in Bangladesh-Towards a Comprehensive and Integrated Approach. M.Sc. Dissertation. University of South Australia. 1996.



improving education or improving agricultural production. It is part of the cost of developing those sectors. The benefits should be described in relation to the particular sector and not specifically in relation to access as such.

8.26 However at the level of deciding which intervention best meets the need to reduce the time spent, placing a value on the time, either directly by ascribing a cost figure to it, or indirectly through assessing the willingness to pay, is necessary to make choices between several options.

## Future Research

8.27 The AP process clearly has developed into a useful planning tool, especially at the local level. In the future, however, there are three broad areas where further work is required to make the process more comprehensive.

8.28 First, AP needs to be able to incorporate the **economic sectors** in a more effective manner. In the case of social services such as water, health and education the concept of providing the optimum service to the maximum number of people applies. In the case of access to employment, access to markets and to other income-generating activities the principal of equity no longer applies. The issue here would be to provide an enabling environment in which the potential for economic activity can be maximised. This will require that data on agricultural potential, marketing systems, labour supply and availability would need to be fed into the analytical process.

8.29 In practical terms, this would mean identifying those facilities that the government can provide and assessing their most appropriate location to encourage economic activity. Roads are the obvious example of this. However, storage facilities, markets, wharves, slaughter-houses and post and communications facilities can all be planned in relation to maximising the economic potential of an area.

8.30 The second area is that of **extending the level of participation** in the process. Whilst in theory many of the social services should be provided by the government, in practice there is a growing tendency to rely on local resources to supplement or even substitute for government funds. It is therefore even more important that the planning process involves the communities throughout the process given that they will be asked to foot the bill.

8.31 In practice, this would mean applying the process at the village level. This has already been tested in Lao PDR and the experience will form part of a forthcoming publication on the subject. The intention is to apply the simplified process at the village level feeding into the already proven process at the level of local government administration.

8.32 The final area that needs further work is that of **target setting**. In general, of course, the targets set for each sector should relate to some overall national or regional target - such as that all households should be within 3 Km. of a health centre. Where realistic targets exist, the local-level planner can set a local target in relation to the national one and the existing condition in the area concerned.

8.33 In many cases, however, planners may have no such national guidelines to help them. It would therefore be useful to have some indicative figures. Research does already provide some guidance here. Over certain distances, for instance, households stop sending their children to school. There are also limits to the distance that people will walk to obtain safe water. Further research looking at health, education and water programmes would help to identify the distances that are acceptable.

8.34 One of the solutions that is constantly promoted to improve mobility, if not access, is IMTs. Clearly, IMTs have a very important role and in some countries - particularly in Asia - they are used spontaneously by people who cannot afford motorised transport. In addition, there is a marketing and support mechanism related to them.

8.35 Nevertheless, there has been a tendency to see IMTs as the solution to rural mobility problems. The plain fact is, however, that attempts by outside agencies to promote their introduction or use have had limited success. Indeed, even where there has been an interest in purchasing IMTs, ownership has not necessarily resulted in their extensive use.<sup>6</sup>

8.36 At the very least, there is a need for an objective assessment of the initiatives that have taken place over recent years to promote the use of IMTs. A clear differentiation would have to be made between the active promotion of IMTs by external agencies compared with their more spontaneous use - as exemplified, for example, in Vietnam, the Philippines and Indonesia.

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<sup>6</sup> Mannoek Management Consultants and ILO. Local Rural transport in three Districts of Zimbabwe. Draft Report. 1997.



## **Annex 1. An example of the development of cost guidelines from Lao PDR.**

### **General**

1. During the T2 training the priorities were set for each zone and for each sector. The priorities were different for each zone. To be able to develop a full action programme these priorities need to be translated into actual defined projects. This of course means looking at each priority and assessing exactly what is required. In the case of water supply for instance what type of water supply system is the most appropriate for the area, what is the overall demand and how many people will benefit from it.

2. One of the key parameters in this process will be the cost of the service to be provided. The higher the cost the less money that will be available for other services. In addition if the cost is high then the fewer the number of people that can benefit. Schemes that rely wholly on funds being made available to the communities will take up more of the money available. Those that depend on counterpart funds or resources coming from the communities will take up less.

