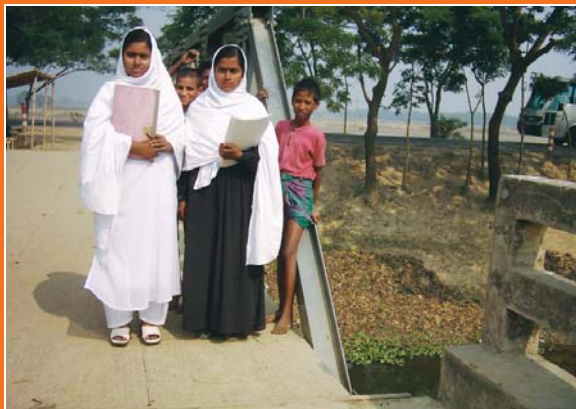


Making Infrastructure Work for the Poor

Synthesis Report of Four Country Studies
Bangladesh, Senegal, Thailand and Zambia

Selim Jahan Robert McCleery



The four country studies - Bangladesh, Senegal, Thailand and Zambia - were done under a joint Japan-UNDP project on Making Infrastructure Work for the Poor. The country studies were preceded by two concept papers: one on linkages between infrastructure and poverty reduction and the other on governance issues regarding infrastructure.

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I. INTRODUCTION

“Infrastructure” is a broad concept that encompasses many of the obvious, physical features of civilisation, such as roads, bridges and highways; transport and ports; basic utilities such as power, water and sanitation; and also schools, health care facilities and public buildings. But more relevant to the goal of poverty reduction are infrastructure services, which include the social and economic benefits associated with infrastructure per se.. Infrastructure can be lumpy, huge, nationwide, but it can also be small, locally maintained and community-based. The benefits from the first type of infrastructure may trickle down to poor people through generation of growth, but it is the small, local and community-based infrastructure that may make a direct contribution in raising the well-being of poor people. Moreover, poor people should not only be beneficiaries of infrastructure, but should also be active participants in decision-making with regard to the development and operations of the services infrastructure brings. And small community-based infrastructures may be better suited for that.

Infrastructure growth and services can play a critical role in economic growth and poverty reduction-and also enhances human security, particularly of poor people, by contributing to their food security, job security, health security, community security, personal security and environmental security. Moreover, infrastructure development and services assume a special role in the post-conflict transitional at stages of conflict-ridden countries. Yet the links between infrastructure growth and poverty reduction are neither automatic nor one-directional. Important and complex issues are involved: numerous infrastructure projects have been hobbled by non-economic rationales, lack of proper feasibility studies or cost-benefit analysis, inadequate provision for operations and maintenance (O&M), and so on. And even in cases where infrastructure development and services have demonstrably contributed to economic growth, the benefits have often not been translated into improvements in the lives of poor people-partly because of design problems, partly because of the non-participation of poor people in formulation and implementation, partly because of adverse social and environmental impacts and largely because the initiatives were not local and community-based.

The effective and sustainable provision of infrastructure products and services can have a considerable impact on achieving the Millennium Development Goals (MDGs). Traditionally, the development impact of infrastructure provisioning has been assessed principally in terms of the alleviation of constraints to higher growth and enhanced

income generation. In the context of MDGs, it becomes essential to identify infrastructure services that directly contribute to getting children to adequately equipped schools, enhance the access of poor families to health services, and broaden the geographical spread of public health programmes. In addition, the MDGs require infrastructure provisioning to improve urban habitats, universalise access to safe drinking water and improve environmental sustainability. MDGs will never be met if we ignore local and community level investments in infrastructure services-roads and bridges, water supply, health care services, electricity etc.

During the 1990s, many in the international development community viewed assistance for infrastructure with considerable skepticism on three grounds. First, though important for economic growth, infrastructure investment had little relevance to poverty reduction. Second, actual benefits from infrastructure were significantly less than anticipated. Too often, there have been negative rather than positive consequences for poor people, including environmental damage to which poor people are most vulnerable. The issue of sustainability of infrastructures has also been raised. Third, weak governance and institutions gave way to corruption, distorted public investment choices and neglected maintenance, thereby lowering infrastructure's contribution to economic growth and diverting benefits intended for poor people.

Nevertheless, there is now wider recognition in the international donor community, that if governance and institutional frameworks are strengthened, capacities are developed, the linkage between infrastructure and reduction of poverty can become stronger. Infrastructure has been found to provide multiple benefits-both economic and human developmental. Attempts have been made to learn from past mistakes and take a fresh approach to infrastructure development.

Given this overall picture and the involvement of many development actors in physical infrastructure at the macro level, developing countries are in need of enhanced capacity and institutional reform for infrastructure development and services at the community and local levels. This will not only lead to infrastructure development in which poor people will directly participate and thereby likely to derive benefits; it will also complement the initiatives undertaken by other development actors at the macro level. With this view in mind, UNDP has developed a project, in collaboration with the Government of Japan, entitled *Making Infrastructure Work for the Poor*.



The basic idea of the project is to assess, in the context of small-scale community-level infrastructure, the dynamics of the infrastructure-poverty reduction-governance nexus; to learn lessons from the experiences and examine the scope of replication, both at the local and the national levels; and to develop capacities and undertake institutional reforms for deriving maximum benefits from infrastructure, from the development stages to operational management. In that larger context, the more specific objectives of the project are:

1. To investigate the links between small, community-level infrastructure provisioning and human poverty reduction and human security enhancement in the context of MDGs.
2. To examine the governance aspect of small-scale community-level infrastructure-how such infrastructure is formulated and designed, how it is implemented, how its results and impacts are monitored; in a nutshell, how it is managed and owned.
3. To support developing countries in their community-level infrastructure initiatives in capacity development and institutional reform, with a view to bring maximum benefits to poor people. It implies making methodological recommendations that focus on capacity development

and institutional reform at the local level.

4. To link the initiatives undertaken and the lessons learned at the community level to macro-level exercises in infrastructure development in complementary ways.

The first objective has been achieved through two concept papers-one on investigating the links between small, community-led and community-owned infrastructure provisioning and human poverty reduction and human security enhancement in the context of MDGs, and the second one dealing with governance issues with regard to small, community-led and community-owned infrastructure. These papers have developed an analytical framework on both those aspects.

The second and third objectives have been addressed through four country studies-Bangladesh, Senegal, Thailand and Zambia. These studies looked at the economic and social impacts of infrastructure on poor people at the local level and also looked at the governance and management of those infrastructure. These four country studies were presented and discussed in draft form in an Expert Group meeting on 14-15 March 2005 in Tokyo, Japan. The Expert Group has recommended that on the basis of these country studies, a synthesis paper needs to be prepared. In fact, a

draft outline for the synthesis paper was presented and discussed in the meeting as well.

The present synthesis paper highlights the following: contextual similarities and differences of the four country studies, of the projects reviewed and of the methodologies used; lessons learned-both common to all situations as well as those unique to particular situations; the issue of scaling-up and linkages of micro with macro level; and policy options. The present paper is intended to advance the project objectives by synthesising and distilling lessons from the project into a single, easily accessible report.

The organisation of this paper proceeds as follows. Section II will introduce some of the fundamental concepts and basic definitions in areas of infrastructure, poverty reduction and governance. Section III presents the analytical framework of the infrastructure-poverty reduction-governance nexus. In Section IV, the contexts of the four countries under the project are presented. Section V highlights key findings of the studies in terms of the project's impacts on human poverty and security as well as the issues of governance, and distills the lessons learned. Section VI contains policy options based on what we have learned from this project. The issue of scaling up of small-scale community-based infrastructure is also addressed. The paper ends with some concluding remarks in Section VII.



II. INFRASTRUCTURE, POVERTY AND GOVERNANCE: CONCEPTS AND DEFINITIONS

Infrastructure development and services

What is infrastructure? The definition most economists have in mind consists of investments in various types of physical assets and services. These investments can be differentiated from standard capital stock on the basis of industry features or ownership. Specifically, infrastructure investments are characterised by economies of scale and externalities; hence they are typically publicly owned. The World Bank's 1994 World Development Report includes the following services in the category of economic infrastructure:

- ❖ Public utilities: power, telecommunications, piped water supply, sanitation and sewerage, solid waste collection and disposal, and piped gas.

- ❖ Public works: roads and major dam and canal works for irrigation and drainage.
- ❖ Other transport sectors: urban and inter-urban railways, urban transport, ports and waterways, and airports.

Broader definitions of infrastructure include human capital investment, research and development capital and health services. The academic literature and international development experience on the sheer necessity of social infrastructure is large and indisputable. Infrastructure is also sometimes used as an umbrella term capturing the “social overhead capital” of a community (WDR 1994). A wide range of institutions play a decisive role in supporting economic and social infrastructure and in ensuring that economic growth is sustainable in the long term.

Economic infrastructure varies by size, purpose, usage and organisation of project aspects such as ownership, financing, monitoring and evaluation.* Projects may be in the public sector, private sector or some form of public-private partnership. Some investments are capable of yielding higher returns in accordance with its capital goods characteristics, while others may provide immediate satisfaction like consumption goods. Infrastructure facilities are capable of yielding services and commanding scope that can vary from the global to the local, and can also cut across the rural-urban divide. Some facilities may be single-purpose, as in defence industries, while others are designed for multiple uses, like a rural road. The spill-over from users to non-users is a fundamental feature of infrastructure and indirect benefits may surpass limited direct benefits.

Infrastructure development has two stages, each with multiple sub-stages. The first stage, ending with the physical completion of the infrastructure, encompasses selection of the type and location of project, other planning, design and feasibility/impact studies, and the actual construction. For convenience, we will term this stage infrastructure construction. Stage two, which we term infrastructure services, includes not only the stream of benefits derived from the physical infrastructure over time, but also the management and oversight thereof, including maintenance, setting and collection of user fees, etc. Wherever possible, we examine and quantify the impact of each aspect of each stage on poverty, and how infrastructure development impacts and is impacted by governance.

Infrastructure is thus a wide and complex concept, which encompasses such physical infrastructure facilities such as

* The discussion of the type and scope of infrastructure follows Prakash (2003).

roads, bridges and highways; transport and ports; basic utilities such as power, water and sanitation; and also schools, health care facilities and public buildings. The present project and the country studies focus on three things:

- ❖ Mostly on physical infrastructure and not on social infrastructure. This is not to deny or disparage the vital support of well-functioning institutions, provision of social infrastructure, or the role of social capital and networks.
- ❖ Small-scale and community-based infrastructure (e.g., feeder roads, community tube wells, local dams) that the project and the country studies focus on, rather than on big, national and lumpy infrastructure (e.g., national highways, regional power grids)
- ❖ Not infrastructure per se, but infrastructure services, which are more relevant for poverty reduction. And the focus of the present initiative is on the provision of and the access to infrastructure services.



Multidimensional poverty

Poverty is a multi-dimensional phenomenon. It is not only about lack of income, but it is also about human deprivations in areas of health, education, participation and security. People can be income rich, but if they are in ill health, they are poor in that dimension. Or, people can be healthy, but if they are not allowed to participate in social or political events because of their race and ethnicity, they are impoverished in the area of participation. It is the multidimensionality of impoverishment that makes people truly deprived.

Income impoverishment may be the most important form of deprivation. This is because income provides the means to overcome deprivations in other areas. But two things are important to note. First, income alone cannot guarantee non-deprivations in other areas. For example, a rich, healthy and educated person may also face personal insecurity

because of the declining law and order situation in the society. Second, all deprivations cannot and should not be reduced to a common denominator-called income poverty. If income is not the sum total of human lives, the lack of it cannot be the sum total of human deprivations.

The multidimensionality of poverty can be termed as human poverty or it can be termed as capability deprivation.* Whatever term is used, the important issue is to treat poverty as a multidimensional phenomenon.

Millennium Development Goals (MDGs)

The Millennium Development Goals (MDGs) are a set of objectives derived from the Millennium Declaration signed by 189 UN member nations in 2000 (Annex 1). These goals are time-bound, quantitative targets in human development (**BOX 1**). The MDGs are anchored in the conceptual framework of the human development paradigm and in the concept of human rights-based approach to development.

But even though MDGs are anchored in human development, there are two qualifiers. First, the MDGs refer only to some basic aspects of human development and do not cover all its dimensions. They do not reflect such human development dimensions as participation or human security, which, of course, are part of the broader Millennium Declaration. Second, although anchored in the human development paradigm, for natural and obvious reasons the MDGs have a stronger association with the deprivation side of human development, i.e. human poverty.

Human security

By “human security” we mean security of people in every aspect of their lives. More than merely territorial security, human security includes food security, job security, health security, community security, personal security and environmental security. Human development and human security are mutually reinforcing. Human security provides the context in which people can enlarge their choices, enhancing human development. On the other hand, human development, by enhancing people’s capabilities, also contributes to improving human security.

Thus poverty reduction and human security are mutually reinforcing. Poor people are also most vulnerable in terms of job insecurity, health insecurity, food insecurity, personal insecurity and environmental insecurity. Enhancement of

* See UNDP (1996) and UNDP (1997).

Box 1: Analytical linkage between human development and MDGs

Human Development						
Directly Enhancing Human Capabilities Dimensions			Contextual Dimensions			
Long and healthy life	Knowledge	Decent standard of living	Participation	Environmental sustainability	Human security	Gender equality
MDGs 4, 5 and 6	MDG 2	MDG 1		MDG 7		MDG 3
Child mortality Maternal mortality HIV/AIDS	Universal primary education	Extreme income poverty Hunger		Environmental sustainability		Gender equality in primary education

Source: Jahan (2002)

their well-being can make them more secure on all these fronts. Infrastructure development in agriculture and in rural areas, by increasing food production, improving distribution and ensuring better access to markets, contributes to food security directly by enhancing nutrition and indirectly by increasing incomes. A public works programme in the physical infrastructure sector, by providing employment to poor people, ensures job security. Better roads and bridges expedite people's access to health care, while improved utilities infrastructure provides people with safe water and better sanitation facilities. All these are essential for health security. Better transportation and communication system, by ensuring quick access to law enforcing authorities, can improve personal security of people. Well-designed and well-implemented infrastructure can be critical for environmental security by reducing flooding, increasing protection from and facilitating quick response to natural disasters, and in some cases reversing past environmental damage from poorly designed and implemented projects.

Human security is a relatively recent concept which focuses on the individual as the means and the ends of development. The concept of human security is to protect human lives in ways that enhance human freedoms and human fulfilment. Development assistance from a human security perspective must then focus on comprehensive and inter-sectoral approaches that focus on human resource development, capacity development and empowerment as tools to free the poor and at-risk from want and fear. To ensure sustainability, not only must technical capacities be transferred, but coordination among donors, governmental agencies at different levels and the broader development community must be strengthened. Ideally, individuals and communities could be evaluated not only based on their current situation, but

those "at risk" from falling into poverty, from macroeconomic shocks, the spread of violence, natural disasters, etc., could be identified, but that ability is largely beyond us, given current data and methods.

Governance

Governance of infrastructure encompasses many areas. On one hand, it covers issues like types, locations and designs of infrastructure. In many developing countries, infrastructure development has been and is still dictated by non-economic rationales such as pride and prestige (e.g., expensive roads, big monuments, huge airports). In others, the development has taken place without any proper feasibility study with regard to both technical and economic considerations (e.g., modern roads with less than optimum traffic, school buildings or hospitals without any consideration of population density, roads and bridges on fragile land). In still other cases, locations and designs are decided without any consultations with local communities, without any dialogues with people whom the infrastructure is supposed to serve, i.e. without any participatory process.

On the other, governance also refers to implementation, operations and maintenance of the infrastructure. Sometimes, the implementation plans are made without adequate financial resources or institutional setup. The quality issue of the infrastructure itself and its services are also overlooked. Infrastructure projects are built without adequate financial and organisational provisioning for O&M.

But the causality does not run from governance to infrastructure only. With improved infrastructure, the level and extent of effective governance also enhance. Therefore,

there are also linkages from infrastructure to governance.

Finally, there should be proper monitoring and evaluations of infrastructure in terms of its impact and sustainability. It requires existence of benchmark surveys, methodologies and indicators for monitoring and evaluation. The need for reliable data can not be overemphasised.

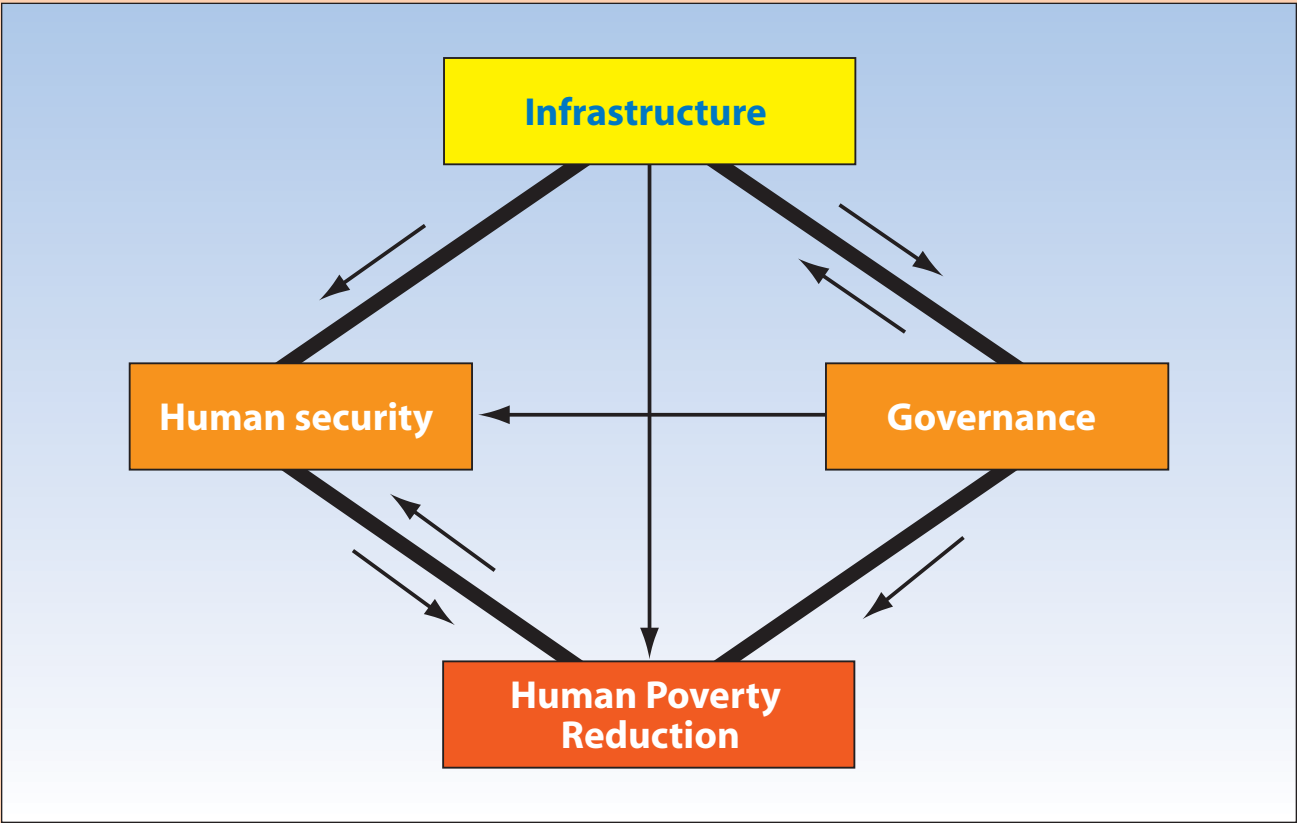
FIGURE 1 illustrates the “diamond” relationship of human poverty reduction, human security enhancement, governance and infrastructure. In this relationship, both the infrastructure and governance are more of means and human poverty reduction and human security enhancement are more of ends. Human poverty reduction and human security are mutually reinforcing; so are governance and infrastructure. Both governance and infrastructure contribute to human poverty reduction and human security enhancement.



III. INFRASTRUCTURE-POVERTY REDUCTION-GOVERNANCE NEXUS: ANALYTICAL LINKAGES

The infrastructure-poverty reduction-governance nexus is a complex one. Infrastructure impacts on human poverty reduction both directly and indirectly. It helps reducing human poverty by directly improving access of people to health and educational services, by providing them with cleaner energy and by protecting them against natural disasters-contributing to non-income aspects of deprivations. But it also contributes to human poverty reduction indirectly by enhancing agricultural productivity, reducing transportation costs, generating more jobs and income-that is, by enhancing economic growth. These are some of the more purely economic aspects of impoverishment. These intended benefits cannot be reaped unless infrastructure is managed properly-from the design and location decision to implementation to operations and maintenance. All these issues interact with each other in a mutually reinforcing way and it is not always easy or even desirable to separate out each linkage.

Figure 1: Inter-relationships between infrastructure, governance, human security and human poverty reduction



In all these inter-linkages, efficiency of use of available resources is a concern. In fact, a whole generation of development economists laboured over general equilibrium models of development trying to clearly specify the interactions between policy interventions and development outcomes (Leipziger et al., 2003). Leipziger et al. (2003) argue for renewed emphasis on the effectiveness of multi-sectoral linkages and in particular, make a case for multiple interventions in infrastructure as the key to reaching the MDGs.

Different infrastructure projects can interact to provide benefits that are greater or lesser than anticipated. These interactions have to be explicitly considered as an essential component of any human poverty reduction strategy. For example, synergies exist between: connectivity infrastructure (roads, bridges, telecommunication, etc.) and fixed-point service infrastructure (schools, hospitals, markets, etc.); connectivity infrastructure and production-enhancing infrastructure (irrigation, land reclamation/improvements); production-enhancing infrastructure and utilities (water, electricity, sanitation, etc.); as well as among different types of utilities projects (electrical pumps needed for water projects) and even different types of water projects (safe drinking water, irrigation, flood control, etc.). Capturing these synergies requires balancing the needs of the individual communities with regional and national project coordination.

Given this tremendous variation in form and usage, the economic valuation of infrastructure becomes extremely difficult and defies simple uniform practice. This is particularly the case when “the price mechanism works imperfectly or is absent in the provision of infrastructure” (Canning, 1998). This has led to projects being evaluated by the methods of cost-benefit analysis. Microeconomic cost-benefit analysis is likely to miss important positive externalities of infrastructure projects. For example, transportation infrastructure may expand the market and the ability of producers to exploit economies of scale and specialisation. It allows greater dissemination of knowledge and technology. Models incorporating these ideas are now common in the “new economic geography” and there is increasing empirical evidence for these effects. Other infrastructure, such as electricity generating capacity, should be critical in the “big push” model of economic development as proposed by Murphy, Shleifer and Vishny (1998). If the takeoff in developing countries relies on a coordinated bout of investment, the public provision of risky, large-scale, infrastructure projects may become a trigger for private sector investment and escape from a poverty trap. These arguments point to very large potential benefits of infrastructure that cannot be identified and measured by conventional cost-benefit methods.