3. In developing an action programme it is important that the data used for costing is reliable. Whilst at this stage it is not necessary to have very detailed costs for the schemes proposed, it is important that they are realistic. If they are not then when the detailed schemes are proposed the overall cost of the programme for the District or the Zone will be inaccurate resulting in changes in the action programme.

4. Improvements in access can involve one or more of the following costs:

- a. Investment Cost: the initial cost, incurred in the year the intervention is implemented, eg. the cost of constructing a health station or a road.
- b. Operating Cost: the recurrent cost of operating a facility, eg. for a school the salaries of the teachers and the costs of the consumable materials.
- c. Maintenance Cost: the recurrent cost of maintaining infrastructure in good condition, eg. the cost of maintaining school buildings or a road.

5. Given that the proposals will be prepared by Provincial and District Authorities, it is necessary to take into account the following points:

- a. the investment cost to the local authority will be reduced if communities participate on a self help basis in the provision of the facility.
- b. if the communities, or the private sector, are involved in the construction, operation and maintenance of the facility the cost to the local authority will be reduced.
- c. NGOs or the private sector may take responsibility for the implementation of some interventions. However the local authority should still assess the investment, operating and maintenance costs during the resource analysis.

6. The data presented in this module are based on a comprehensive collection throughout Lao PDR. To the extent that has been possible they come from practical experience from projects and programmes that have been recently implemented in the country. Rural development programmes are a relatively new feature in Lao PDR. The sample of projects in certain sectors has therefore been relatively small. For example, in the case of rural roads there has been very few such programmes. This means that we have had to make the best estimates from the limited data that is available.

## Water Supply

7. The most effective intervention to improve access to water is to provide an improved water supply system. Given the serious lack of water supply systems in the country, this will involve the installation of a new system rather than the rehabilitation of an existing system. The type of system that is most appropriate for a community (eg. gravity system, well, hand-pump, deep tube-well, etc.) will depend primarily on the terrain and geographic conditions. The cost of the installation will depend on the type of system required and the number of people it has to serve. Water supply systems do not incur operating costs, but they do need to be maintained. However the preferred approach is that the system should be maintained by the community that it serves. Thus, for the purpose of resource analysis, the standard cost data required is:

- a. Data on the types of water supply system appropriate to different terrain and geographic conditions.
- b. Standard costs for installation of different types of water supply system, to serve different sizes of population.
- c. Standard costs for rehabilitation of different types of water supply system.

8. In Lao PDR the choice will be between three types of system:

- a. Hand dug shallow wells
- b. Spring protection generally with a gravity feed to the beneficiaries. These are particularly relevant in the more mountainous areas of the country.
- c. Machine dug bore holes with the attendant hand pumps.

9.. In addition rain water jars are also in use. These are made by the villagers themselves with materials and some form of training provided by the Institute of Clean Water (ICW). Total cost of a 2 cubic metre jar is about 33 US \$ with about 25% labour cost. Water jars have not been very successful because they need to be used with households buildings having galvanised steel roofs which is quite rare.

10. Standard dug wells as specified by the ICW emphasize the protection against contamination by polluted surface water. The well is 1.0 m. in diameter and 7-10 m. deep. The wall is lined with concrete ring and the perimeter area of the well is protected by concrete platform. Excavation of the well is done by local labour. Concrete rings for lining the well are also made by the villagers themselves with moulds

and some basic form of training provided by ICW staff. In some situations, villagers decided to include additional items at their own cost eg. roofing, well covering and hand pump (additional hand pump cost about 80 US \$ per unit).

11. Dug wells are also being provided by various projects and NGOs. More details of these can be found in the Note on the Guidelines.

12. Typically, a gravity feed system consists of:

- a water collecting structures at the water source usually situated in high mountain area.
- main pipe to transport water to the village area, the pipe is usually HDP, transporting distance can be up to 2 km.
- a concrete storage tank in village areas.

Sometimes, a pipe network to distribute water within the village area is also provided.

13. Bore holes are more expensive, although in flat areas may be indispensable. Because of the drilling rig, they require some form of road access to the site. The other aspect of bore holes is the need to ensure that the full cost of the rig is taken into account.