Economic growth and human poverty reduction-the linkage effects of infrastructures*

Human poverty reduction requires economic growth which, when accompanied by sound macroeconomic management and good governance, results in sustainable and socially inclusive development. The impacts of infrastructures on economic growth and poverty reduction occur in a multiplier way-there are first-round effects followed by subsequent impacts (**FIGURE 2**). The first-round impacts on poverty reduction are more direct, while the subsequent effects, realised through fiscal and private spending channels, are broader and more general.

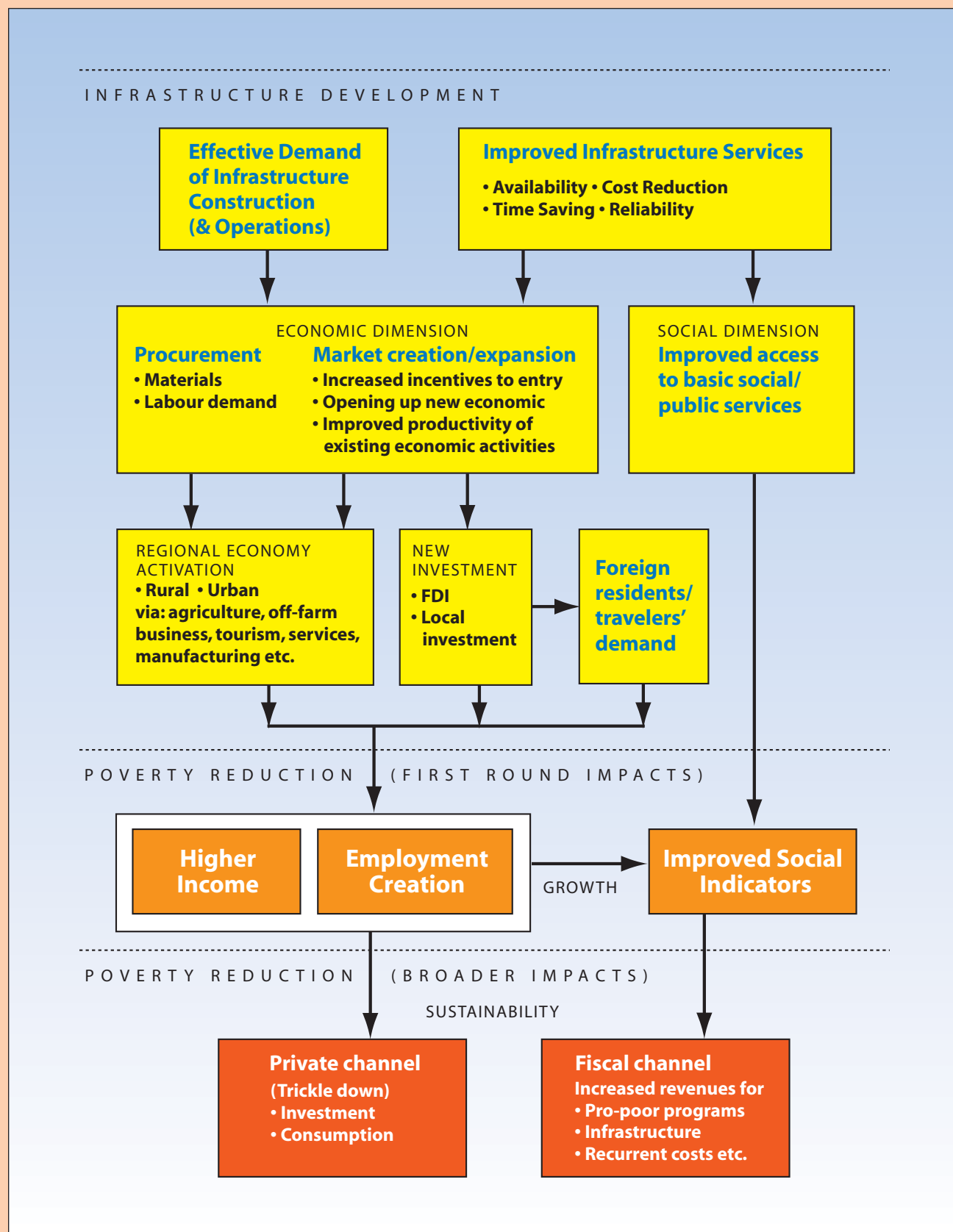
In the first round, there are two initial impacts of development of infrastructure that could lead to poverty reduction through economic growth. These are the supply-side and the demand-side effects. On the supply side, improved infrastructure services in terms of costs, availability and reliability could create, at least, two types of linkage effects:

- ❖ **Investment-inducement effect:** Through this channel new investment is generated by an enhanced business climate. Attraction of foreign direct investment and domestic investment could promote industrial growth and generate jobs and income at the newly invested firms and in related industries/ services-through increased procurement of local inputs and services.
- ❖ **Regional economy activation effect:** This is a channel through which new economic opportunities are opened up and productivity of the existing economic activities is enhanced-even without additional investment. For example, better access to markets and information could generate jobs and income in rural households through improved agricultural productivity, diversification of agricultural products and promotion of off-farm industry in rural areas.

On the demand side, it is possible to expect the effective demand effect of infrastructure construction. This is a channel through which jobs and income are generated by implementing the project itself. For example, effective demand from construction work could generate jobs and income during the construction period directly and indirectly (through the procurement of local inputs and services). In the social dimension, better infrastructure services (particularly, the availability of transport and power supply) could increase access to basic social/public services and thus improve the living conditions of the poor.

* Unless otherwise stated, most of the data in present section are from Tripathi (2004)

Figure 2: Linkages among infrastructure, growth, and poverty reduction: hypothetical illustration



Source: GRITS Development Forum (2003)

Furthermore, the impact of infrastructure should be understood in a broader and more general context. In the subsequent rounds, fiscal revenue and multiplier effects can be created. Increased fiscal revenues through growth could generate additional budget for programmes that improve the living conditions of poor people. Private spending could also generate multiple-round impacts.

This virtuous circle makes poverty reduction sustainable. However, it should be noted that the extent and feasibility of creating such a virtuous circle depend on the government's commitment and capacity to effectively implement pro-poor programmes, as well as country-specific initial conditions. It is important to emphasise that the poverty reduction impact of infrastructures depends not only on the growth rate, but the pattern of the growth as well. In that context the distribution of growth is major determinant of whether infrastructures would make an impact on poverty reduction (**FIGURE 3**).

There is also some evidence to suggest that the benefits of infrastructure services favour poor people by generating more equitable growth. Studies in India show that invest-

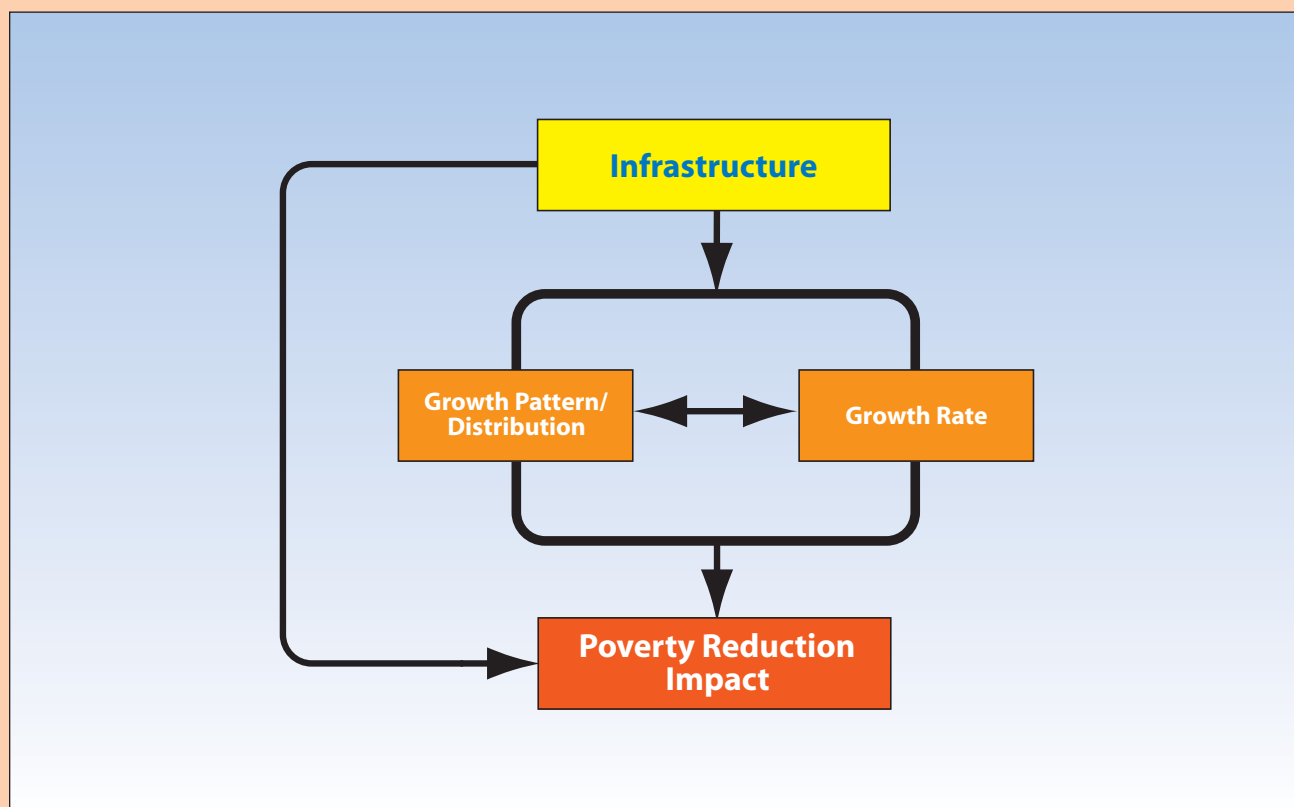
ments in roads are twice as effective in targeting and reducing rural poverty as any other form of intervention, creating win-win options (Fan, Hazell and Thorat, 1999). This is further supported by a study of shared growth in East Asia that found that more equitable access to infrastructure services in rural and urban areas encouraged growth with equity-serving as preliminary evidence that access to infrastructure can benefit low-income groups under certain conditions (Campos and Root, 1996).

But while all the above effects are more concentrated in reducing income deprivations of poor people, infrastructure development also contributes to non-income aspects of human deprivations. Infrastructure facilities help in building human capabilities, enhance educational and health achievements, improve human security, enlarge participation and reduce vulnerabilities.

Infrastructure and human development

Infrastructure-capabilities linkages. The provision of rural infrastructure services has important implications for the

Figure 3: Pattern of growth-the missing link between infrastructure, economic growth and poverty reduction



health and education of the rural poor. Improved access to infrastructure services can also free up significant amounts of time as rural households, especially women and young girls, spend a large part of their day on collection of water and firewood. Easy access to potable water and energy results in time-savings that can be used for economically productive activities, as well as educational or leisure activities (Calvo et al., 2002).

Infrastructure-education linkages. Good transportation links reduce the time it takes to go to school. Better roads and transportation can improve the enrolment ratios. In many cases, particularly in remote areas, children cannot go to school when easy transportation means are not available to them. Improved roads and transportation have major implications for girls' enrolment. Adequate transport lowers the cost and increases the effectiveness of other support for school services.

Having access to potable water reduces involuntary absenteeism and improves the educational performance of children. In Africa, access to piped water has been found to increase school attendance between 2 and 16 percent (Jahan, 2005). In Nigeria, it was estimated that Guinea Worm, a parasitic infection caused by poor quality of drinking water, was responsible for 60 percent of all school absenteeism. The data from a rural Indian household survey showed that by doubling the number of families with access to a water tap and a well, the school attendance index would rise 20 percent.

One of the major uses of energy by the poor is for lighting. Collecting traditional fuel (usually done by children) is time-consuming. Lack of electricity inhibits access to information from the outside world through the use of modern educational tools, such as radio or computers. Communities that lack access to modern sources of electricity are at a serious educational disadvantage. By connecting households and schools to electricity, energy



projects can help increase the amount of time that children can study or read, improving educational performance. Innovative teaching strategies due to the use of information and communication technologies (ICT) have been credited with improved test scores and other learning benefits in many studies. ICT-based services can also be used to deliver education to children in rural areas and allow for discussions and exchanges between people separated by large distances.

Infrastructure-health linkages. Having access to potable water improves access to sanitation services and helps prevent parasitic infections. A survey of 49 studies on diarrhoeal morbidity showed an average 22 percent reduction, with the 19 most rigorous of those studies showing a 26 percent reduction as a result of improved water and sanitation. Estimates show that in Latin America, bringing water and sanitation coverage to 100 percent would decrease child (under five) mortality due to diarrhoea by 22 percent; in South Asia, it would decrease by 21 percent, and in West Africa, 21 percent.

In Albania, 60 percent of households attribute their health problems to poor water quality and inadequate sanitation. A study of 3,509 children in 2,600 households in Romania showed that when controlling for parent's education, age and ethnicity, poor sanitary conditions of a toilet were strongly negatively correlated with a child's health-for-weight Z-score. According to a study in Greater Baku, Azerbaijan, 9 to 13 percent of households report illnesses due to unsafe drinking water. This was especially true among people earning less than 100,000 manat per month, 19 percent of whom reported illness due to drinking water compared to 10 percent of those earning over 100,000 manat per month.

When transportation costs are high, or health centres are hard to reach, many poor people stop seeking health care altogether. In Jamaica, 73.1 percent of women reported that mobility was a problem with respect to access to prenatal healthcare services. About 12 percent of African people, according to a 1995 household survey reported that the unavailability or high cost of transport was the major barrier to obtaining health care. ICT-based services can help to improve health by allowing health care providers to exchange information over the phone or over the internet, reducing inefficient expenditures of time and resources and improving the ability of health care providers to identify the most effective treatments.

Widespread use of unclean energy sources severely damages the health of the poor. More than 130,000 premature deaths and 50-70 million incidents of respiratory illness



occur each year due to episodes of urban air pollution in developing countries, half of them in East Asia. Without electricity, health clinics cannot safely administer vaccines or perform operations. Electrification or provision of liquid fuels, which provide more controlled flame than biomass fuel, can significantly reduce household injuries and accidents such as burns and poisoning among the poor.

More effective transport between rural communities and urban centres can help make it easier to establish and staff health care centres and to give them adequate support. In Morocco, a study conducted in 1985 and a follow-up survey conducted in 1995 after a rural roads project rehabilitated old roads and built new roads showed that the number of full-time medical staff per clinic in affected areas increased from 0 to 3 or 4 per health centre. Improving access to clean water through better transportation reduces intestinal disease and child mortality.

Infrastructure-empowerment linkages. Infrastructure can play an important role in empowering people, linking isolated communities to the rest of the world—giving poor communities greater access and influence over political and local decision-making processes. Markets work much better when information is widely available. Rural infrastructure services such as roads, radio, telephones and internet connections can directly improve communications and enhance poor people's access to information. Electrification can also be important for broadening access to electronic communication and radio. As an indirect benefit, well-delivered, quality infrastructure is likely to attract better teachers, better agriculture extension agents, and open the door to industrial or agro-industrial development. These influxes are like many windows opening up again on the outside world. They bring with them outside influences, new ideas and stimuli, correcting information asymmetries and result in profound changes in mental attitudes (Pouliquen, 2000).

Infrastructure and human security

As mentioned above, infrastructure services contribute to human security. Access to health services ensures health security, while access to education ensures that people become knowledgeable. Apart from ensuring human security on these fronts, infrastructure services have positive impacts on food security, access to cleaner energies and so on, thereby reducing many risks and vulnerabilities that affect poor people in particular.

Energy-food security linkages. Energy affects the food security of poor people, particularly women, because they have to collect firewood for cooking and lighting. By providing alternative, non-biomass sources of energy, projects can reduce food stress and limit wasteful calorie expenditure. Because of the large amount of time it takes to collect enough firewood, dung or other biomass fuels, many people



are unable to collect an adequate amount and compensate by boiling less water and cooking less healthy food. Access to modern energy sources will decrease the health risks associated with unclean fuels, water and food. Seventy-two percent of respondents to a survey of recently electrified households in Malaysia reported that their health had improved as a result of refrigerated food and greater ease in boiling water. A study of 500 children in the Gambia showed that children in huts where cooking with biomass fuels was conducted were six times more likely to contract respiratory illnesses than other children. In India, women who did not smoke but cooked with biomass fuels had death rates from chronic respiratory illnesses similar to that of males who were heavy smokers.

While performance in health, education and gender equity are clearly influenced by income levels, as suggested by Jayasuriya and Wodon (2003), GDP per capita is only one

of several key inputs entering the “production function” for poverty reduction. Similarly, Jalan and Ravallion (2001) argue for the need to combine infrastructure interventions with effective public action to promote health knowledge: their research on India shows that diarrhoea is much less prevalent and severe among young children in households with piped water, but that this gain largely bypasses children in poor households, particularly when the mother is poorly educated. Thus, the interaction effects between infrastructure, education and health services suggest the importance of building on cross-sectoral synergies to reach the MDGs.

Infrastructure-vulnerability linkages. Vulnerability is a particularly serious dimension of poverty that can result in total destitution. Poor people often live in the least desirable parts of rural towns and villages and are the first ones to be hit by natural disasters; their farms are at the periphery of irrigated areas and are the first to be hit by drought; their villages are isolated, making access to medical support difficult in times of crisis. As well as being the most exposed to risk of shock, poor people are the least prepared to deal with its consequences because they operate at low to non-existent safety margins. Shocks do not need to be of significant levels to affect them (Calvo et al., 2002).

The provision of basic infrastructure can substantially reduce the vulnerability of poor people by helping them to cope with natural disasters. Properly designed infrastructure-banning construction in hazard zones and establishing robust design standards-can help to mitigate the impact of natural disasters, although at considerable cost. Other mitigation measures, such as good drainage, a well-maintained network of roads and telecommunications to assist with relief and food redistribution efforts, go a long way towards alleviating problems of flooding, drought, famine and earthquakes. By opening rural communities to the outside world and providing access to modern technologies (e.g. irrigation, pesticides, disease-resistant seed varieties) basic infrastructure facilities also indirectly serve to reduce weather related uncertainties (mainly rainfall), plant disease, pests and other harvest risks.

Basic infrastructure services can ameliorate the effects of economic shock on poor communities. Good transport facilities are integral to stabilising food price fluctuations and, through arbitrage, for ensuring that poor sellers receive fair prices. Unfortunately, during periods of major economic shocks, budget cuts are often targeted at infrastructure without a full appreciation of what the long-term effects on poor people may be. Infrastructure maintenance is neglected due to chronic funding shortages leading to deterioration of existing assets that becomes costly to reverse. Thus economic



shock can be particularly costly for infrastructure, because by delaying expenditure, it increases costs and results in fewer funds for direct poverty reduction. Secondary and tertiary infrastructure serving poor rural areas are particularly vulnerable because of the limited “voice” of the people served by this type of infrastructure (Pouliquen, 2000).

Finally, due to their potential for creating jobs, infrastructure works programmes can be important components of crisis mitigation packages during times of economic shock. Although the primary aim of such programmes is to provide poor households with income during crisis, well-designed programmes-such as the Maharashtra Employment Guarantee Scheme in India and the Trabajar in Argentina-can provide low-cost infrastructure development in addition. Workfare programmes, however, are not always cost-effective, and the quality and productivity of infrastructure investments made under these programmes are not always satisfactory (Calvo et al., 2002).

Infrastructure and MDGs

Even though the MDGs contain no goal on infrastructure as such, developing infrastructure services is a crucial strategy for achieving those goals. Infrastructure development, by generating employment and income and enhancing economic growth, can reduce income poverty substantially. Irrigation and other infrastructural facilities increase agricultural productivity, which has a positive impact on hunger. Access to water and easy access to health facilities, through improved roads and transportation, help reduce mortalities. School enrolment is also enhanced by better transportation. The linkages are direct and indirect and they are mutually reinforcing. Annex 2 provides a detailed account as to how infrastructure services contribute to progress towards achieving the MDGs.

The identified linkages are quite clear. For example, if there are improvements in rural transport in the form of village to township or main road, they are expected to have strong positive effects on various MDGs. Improvements in low-volume local roads and associated networks of village tracks/paths can significantly reduce poor farmers' transaction costs and expand their production possibilities. This helps reduce poverty and hunger. Improvements in village roads significantly affect school enrolment contributing to universal primary education. Furthermore, better roads and safer communication encourage more girls to go to school, reducing gender inequality in school enrolment. Improved roads also make it possible to make increased use of primary health care facilities, antenatal care and professional attendants for deliveries. All these impact positively on both child and maternal mortality. The same arguments can be made with regard to HIV/AIDS.

Similarly, cleaner and better energy often contributes to a sharp increase in regional incomes and growth of non-farm activity. Availability of a modern energy supply strongly affects investments in, and competitiveness of, local enterprises. These help address issues of income poverty and hunger. Cleaner and improved energy increases school enrolment and attendance rates, and home electrification raises time devoted to study-contributing to MDG 2. Because of modern energy availability, less time is needed for fuel wood and water collection and that raises girls' attendance rates. With less indoor pollution, better services at health care centres because of electrification, both child and maternal mortality are reduced. Modern energy availability also positively impacts on deforestation as people do not indiscriminately cut trees for energy needs.

As Annex 2 indicates, comparable linkages can be made with regard to safe water supply, better sanitation, information and communication technology, public markets and so on.

Governance for infrastructure: some critical issues

There is a strong two-way link between infrastructure and governance: good governance is necessary to the successful implementation of infrastructure programmes, and infrastructure programmes can be important vehicles in the improvement of governance. Indeed, when good infrastructure such as roads and transportation, electricity are put in place, the efficiency and effectiveness of local government and administration are greatly enhanced. The converse is also true: Without broad popular participation in the decision-making process in terms of location, design and nature of

infrastructure, without the local community's involvement in the implementation and operations and maintenance of infrastructure and without adequate financial and human resources, the infrastructure can neither provide maximum benefits nor be sustainable. Governance of infrastructure requires institutional reforms and capacity development.

Some of the relevant issues related to the governance of infrastructure are: public and community participation, privatisation, decentralisation, corruption, polarisation and gender consensus.