	Gravity Feed Systems.	Hand Dug Wells	Boreholes
Construction	\$15-30 per Household(a)	\$150-250 per well depending on depth.(b)	\$1,250 per borehole (c)
Operation and Maintenance	By the communities. 2 in the community are responsible for collecting money from the households	By the community	By the community

(a) Cost includes provision of materials and technical assistance only. Labour and some materials are provided by the Government

(b) Approx. 40% of cost coming from the community

(c) Assumed 25 boreholes a year, initial cost \$100,000, 10 year life, 10% interest.

14. In the case of hand dug wells and boreholes the overall price has been given. Some agencies have provided a cost per household or per user. This clearly requires an accurate assessment of the coverage of the system. However the IRAP process can identify the number of users and consequently the cost per user.

## **Health Facilities**

15. Access to primary health care can be improved by the provision of a Health Station, and of health personnel. The provision of a Health Station involves an investment cost and a recurrent maintenance cost.

16. The provision of health personnel is a recurrent operating cost to the government. Health personnel must also have access to supplies and medications, which are a recurrent cost.

17. It may be possible to envisage the recovery of the costs of personnel and supplies from charges to patients. Hence the standard cost data required is:

- a. Standard cost of constructing a Health Station.
- b. Standard cost of maintaining a Health Station per annum (most easily expressed as a percentage of the construction cost).
- c. Standard cost per annum of health personnel, on both a 'full-time' and 'regular visit' basis.
- d. Standard cost per annum of providing a Health Station with essential supplies.

18. The Ministry of Health base their planning on a 10 Kms catchment area. This is complemented by the target that each health centre should serve between 1000 and 2000 people. These of course are global planning figures and should be used as a guide only. The IRAP planning process provides a more specific means to identify the actual catchment area.

19. A standard design for health centres has been prepared as part of the Asian Development Bank programme. This consists of the dispensary itself which has two beds and basic furniture, a separate kitchen block, house for the medical assistants and a toilet. This can be considered as the ideal that should be achieved if funds are available. Where local communities are prepared to contribute labour and materials a less rigorous design may be acceptable.



Construction	\$50 - 150 per sq.metre
Maintenance	7% of construction cost per annum
Operation- Personnel 2 Medical Assistants	2 @ 400,000 gives 800,000 Kip per annum
Operation- Basic Medicines	Medicines provided by central government

## Primary Schools.

20. Access to education can be improved by the provision of a primary school and of school teachers. The provision of a school, or of additional classrooms involves an investment cost and a recurrent maintenance cost. Provision of teachers is a recurrent operating cost. Teachers must have access to supplies, which are a recurrent cost, if they are to be effective. Hence the standard cost data required is:

- a. Standard costs of constructing a school (based on the number of classrooms).
- b. Standard costs of maintaining school buildings per annum, based on the number of classrooms
- c. Standard cost per annum of a teacher.
- d. Standard cost per annum of providing essential educational supplies.

21. Under the school building programme of the government, standard designs have been prepared for primary schools. These provide 5 classrooms of 6m by 7m and a room for the teacher.

22. Some NGOs have also constructed primary schools to different standards. These projects usually rely on local participation in terms of local labour and materials and may therefore not reach the full design standard set out in these standard designs.

Construction	\$50-150 per sq metre.(1)
Maintenance	By the communities
Operation - Teacher	Approx 400,000 Kip per annum
Operation - Educational Supplies	From the central Ministry to the Teacher only

(1) see Notes on the Guideline

23. The Ministry of Education have a target catchment area for primary schools of 3 Kms from the school. However the IRAP process will be able to provide a more accurate figure on the actual catchment area.

## **Public Market**

24. In some cases it may be appropriate to improve access to crop marketing facilities, or to consumer goods, by constructing a new public market. This will involve investment, operating and maintenance costs. However there may be a degree of cost recovery from market fees. Thus the standard cost data required is:

- a. Standard costs of constructing a public market (based on the floor area of the market).
- b. Standard costs of maintaining the market facilities per annum, based on the size of the market (most easily expressed as a percentage of the construction cost).
- c. Standard personnel costs per annum of operating the market.
- d. Degree of recovery of recurrent costs from market fees.

25. As yet there are very limited data on the costs of public markets. For the construction costs a conservative figure of \$75 per sq.metre, based on a concrete floor and timber columns and roof seems appropriate.