Public participation. Great emphasis is placed on consultation, capacity development and empowerment of citizens, through the delegation of authority, accountability and resources. The rationale is that 'if people are not brought into focus through sustainable development, becoming both architects and engineers of the concept, then it will never be achieved' (Redclift, 1992). The term 'public participation' (PP) describes the goal of integrating these ideas within the planning and implementation of projects, programmes, plans and policies—from small-scale rural education programmes and water supply projects, to major transport infrastructure projects and national energy policy. **BOX 2** describes the typologies of participation.

At a minimum, PP seeks to inform and consult with those directly affected by a project—either the intended primary beneficiaries or those unintentionally but adversely affected. At its most effective, PP is about empowering all those parties influential in and/or affected by a project, in defining and realising the project's objectives, ensuring sustainable benefits, and avoiding or mitigating harmful economic, social and environmental impacts. The operationalisation of PP has mainly centred on the social development sectors—projects concerned with the development of specific disadvantaged groups, in terms of welfare and livelihoods, including small-holder agriculture, community forestry, health care, education, urban poverty and small-scale water supply. Until recently,



Box 2: Typology of participation

Information disclosure - people participate by being told what has already been decided or has already happened.

Public consultation - people participate by being consulted. External agencies define problems and information-gathering processes, and so control analysis. Consultation carries no obligation to take account of people's views.

Functional participation - people are encouraged to participate as a means to achieve project goals, especially to reduce costs and comply with procedural requirements.

Interactive participation - people participate in partnership with external agencies, at the early strategic stages of project design and throughout its implementation.

Self-mobilisation - people participate by taking initiatives independent of external agencies, particularly if governments, NGOs or private companies provide an enabling framework.

Source: ODI (1998) adapted from Pretty (1995).

relatively little attention had been paid to PP in economic, particularly large-scale, infrastructure projects (OECD, 1997).

In such projects, the disadvantaged tend to be consulted not so much because of their stake in the project, but because they happen to live in or around the project site or are unintentionally affected by off-site components of the project. In social development projects, PP is an 'internal' component of the project, whereas in economic infrastructure projects, it is essentially an 'externality'. There are forces directing PP in economic infrastructure projects towards improved effectiveness. These include improvements in environmental

and social policy and guidance, investment security, growing corporate social responsibility and public relations in the donors', or other participants', home country.

The consequences of poor PP are well known. In 1997, the private arm of a joint venture energy project in South-east Asia belatedly undertook a programme of public consultation over the design of a power station, the intention being to satisfy the requirements contained within the environmental assessment procedures of the aid agency providing part of the public finance. The programme sought to identify the social impacts of the project and define a resettlement plan for those families directly affected by the power station's location. As far as the affected population was concerned, the consultation came too late to affect the location of the power station. At one stage, the level of hostility from those to be resettled escalated to the point where incoming construction vehicles were shot at. The resulting media attention instantly generated negative publicity for the lead government ministry, the aid agency and the private company, and the aid agency refused to release any further funds until the resettlement issue had been resolved. This caused an eight-month delay in the project. In addition, despite a rapidly growing market for power, four years later the company found that its damaged reputation still prevented it from winning new government contracts.

Community participation. Given the failures of top-down institutions, some countries are shifting to community-managed systems-typically with the support of donors, as in India and Ghana. Communities are involved in the design and management of their water systems, paying for operations and maintenance costs. Governments, generally central governments, pay a significant part of the capital costs. Donor-funded project management units, backed by not-for-profit organisations, often form the technical and organisational backbone of these systems.

Local governments can form the institutional and financial support for expanding community-based systems. With access to a tax base, local governments can provide resources to cover periodic capital expenditure, provide temporary fiscal support to communities to adjust to economic shocks, and facilitate access to technical assistance. Uganda and South Africa provide examples of arrangements in which local governments are part of a larger fiscal decentralisation programme with their own resources and significant autonomy. Local governments thus strengthened can support community-based programmes. Even in India, where local panchayats do not have as much autonomy, the relations between local governments and user groups are evolving;



some rural local governments have begun supporting their communities by contracting with effective infrastructure providers found in neighbouring towns.

The local externalities and the need to understand and draw on local conditions and knowledge suggest that local governments are the appropriate policy maker tier. In Vietnam and West Bengal, India, local governments have supported community participation and ensured its continuity by financing the work of the service provider, usually a non-profit organisation. In Vietnam some local governments have used a programme similar to Maharashtra state's Gadge Baba scheme to acknowledge village and individual achievements.

Communities can also contract with a third party or an independent provider to manage local network systems. In China formal cooperatives (rural companies) run on commercial principles with very high cost recovery. In several African countries village entrepreneurs manage water systems under contract. In East Asia small independent providers are being organised to take on operational responsibility on a concession basis. In each case, the process is organised through group consultation and endorsement. While small systems can be contracted by community organisations, village-wide systems may again require the support of policy makers at the local level. For rural systems-community-managed systems and self-provision-the challenge is to seek mechanisms for the policy maker to support client power, using local governments, regional utilities and independent providers.

Privatisation. To better understand the connections between governance and infrastructure provision, two attributes of infrastructure services should be considered: the degree of excludability and the degree of rivalry. While the first refers to the operator's ability to limit the access to those willing to pay for the service, the second refers to the extent to which the use by one person restricts the potential

use by others. A third related concept is the natural monopoly, a service that is most efficiently provided by a single supplier. Natural monopolies, public or private, require effective regulation, while other forms of service provision require working markets.

The categorisation of infrastructure projects according to their level of excludability and rivalry helps determine which projects should remain in the public sphere and which can be provided by the private sector. Low excludability is usually associated with goods that should remain in the public sector, or at least closely regulated by public agencies. Conversely, high excludability cases, such as telephone lines, can easily be transferred to private operators. High rivalry goods, such as latrines and bridges, can often be effectively privatised, while low rivalry goods, like street signs and lighthouses, should generally be provided by the public sector.

Even more so than privatisation or decentralisation, unbundling of different aspects of service provision (for example, the generation, transmission and distribution of electricity) allows each aspect to be handled in the most appropriate ways, with appropriate market structures, regulatory systems, etc. The levels of initial investment and fixed costs have also determined the structure, complexity and hierarchical organisation of the infrastructure providers. Where initial investments are low, monitoring is simple and local knowledge is important, either micro-enterprise or local community groups may be the cost-effective way to provide a service. In general, only the dimensions of infrastructure projects that require large sunk costs are best managed by more complex hierarchies, such as large corporations or government agencies.

The conversion of infrastructure provision from the public sector to private operators still promises the potential for better management, increased productivity and more profitable and efficient operation. However, there is only limit-





ed evidence that such conversion has provided substantial benefits to the poor. The objectives of “redistribution” or “social benefits” require more, not less, government oversight and effective regulation throughout the process. Attracting private investors during the privatisation process at any cost (at the expense of universal service requirements, transferring assets but not liabilities, etc.) is clearly not the answer.

A particularly troublesome aspect of most privatisation processes is that they have been perceived as lacking transparency, being managed by corrupt public officials and being governed by regulatory frameworks that were intended to attract investors more than protect consumers from the newly created private monopolies. Improvements to the governance of both the privatisation process itself and the subsequent regulation of the private companies providing infrastructure services are required, if privatisation is to improve the quantity, quality and accessibility of infrastructure services, as advertised.

Decentralisation. Another process, which has accelerated almost concurrently with privatisation, is decentralisation, the devolution of power from the central government to lower levels of administration. A solid theoretical foundation states that services are more effectively delivered by administrative levels closer to the population being served. Yet, as is the case with many other points in this analysis, it is not the conceptual aspects that are flawed, but the actual implementation.

The main source of failure in decentralisation efforts can be subsumed in one word: incompleteness. For the decentralisation process to be successful, functional authority and resources must be transferred and management capacity developed in a coordinated fashion. There are three dimensions to an effective decentralisation process: political, administrative and fiscal. Incomplete decentralisation is

common, typically with responsibilities being transferred without either fiscal support or capacity development. The NGO involvement may mitigate this problem, but often comes too little or too late to achieve the potential benefits. In transferring policy and legislative functions to lower levels, the central government creates an opportunity for local governance structure to include traditional authorities (i.e. village councils) as well as the inclusion of traditionally underrepresented groups, such as local civil society groups, women and minority groups (the poor, the elderly, religious/ethnic minorities). Ideally, providing technical assistance to local governments and village councils will not only improve the management of infrastructure projects, but also improve accounting and accountability in other aspects of local government operations as well.

Corruption. The importance of good governance is dictated by the dispersed nature of infrastructure programmes. Individual projects are very small. They can serve a few thousand beneficiaries—as in the case of a road linking a village to a secondary road—or as little as a few dozen—as in the case of a well serving a group of isolated habitations. By the time money and technical resources reach these small groups they have transited through many layers of “decision makers” and “implementers” who are all prime targets for corruption and incompetence. Extremely low salaries and poor training exacerbate the tendency to depart from acceptable professional standards and undermine any trace of professional dedication. Worst of all, the beneficiaries seldom have the visibility that would enable them to record a complaint that would be heard and, eventually, lead to corrective measures being taken. In other words, they lack voice. They are poor, often divided and altogether not important enough to carry the political clout that would make them a group worth listening to. Facing an implicit lack of power to change things, the poor grow accustomed to poor governance as a way of life.

While the most visible manifestation of poor governance is through corruption and misuse of funds, it affects infrastructure programmes in many other ways. At the project selection level the more influential members of rural communities press for investments that serve their needs without giving the less fortunate much of a chance to air countervailing views. The most typical and frequent victims of such discrimination are women and members of ethnic minorities. At the project implementation stage poor governance manifests itself essentially through inflated construction costs, the use of substandard materials, design flaws and generally poor construction. Service provision is critically dependent upon good governance in O&M. The

impact of bad governance contributes to a pervasive feeling of social injustice. In addition to being firsthand witnesses to corruption and incompetence, the poor are permanently reminded that even basic infrastructure is not for them and end up paying more than the relatively better off for much inferior services.

If indeed governance improvement starts with showing people whose mindset assumes that corruption, mismanage-



ment and incompetence are unavoidable that this need not be the case, infrastructure is a good candidate to bring about this change in attitude. Good governance brings about simple and tangible results that can easily be seen. Furthermore, the changes can be made at the grass roots-level, with a minimum amount of external support, thus increasing the likelihood that communities may develop a strong sense of ownership that should quickly transcend non-infrastructure activities. Building an electronic forum through which practitioners from developing countries can exchange and discuss concrete approaches to meeting this objective could be an important step in the attack on bad governance and its pervasive impact on social injustice.

The development literature refers to “coordination failures” as one of the most important causes of the collapse of

development strategies. However, how those coordination failures can be prevented, or their impact reduced, is not so clear. Efforts to coordinate government action with regard to infrastructure projects may offer an answer. National development strategies will also benefit from these local/regional/supra-regional coordination efforts. Large-scale infrastructure projects will be informed by the existence of development initiatives geared toward the poorer sectors, and therefore the needs of those sectors as well as their development expectations will be incorporated in larger projects. This, in turn, could prevent those larger projects from reducing, or even reversing, the effect of small-scale, local projects.

Polarisation. A common attribute of underdeveloped polities is the prevalence of fragmentation, either along racial or ethnic fault lines, or those created by class polarisation. This fragmentation is often both the source and the consequence of failing governance in developing countries. A fragmented society is unlikely to reach an agreement on the collectively desired level of production of social or public goods, or the process of distribution. This will in turn reduce the amount of non-traded public goods produced, and will have negative consequences on economic growth, as those goods are needed in the production and distribution of tradable, market goods.

Conversely, developed societies have established institutions that provide a framework for pooling resources from the private sector for the production of public goods. Poor governance weakens existing institutions or prevents the formation of new ones. The frailty of institutions essential to the pooling of resources usually results in failure to provide major infrastructure projects, such as interconnected power grids, transportation hubs and networks, and complex irrigation projects.

The poorer sectors of society are also vulnerable to the effects of socio-political polarisation. When politicians take advantage of this polarisation, a phenomenon known as “clientelism” takes hold of the political process. Politicians make use of resources at their disposal to bribe voters, co-opt opponents or reward allies. The misallocation of resources that emerges from such practices is particularly damaging to the poor as their only option is to keep voting for corrupt public officials out of fear of losing the meager benefits of the clientelist system. Society as a whole also is adversely affected, since resources are allocated via rules that are based neither on equity nor efficiency.

Gender equality. Gender equality is more than gender parity, which is more of a mechanical concept. If in a



society, 15 percent of men and 15 percent of women have access to safe water, one may say that there is gender parity. But the problem here is that the overall level is so low. The challenge in this context is to enhance the overall level quickly but making sure that women are not left behind and they move ahead quickly.

Gender equality is more holistic concept that goes beyond gender parity. It is concerned with changing the socially constructed role between women and men so that the entire society flourishes. Thus gender parity is a necessary, but not a sufficient condition for gender equality. Gender equality requires that women receive equal opportunities and access—but not at an overall low level; it also requires that the dynamics between productive and reproductive roles should be addressed.

Governance for infrastructure: capacity development and institutional reforms

Capacity development may be defined as the ability of people, institutions and societies to perform functions, solve problems and set and achieve objectives. Fundamentally it is a broad goal achieved over time. Capacity development as an objective corresponds to the goal of people wanting to learn and increase their options and choices. This applies similarly to institutions and societies as a whole. Capacity development is also an approach and a process in development—a means by which individuals, institutions and societies are empowered to make choices and chart their own development course. Finally, the far reaching nature of capacity development not only makes it an objective, an approach, a process and a means, but also an outcome.

Such a definition of capacity development implies seven fundamental points:

- ❖ Capacity development has many facets-it is an objective, an approach, a process, a means and an outcome.
- ❖ It can take place at several levels-individuals, institutions and societies-and these levels are mutually reinforcing.
- ❖ Capacity development is voluntary and stems from one's motivation to do things and do them well.
- ❖ Key capacities include competencies that permit all concerned to influence their own destiny-such as the ability to set objectives, strategise, plan and implement those plans. There are underlying capacities that lead to development effectiveness, including self-esteem, facilitating change, leadership development and knowledge networking.
- ❖ Capacity development takes time and it is dynamic. Developing sustainable capacities is a decade-long endeavour. And as life and societies are constantly changing, so do the needs and the nature of capacity development.
- ❖ Capacity development is case-specific and is based on existing capacity. Development of capacities is not something abstract, rather it is highly contextual: Each generation learns from the preceding one and capacity development at any point in time builds on preceding results.
- ❖ Capacity development is an endogenous process that takes place in every society. It can be supported or distorted through external intervention.

Three principles are crucial for capacity development. First, ownership is critical. Second, leadership matters. Third, capacity development requires changes in mindset and overcoming vested interests and power. Two misconceptions must also be avoided. First, capacity development is not synonymous with socio-economic development, even though developing capacities to conceive and carry out relevant tasks is crucial to the advancement of human well-being. Second, another term-capacity building-is often used interchangeably with capacity development. The latter is more comprehensive, connoting the initial stage of creating and building capacities, as well as the subsequent use and retention of such capacities. Capacity building, which is not self-sufficient in and of itself, is thus a sub-set of capacity development.

Institutional reforms have far-reaching meaning. Simply stated, reforms may bring about a more efficient institution, but institutional reforms go beyond that. To start with,

far-reaching reforms must be the product of a broad-based dialogue and consensus and must produce results accessible to all people in the society. Reforms must also highlight effective institutional design, must be responsive and adaptable and finally must be sustainable.

Institutional reforms go beyond improving the functioning and management of the public service, modernising state institutions and reducing civil service costs. It is related to increased levels of competence, commitment and motivation of the personnel concerned. It is also about broad participation of citizens in decision making is incorporated. Sometimes institutional reforms would imply decentralisation or alliance with non-state actors. They are also about transparency and accountability.

It is obvious from the preceding discussion that the maximum dent on poverty reduction can be made not by infrastructure alone or by exclusive capacity development. A balance has to be struck between the two so that both can move forward and the maximum synergies can be reaped. Infrastructure building without capacity development would end up in non-sustainable infrastructures and capacity development without infrastructure building would result in unused capacity.

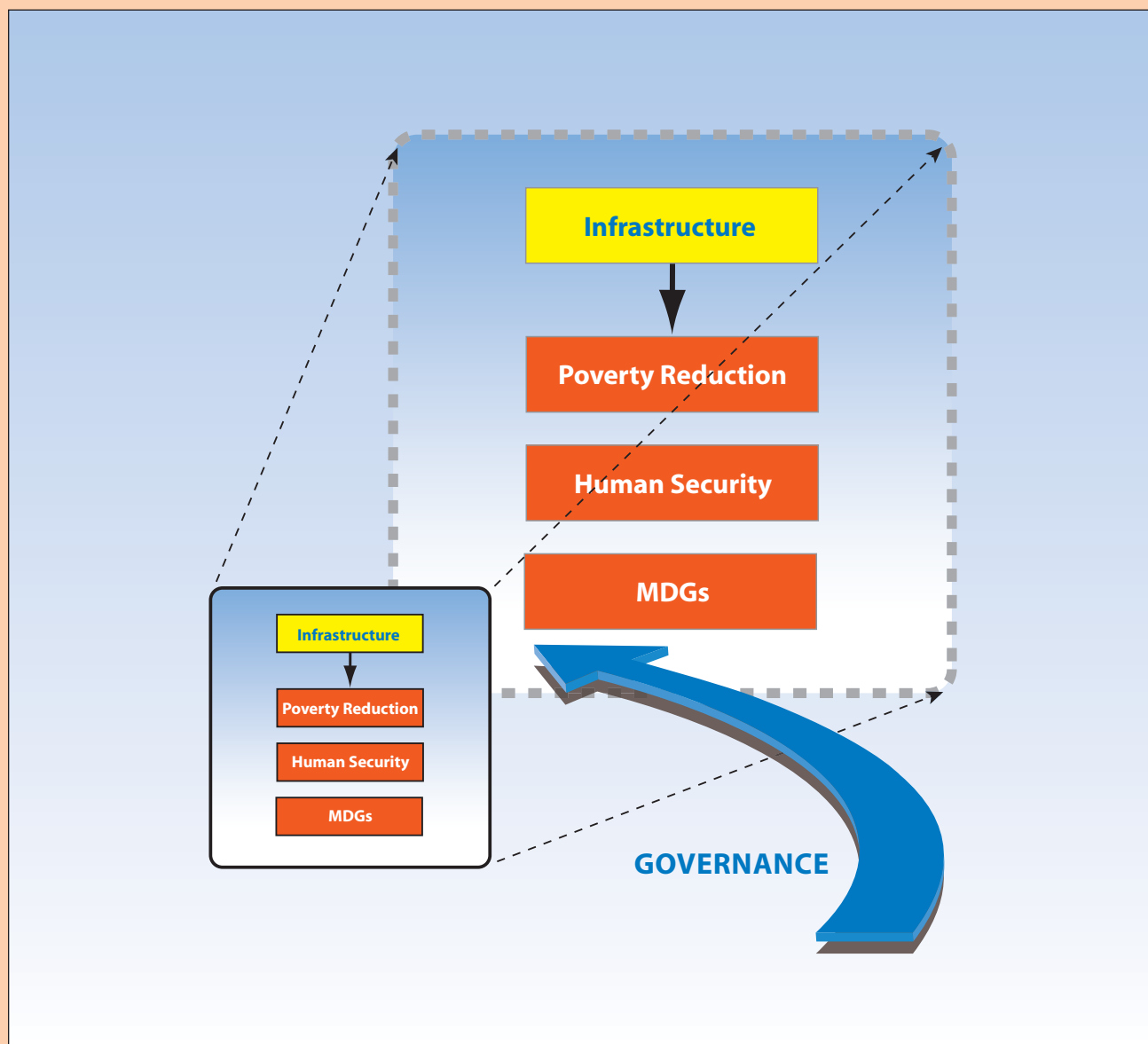
Only when a balance is maintained between the two can maximum impacts be achieved on economic growth and human development. The synergistic dynamics then make a significant impact on human poverty reduction and human security.

In sum, governance plays a major role in providing better and improved infrastructure services. First, with improved governance, there is an increased efficiency in resource use, with less waste in the form of leakages and corruption. Second, with better governance, efficiency in service delivery also improves. This maximises the effects of infrastructure. Third, better governance also ensures transparency and accountability. Furthermore, governance plays a major role in the scaling up process of the infrastructure (**FIGURE 4**).

The case for small-scale community-based projects

In the context of the overall infrastructure-poverty reduction-governance nexus, small-scale community-based infrastructure assume a special place. Compared with large-scale infrastructure projects, the small-scale community-based projects may present more insights with regard to poverty reduction and governance; for example:

Figure 4: Dynamics of scaling-up



❖ Because of the nature, location, design and implementation process, small-scale infrastructure may bring more direct impacts on the lives of poor people. Small irrigation projects contribute immediately to agricultural productivity bringing tangible benefits to local farmers. A rural feeder road improves mobility of local communities and reduces transportation costs which have impacts on economic activities. Rural public works programmes create jobs locally. Rural electrification through small-scale electricity generation contributes directly to the well-being of rural households. A small-scale infrastructure facility raises overall productivity of the local economy through the construction and maintenance of local roads, the water

supply systems, small bridges and local agricultural electrification projects, et cetera (Swada, 2000). There may be a high possibility to contribute directly to chronic poverty reduction through improving the average income levels of local communities.

❖ In cases of small-scale and community-based infrastructure, local communities take part directly in making decisions regarding the nature of the infrastructure (what would serve them best), their locations and designs. In small-scale community-based infrastructure, local communities can also take part in the implementation process. They can also be involved in the operation and maintenance of the infrastructures through mobilisation of financial and

human resources locally, developing local capacities and monitoring and evaluating the situation. This provides a sense of ownership to local communities, which is essential for the long-term sustainability of facilities.

- ❖ Small-scale community-based infrastructure helps to reinforce social capital and consolidate community organisations. For example, a local-level small-scale electricity generation project in a community reduces poverty directly-by contributing to irrigation of agriculture and increasing productivity of self-employed enterprises, for example. At the same time, such a local project can reduce poverty indirectly, by providing a means-a cause to rally around-through which the community strengthens its effectiveness as a local polity.

The small-scale community-based infrastructure efforts are complementary to large-scale infrastructure initiatives in many ways.