26. The cost of maintenance may be borne from a small tax or levy on the market vendors.

27. It is not at this stage possible to provide figures in relation to the operation and maintenance. (see Note on the Guideline)

## Roads

28. Improvement of rural roads is an important means of improving access for a number of different purposes. Road improvement involves investment, and subsequent maintenance, costs. The structure of rural road costings is quite complex. Roads can be constructed to different standards:

- a. Earth road: this normally involves work to raise low sections, shape the running surface, provide side-drainage and cross-drainage (culverts) and to gravel steep sections.
- b. Gravel road: an engineered road with shaped running surface, side and cross-drainage, and gravelled surface.

29. In addition it is often necessary, as part of road improvement works, to construct water crossings - drifts or bridges.

30. The main factors which determine road construction costs are:

- a. the standard of road to be provided
- b. whether the work involves construction of a new road or the rehabilitation of an existing road which has deteriorated
- c. the length of the road
- d. terrain, whether the road is in flat, rolling or hilly areas
- e. the number of water crossings required
- f. the number of drainage structures

31. Road maintenance costs depend upon the standard of road, the traffic level, and the terrain. Different types of road maintenance are required:

- a. routine maintenance, which comprises basic preventive maintenance and minor repairs, and should take place throughout the year

- b. periodic maintenance, which is required at intervals of several years, eg. re-gravelling of rural roads
- c. emergency maintenance, which is the urgent response to unforeseen damage and cannot be programmed

32. For planning purposes, the costs of road improvements can be estimated from the following standard cost data:

- a. For each of flat, rolling and hilly terrain, the standard cost per km of:
  - i. constructing an earth road
  - ii. rehabilitating an earth road
  - iii. constructing a gravel road
  - iv. rehabilitating a gravel road
- b. Cost per metre of constructing:
  - i. drift
  - ii. bridge
- c. For each type of road, and for each type of terrain:
  - i. the annual cost per km of routine maintenance (most easily expressed as a percentage of construction cost)
  - ii. the cost per km of periodic maintenance, and the frequency with which it should be carried out (eg. every three years)

Note: emergency maintenance costs should be covered by means of an annual provision for the overall road network in the budget of the relevant Local Authority.

33. In addition one can construct a road using either machines or labour or a mixture of the two. Conventionally roads have been constructed using machines. However this has several difficulties. It uses up foreign exchange because the machines have to be bought from abroad. It creates very little employment or income in the areas around the road. Moreover machines do break down and in rural areas it is often difficult to obtain spare parts. More recently Lao PDR has tested out the use of labour based methods which, whilst still using some equipment rely on labour for the main activities.

34. The data for costs for rural roads built by machines is limited. The data for labour based methods comes from the various projects that have recently been implemented.

35. It has to be said that the range of cost data from the limited sample is very large (see Notes). In addition it is difficult to compare like with like. Some rural roads have been built with community involvement, some with cash wages, some with food aid. Some roads are not in fact completed in that major box culverts and small bridges have not been built at the time of the road construction for lack of funds. The figures provided below therefore represent the best estimate

that one can have at this time of a reasonable cost. The figures are an amalgam of existing figures and assume that:

- a. box culverts and small bridges are not included in the price.
- b. major clearing activities are carried out by machines
- c. the number of culverts provided varies with the terrain type
- d. the road is provided with proper side and cross drains

	<b>Flat</b>	<b>Rolling</b>	<b>Hilly</b>
Constructing an earth road	\$8,000	\$13,000	\$21,000
Rehabilitating an earth road	\$5000	\$9,000	\$16,000
Constructing a gravel road	\$12,000	\$17,000	\$25,000
Rehabilitating a gravel road(1)	\$9,000	\$11,000	\$13,000

(1) assumes reshaping of the formation, shaping of ditches and replacing of culverts

**Notes:**

- a) Based on 5m carriageway width (add 15% for 6m wide)
- b) Culverts 6m. wide. 60 cms @ \$26 per metre, 80 cms. @ \$35 per metre. In rolling and mountainous terrain an average of 4-5 culverts per kilometre would be normal. In Flat terrain this would be less, of the order of 3-4.
- c) Gravel cost, Excavate, Load, Haul, Unload. 27000 Kip per cu.m. = \$2.7 per cu.m. Add 10% for spreading by hand
- d) Labour cost 1800 kip per day

**Maintenance**

36. Road maintenance consists essentially of two parts, routine and periodic. Routine maintenance is carried out throughout the year and consists of certain basic operations to keep the road in a reasonable condition. Periodic maintenance is done on a 2-3 year cycle and involves reshaping the road and the ditches and in some cases regravelling. As a rule of thumb the annual cost of maintenance is estimated at 3% of the construction cost. From the work that has been carried out in Lao PDR it is possible to suggest the following figures for routine and periodic maintenance for 5-6 metre gravel roads.