- ❖ First, small-scale infrastructure fills in the gaps left by large-scale projects designed from the top down. Furthermore, the small-scale infrastructure may be networked with large-scale infrastructure and there may be significant externalities. For example, when a rural feeder road is connected to a national highway, the incremental benefits for the rural people increase manyfold as they get the accessibility to larger markets and services.
- ❖ Second, there are complementarities between large-scale and small-scale infrastructure. Improvement of access to a high-quality main road and a transportation system enables improvement of agricultural technology, a stable supply of input goods and improvement in productivity (Lipton and Ravillion, 1995). The improvement of a local traffic system improves the liquidity of farmers and expands their opportunity for higher pay, while enabling the diversification of local economic activity and raising the overall income level significantly.
- ❖ Third, some of the governance lessons from small-scale community-based infrastructures may be replicated and scaled up in large-scale infrastructure.



IV. CONTEXTS OF COUNTRY STUDIES

In mutual consultations, four country studies were initiated in Bangladesh, Senegal, Thailand and Zambia. In terms of their locations, levels of development and infrastructural development, these four countries represent diverse situations.

Though Bangladesh and Thailand are both in Asia, Bangladesh is in South Asia and Thailand is in South-East Asia. Likewise, though Senegal and Zambia are both African countries, Senegal is French-speaking and Zambia is English-speaking, a significant difference. Bangladesh, Senegal and Zambia belong to the category of least developed countries (LDCs), while Thailand is a middle-income country. In terms of human development, Thailand is at the upper end of the middle category of countries, while Bangladesh is at the lower end of the same category. The state of human development in both Senegal and Zambia is low. These country contexts are summarised in **TABLE 1** and detailed in Annex 3.

Infrastructure development is central to the Poverty Reduction Strategy Papers (PRSPs) of Bangladesh, Senegal and Zambia. For Zambia, infrastructure development is placed at the centre of the graphic representation of national poverty reduction efforts, feeding into economic activities, social sectors (education, training, health and nutrition) and cross-cutting issues (environment, HIV-AIDS, and gender). In Senegal, infrastructure is explicitly discussed in the Economic and Social Development Plan Guidelines three and four, and referred to implicitly in several others, thus ranking, along with governance, as the country's top priority. The Bangladesh PRSP appears at first glance to show infrastructure ranked sixth among poverty reduction foci; but a closer look reveals the importance of infrastructure development to virtually all foci. For example, privatisation of utilities and services is important to the preservation of macroeconomic balance (top priority), while irrigation, drainage, and flood control are vital contributors to agriculture and rural development (priorities three and four), etc.

In selecting the countries, the focus was on Asia and Africa and on countries where there are UNDP and JICA-supported projects. Based on selected projects, each country study was supposed to cover two major issues, the infrastructure-human poverty reduction-human security enhancement linkage and the governance aspects of the infrastructure, with regard to small-scale and community-based infrastructure. With these goals in mind, the country studies, anchored analytically in the two concept papers, were expected to focus on the questions listed in **BOX 3**.

Since capacity development and governance are necessary in order for infrastructure projects to be beneficial to poverty reduction, the country studies concentrated on: pro-poor design, governance and capacity development at community levels, impact on human poverty reduction and human security enhancement and scaling-up. Pro-poor design

should meet the criteria of the five 'A's: availability, accessibility, affordability, acceptability, and adaptability. The governance issues should focus on the roles of communities and local governments and their inter-relationships at various stages, from planning and implementation to operation and maintenance. The country studies highlighted the concrete lessons with regard to human poverty reduction, human security enhancement, operations and management, and capacity development at community levels.

The country studies were not expected to cover all the relevant small-scale, community-led and community-managed infrastructure projects in the country. Rather, it was decided that a sample of five to six projects should be selected from various sectors, e.g. rural roads and bridges, safe water, rural irrigation and electrification, primary health care and community support. In addition, projects were selected based on their variety of management modalities. These diversities were needed to assess the poverty impacts of various kinds of projects from different angles and also to

consider the effects, if any, of different kinds of governance structures. It was further decided that since in three of the four countries selected (except for Thailand), the Japan International Cooperation Agency (JICA) is involved in funding small-scale infrastructures, the project selection in these three countries should include some JICA-funded projects. Projects funded by other donors were also included in these three country studies. Within this broader framework, each country study, however, used specific criteria for project selection and these criteria have been detailed in each study.

TABLE 2 presents the projects selected and their funding sources in four country studies. Annex 4 presents outline of selected projects for each country study in terms of location, objectives and duration.

The methodologies used by the country studies have some general elements, common to all studies, as well as specific dimensions, relevant to each specific study. The common elements of the methodologies used in the studies can be summarised as below:

Table 1: Summary of country contexts: Bangladesh, Senegal, Thailand and Zambia

	Bangladesh	Senegal	Thailand	Zambia
Demography				
Total population (in million) 2003	137	11	63	11
Population growth rate (%), 2003-2015 (Projected)	1.7	22	0.7	1.7
Economy				
Total GDP (US\$ billions), 2003	52	7	143	4
GDP per capita (US\$), 2003	376	634	2,305	417
Per capita GDP growth rate (%), 1990-2003	3.1	1.3	2.8	-0.9
Human development				
Human development index (HDI), 2003	0.5	20	0.458	0.394
Life expectancy at birth (in years), 2003	63	56	70	38
Adult literacy (%), 2003	41	39	93	68
Income poverty (One dollar a day), 1990-2003	36	26	<2	64
Gender issues				
Gender-related development index (GDI), 2003	0.514	0.449	0.774	0.383
Gender-empowerment measure (GEM), 2003	0.218	-	0.452	-
Female youth literacy (%), 2003	41	41	98	66
Female economic activity rate (%), 2003	73	62	73	64
Women in parliament (%), 2003	2	19	8	13
Infrastructure				
Access to safe water (%), 2002	75	72	85	55
Cell phones (per 1,000 people), 2003	10	56	394	22
Electricity consumption per capita kilowatt-hours), 2002	119	141	1,860	603
Roads				
Area irrigated				

Source: UNDP (2005)

Box 3: Issues country studies addressed

- ❖ What are the conditions and problems that led to provision of the identified infrastructures and what were they expected to achieve?
- ❖ How are infrastructure projects identified and decided upon at the community level regarding location, size and design, and procurement?
- ❖ Do poor people become part of the decision-making in all these processes? If not, why not?
- ❖ Who takes initiative in infrastructure planning, implementation, management and maintenance of infrastructure and what mechanisms are adopted for these?
- ❖ What are the roles of different actors or stakeholders and what are their interrelationships in all these processes?
- ❖ What benefits and costs accrue to poor people from infrastructure development?
- ❖ How are infrastructures maintained and the benefits of the infrastructure developed sustained?
- ❖ What and whose capacities and institutions are necessary to achieve goals of infrastructure development?
- ❖ What capacities and institutions are developed in the process?
- ❖ What are the lessons learned, with policy implications? What are the mechanism and capacity of local governments and local people which enabled benefits of infrastructures scale up (if there are such cases)?

Source: Terms of Reference for country studies

❖ **Review of existing literature, documents and data:** All country studies used such review as the starting point for their research. Information from the secondary sources was gathered from the respective project offices. This included obtaining various project reports (such as project proposal, feasibility reports, evaluation reports, impact study) and analysing the data and information therein.

❖ **Questionnaires and survey:** All country studies used questionnaires and survey to collect quantitative data from the projects. The detailed questionnaires for the Bangladesh and Zambia studies are provided in the annex of those studies. The questionnaires have also been pre-tested in each study.

With questionnaires, field trips were undertaken for interviews with various actors and stakeholders in project areas. Those interviews generated both quantitative and perception data. The information gathered was then collated and mathematical and statistical techniques (e.g., arithmetic mean and ratio comparisons) were used to derive quantitative conclusions from them. Comparative analyses were made with information from various sources for consistency.

❖ **Case studies:** Each country report used case studies to collect qualitative data. Several rounds of focus group discussions (FGDs) were also conducted involving the beneficiaries and the stakeholders. All the studies ensured that at least some of their FGDs included members of extremely poor household. Special FGDs comprising female beneficiaries exclusively were also conducted in every project area. Several case studies were also carried out to illustrate the effects of infrastructure services. In many instances, field visits were made to obtain follow-up information or conduct interviews with FGD participants and key informants. The qualitative methods used were graphical presentations: bar graphs, pie graphs and tables, graphs of frequency of relevant variables.

To gain further insight, project-specific instruments were designed in a number of cases. For example, for the Bangladesh study, a 12-hour traffic survey was carried out in the portable steel bridge localities to see the use of infrastructure services by various types of beneficiaries (e.g., students, male, females, traders, etc.).

The specific methodologies used in each country report have been described in each study. However, it is important

Table 2: List of projects included in four country studies

Country	Selected projects	Funding sources
Bangladesh	<ul style="list-style-type: none"> • Portable steel bridge (PSB) • Small -scale water resources development sector project (SWRDSP) • Participatory rural development project (PRDB) • Sirajganj project (SP) • Sustainable rural electrification project (SERP) 	<p>Government of Japan</p> <p>ADB, IFAD, Governments of Bangladesh and the Netherlands</p> <p>JICA</p> <p>UNCDF, UNDP and Government of Bangladesh</p> <p>UNDP</p>
Senegal	<ul style="list-style-type: none"> • The Health Integrated Development Programme (PDIS) • The Town Councils Support Programme (PAC) / Municipal Development Agency (ADM) • The Local Development Fund (FDL) (Kédougou) • Rural Areas Decentralization Support Programme (PADMiR) • The Poverty Fighting Programme (PLCP) • The National Rural Infrastructures Programme (PNIR) • The Drinking Water For All Project and Support to Community Activities (PEPTAC) • Programme of Building of Hydraulic Infrastructures in Rural Areas from 1979 to 2003 • Rural Communities Promotion (PROCR) of the regions of Fatick and Kaolack which became later on the Groundnut Basket Programme (Programme du Bassin Arachidier) 	<p>World Bank</p> <p>World Bank</p> <p>FENU(FDL), Government of Senegal's Local Development Support Programme (PISDEL)</p> <p>UNCDF, EU, the Government of Senegal, Local communities</p> <p>African Development Bank/the Nordic Fund, Government of Senegal</p> <p>World Bank, OPEC, ADB</p> <p>JICA</p> <p>JICA</p> <p>KFW</p>
Thailand	<ul style="list-style-type: none"> • Doi-Tong Development Project • Krai Kang Won Distance Learning Programme KKWDL) • Kung Krabaen Seawater Irrigation Development Project (KKSIDP) • Lomsak Primary Care Unit (PCU) • Panasnikom Pipe Water Supply (PPWS) 	<p>Initiative by King's mother</p> <p>Krai Kang Won Foundation under the patronage by the King</p> <p>Government of Thailand</p> <p>Government of Thailand</p> <p>Local Administration, Government of Thailand</p>
Zambia	<ul style="list-style-type: none"> • Linda Water Project • Kanyama Water Project • Chipata Water Project • George Water Project • Mtendere Health Centre Project • Ng'ombe Health Centre Project 	<p>Various donors</p> <p>DFID</p> <p>DFID</p> <p>JICA</p> <p>JICA, Irish AIDS</p> <p>JICA, DHMT</p>

to note that the methodologies have many limitations. First, even though there are common elements in methodologies adopted in four country studies, the quality of methodologies in terms of execution varied from country to country. Thus the robustness of information gathered was not the same. Second, since even within each country, projects were different in nature—ranging from water to health to roads and bridges—the results were not strictly comparable. Third, the methodological elements, which are specific to each country, make any inter-country comparison difficult.