	\$ per Km
Routine Maintenance	100-150
Periodic Maintenance	400-500

### **Bridges**

37. For the type of roads that will be under consideration in the IRAP process, the bridges are unlikely to be longer than 10 metres. If they are then the cost of the bridge will probably be prohibitive and alternative routes or solutions will need to be found.

38. Again very little data are presently available on small bridges. The National Transport Study carried out a desk study which resulted in the following figures for bridges with wooden decks and steel beams:

With Concrete abutments	\$6,000 per metre
Masonry abutments	\$4,000 per metre
Timber abutments	\$3,500 per metre

### **Footbridges**

39. Footbridges of various lengths have been built by local people in the mountainous areas. For all but the local people many of them would be considered dangerous. Only a limited number have been built by government agencies or externally funded projects.

40. In Oudomxai for example the UNDP/UNCDF project have constructed a 75 metre span, 1.8 metre wide wooden suspension bridge. The cost of materials, principally for the abutments was 8.6 million kip and the estimated cost of the locally provided materials and labour was another 5 million. This gives a total of 13.6 million kip or \$14,000.

## **Irrigation**

41. The cost of irrigation schemes, like all other infrastructure, comprises of three elements, viz:

- a. The construction costs including water retaining structures, weirs, canals and where necessary pumps.
- b. The operating costs in particular the regulation of the weirs and the canals.
- c. The maintenance of the system.

42. In the case of the construction costs this should also include the cost of the survey and design. This is particularly important in the sense that many schemes have been built without a full knowledge of the availability of the water and the potential for its use.

43. The cost of the construction is dependent on a whole variety of factors such as:

- a. topography
- b. need for storage or pumping
- c. the command area of the scheme
- d. the overall function of the scheme

44. It is natural to think of irrigation schemes in terms of ensuring a dry season crop. In fact, in many instances the immediate need for an irrigation scheme, in particular small scale ones, is to provide better control of the water in the wet season either to secure the cultivation of the already cultivated land or to expand the area of wet season cultivation. Expanding the cropping season to include the dry season generally involves a major investment requiring central government or donor funding.

45. In the Notes to the Guideline these issues are discussed in more detail.

46. Small to medium scale Irrigation schemes generally consist of some simple water retaining structure of earth, stones, gabions or concrete, weirs, traditionally made of timber but being replaced by stone or concrete, to control the flow into the canals and a system of canals to channel the water to the fields.



47. Whilst this guideline is concerned with costs it is worth saying a few words about the benefits of irrigation schemes. Given that many of the small scale schemes are concerned with either securing or in some cases expanding the wet season crop, the overall benefits may be relatively small. Bringing new areas under cultivation, which would produce significant benefits, is a slow process involving land clearing, canal digging and other factors. In a study carried out by the Quaker Service Laos of 39 small schemes it was concluded that whereas it took only one year to operationalise projects aimed at securing the existing paddy area, it could take as much as two and a half years to make operational projects aimed at expanding the cultivated area.

48. The cost figures given for construction assume an input from the communities in terms of labour and local materials. The figures have been categorised according to the objective of the scheme.

Type of Scheme	\$ per hectare(a)
1. Providing security of water to existing cultivated area	500
2. Providing security of flow but also expanding the area for wet season cultivation	1000
3. Providing both wet and dry season cultivation	2000-7000

(a) In addition one should add a figure for schemes type 2 and 3 for survey and design. This would be of the order of \$200-300 per hectare.

49. In general the operation and maintenance of small scale irrigation systems is considered to be the responsibility of the communities benefiting from the system. Experience shows that this cannot be left to chance. The setting up by the communities of a Water Users Group and the provision of some training to them is considered indispensable.

50. Often the repair of the system requires the purchase of materials such as cement. The WUG needs therefore to have some means to raise funds for this. In general this has been done by charging a small levy in terms of Kgs of rice from the beneficiaries.