V. KEY FINDINGS OF COUNTRY STUDIES AND LESSONS LEARNED

The key findings of the country studies are summarised thematically below. In assessing this deliberately broadbrush summary, a few points are worth noting:

- ❖ First, the findings are drawn from a relatively small sample of selected projects. Though these projects may be taken to be somewhat representative, any generalised conclusions should be regarded as speculative.
- ❖ Second, quantitative presentations should also be looked at with care as in some cases, the time period may be short or the base line data may not be robust. Furthermore, observed quantitative improvements or changes in selected indicators cannot fully be attributed to the project itself. In fact, it is difficult to identify the precise contribution of the project to such improvements, but one can assume that if there are improvements and as the project is operating, there may be some association between the two.
- ❖ Third, straightforward inter-country comparisons should be avoided as the contexts are different and the methodologies for assessments, even with some common elements, may be different.

Small-scale infrastructure contributes significantly to reduction of income poverty and hunger

Most of the projects included in the country studies have indicated that small-scale infrastructure contributes significantly to reducing income poverty and hunger. This finding was, more or less, the rule across the four country studies. Despite measurement challenges, there is clear evidence of increased incomes, particularly from poor people, from the

projects studied. A second way poor people benefited from these projects is by shifting vocational categories, from day labourer to micro-enterprise entrepreneur. This transition, often aided by micro-lending and other support, allows for a much larger jump in income, but with an additional source of risk, as well. A third way income of poor people was increased is through a general rise in the demand for unskilled labour, reducing the frequency and duration of periods of unemployment. In addition to project construction and maintenance activities (typically scheduled for the slack season), improvements in land quality, irrigation systems, and connectivity to markets and suppliers encourage a shift to high-yield varieties (HYV) of crops and more intensive cultivation techniques, which require yet more labour.

The Small-Scale Water Resources Development Sector Project (SWRDSP) of Bangladesh is a good example of how small-scale infrastructure projects can contribute to reduction of income poverty and hunger. Improvements in flood management, water conservation capacity, irrigation facilities and decreasing water congestion have reduced some of the risks traditionally faced by farmers while bringing new benefits in terms of increased productivity, higher cropping intensity and more profitable cash crops. Due to a better water management, the cultivable land has increased by about 16 percent—a remarkable achievement for a land-scarce country like Bangladesh. The cropping intensity in the project area has increased by more than 18 percent as availability of irrigation water during the dry season allows the farmers to harvest multiple crops. In fact, with the introduction of commercial crops that are more profitable to farmers, the dependence on traditional crops has declined.

Because of the project, there have been significant changes in the yield rate as well. For example, the yield rate of the Aman paddy has increased by 63 percent and that of Boro paddy by 31 percent. The production of cereal crops has gone from less than 50 thousand metric tonnes in 1999 to more than 250 thousand metric tonnes in 2003. During the same period, the production of non-cereal crops increased from less than 10 thousand metric tonnes to more than 200 thousand metric tonnes.

Nor did the SWRDSP limit its activities to crop production only. A dozen fishery projects were created which have enhanced incomes of 80 households; dairy firms, poultry firms and nurseries have been initiated, benefitting 40 households. The resulting non-farm activities and employment opportunities have undoubtedly helped reduce the severity of extreme poverty and hunger.

Other opportunities for new employment and income gen-

eration were created, including some that addressed the issue of extreme poverty. Embankments built under the project were also used as roads. Immediately people started investing in rickshaws and rickshaw-vans. In terms of income earned, driving a rickshaw-van is usually more rewarding than working as a hired agricultural labourer. Construction and maintenance works related to culverts, small bridges, repairs of embankments, irrigation facilities have generated many direct employment opportunities as well. Under the SWRDSP, the earthwork (prior to and during construction) is carried out through the Labour Contracting Society (LCS), which is mainly constituted by the relatively poor people of the locality, both male and female. The work is very labour-intensive in nature, allowing a relatively large number of people's employment in such activities. More important, the steady work represented by the earthwork acts as a safety net to many members of the disadvantaged population, who would otherwise be quite vulnerable to sudden economic shocks.

The feeder roads and the embankment-based roads under the SWRDSP resulted in trade and small businesses. Major rural marketplaces (haats), small grocery and tea stalls were opened along the road sides to cater to the needs of road users. Better roads and transportation networks have facilitated the marketing of agricultural products. Farmers (specially small and marginal farmers) are now able to market perishable goods in time with reduced transportation costs. Moreover, because of market expansion and increased availability, prices are more stable. All these have resulted in higher returns for people dependent on agricultural activities. In the SWRDSP area, the median cost of travelling to the nearest market has fallen from 15 Bangladesh taka (BTK, or US\$ 0.25) to BTK 5 (US\$ 0.08).

In concrete terms, the daily per capita income in the SWRDSP project area has increased from BTK 55 in 1999 to BTK 80 in 2004—an increase of 45 percent. As the consumer price index during the same period has increased by about 17 percent, income has increased by 28 percent in real terms. In terms of income poverty, it was halved in the Chuadanga sub-project area—from an incidence of 60 percent to 30 percent—and nearly halved in the Natore sub-project area—from an incidence of 70 percent to 40 percent.

The SWRDSP has also been quite successful in enhancing human security on several fronts. To start with, the increases in agricultural productivity have helped improve the food security of people, particularly of poor people. With higher production of food grains, better management of food distribution, the availability of food has improved for poor

people. Second, the project has also contributed to job and income securities of people in the area. With more employment generation, people now have access to jobs in what was traditionally farming's off-season.

The success of the SWRDSP project in combating hunger and poverty is also related to the fact that it was conceived and implemented as a package—irrigation and water management, roads and embankments, crop and non-crop activities, employment and marketplace creation—and consistently focussed on poor people. Without such a package approach and supporting factors, sometimes poor people cannot capitalize on the opportunities provided by even the small-scale infrastructure.

Mortality rates are reduced with expansion of small-scale infrastructure services in health and water areas

Infrastructure initiatives that improve a community's access to a primary health care centre, with its medical equipment, skilled nurses and health personnel who work actively to promote healthy practices and health education to community residents, can contribute to reducing mortality rates, particularly child and maternal mortality. This has been amply highlighted by the Mtendere Health Centre Project and the Ng'ombe Health Centre Project, included in the Zambia Study. The incidence of diseases that are common causes for child mortality, like diarrhoea, malaria and pneumonia, can be used as an indication for child mortality. Respondents representing all socio-economic groups in both the project areas noted a considerable improvement related to this incidence (**TABLE 3**)

The medical attendance during pregnancy and after giving birth, before and after the project, was used as an indicator, as well as medical attendance at childbirth. In Mtendere, there were considerable differences between the better off and the poor in terms of attendance during pregnancy and after giving birth. These differences have disappeared, more or less, after the project. Differences were not as pronounced in Ng'ombe, except for attendance after giving birth among the poorest. Also, the difference has disappeared after the project (**TABLE 4**).

Before the project started, the better-off women were typically attended by a licensed midwife when giving birth, while the poor and poorest women more often went to an untrained midwife or a relative or did not receive any attendance at all. After the project, the use of licensed midwives and the community clinic for birth attendance has

Table 3: Incidence of illness among children compared to before the project, Zambia

	Better off	Poor	Poorest
Ng'ombe	3.91*	3.91	3.83
Mtendere	3.90	3.83	(3.22)

* Mean score on scale between 1 (much higher incidence) and 5 (much lower incidence). Source: Zambia Country Study

Table 4: Medical attendance during pregnancy and after giving birth, Zambia

			Regular check-up during pregnancy		Regular check-up after giving birth	
			Yes (%)	No (%)	Yes (%)	No (%)
Mtenndere	Before	Better off	72	28	63	37
		Poor	59	41	45	55
		Poorest	-	-	-	-
	Now	Better off	91	9	80	20
		Poor	81	19	90	10
		Poorest	-	-	-	-
Ng'ombe	Before	Better off	69	31	75	25
		Poor	70	30	68	32
		Poorest	64	36	33	67
	Now	Better off	88	12	75	25
		Poor	93	7	86	14
		Poorest	93	7	93	7

Source: Zambia Country Study

increased for socio-economic groups in both projects. Attendance by untrained midwives and by relatives has decreased.

Access to safe drinking water also produces better health outcomes and lower mortality rates. This is illustrated by the Kanyama Water Project, included in the Zambia Country Study. The impact of improved drinking water provision on child mortality can be measured by the incidence of water-borne diseases. About 70 percent of all respondents indicated that the incidence of diarrhoea is less and much less after the project and among children. Among the poorest about 57 percent indicated that because of access to safe water, the incidence of diarrhoea has declined among children.

This has happened because there was a marked improvement in the quality of water, and many people were spending much less time fetching water. Less time spent fetching water means that people have more time for income-

generating activities and other household tasks. Because of better access to safe water, more than 60 percent of poor people had more time to spend on income-generating activities; the poorest reported an increase of more than 30 percent.

With better access to improved health services, health security of people in the project areas has gone up. Improvements in access to safe drinking water have contributed to that. Reductions in water-borne diseases including diarrhoea have improved the health security of children and their mortality rates have declined.

Small-scale infrastructure has a positive impact on education

The country studies have argued that small-scale infrastructure contributed to educational attainment through various transmission mechanisms. First, better roads led to lower

transportation costs and better security; as a result, school attendance improved and drop-out rates fell, particularly for girls. Second, improvement of school facilities also contributed positively in these areas. Third, improved energy facilities by providing electricity in households and bringing televisions and computers to households help students improve their skills. Finally, there are a series of indirect impacts-enhanced income from other infrastructural development, better awareness of parents and so on.

As the Sirajganj Project (SP) in the Bangladesh Country Study shows, improvements in village roads and other infrastructural facilities (e.g., repairing damaged and partially damaged roads and classrooms, construction of culverts for easy movements of people) have greatly motivated households to send their kids to schools. In the SP, project activities related to school infrastructure development got some priority, which made schools interesting and attractive to children. In the SP area, classrooms of the primary schools have been repaired and local community has been sensitised about the importance of primary education which perhaps resulted in greater interest among the children and community about schooling and thereby higher enrolment and lower drop-out after initiation of the project (TABLE 5).

Indirect effects of SP are likely to be very strong in promoting primary education. There are several avenues through which these infrastructures influenced progress towards better educational attainment. Income earning opportunities and economic activities expanded following the project, raising the living standards of the poor households. When incomes increased, educational attainment of household members tended to increase. Previously school-age children from the poorest households often were engaged in economic activities.

The Sustainable Rural Electrification Project (SREP), one project included in the Bangladesh Study, reports that provision of electricity in rural households significantly increases children's attention and willingness to study and



also enhances the school attendance rate. In the focus group discussion with males, 50 percent have said that after rural electrification children's attention and willingness to study has increased, while with female focus group, 70 percent said that it has gone up. In both groups, only 10 percent said that school attendance rate has increased, while nearly 70 percent disagreed, which suggests that people value other considerations more as the motivation for higher attendance at school.

One of the major impacts of the SP is that people feel safer sending their children to schools. They also feel that because of the better roads and bridges they can move around freely for economic and social reasons. Better infrastructure has also provided quicker access to law enforcement agencies, thereby enhancing security in the face of threatened crimes.

The phenomenon of HIV/AIDS can also be influenced by small-scale infrastructure

A community health care project may mitigate the effect of HIV/AIDS to some extent, but it cannot reverse it. In the community context, three issues are important: access to voluntary counselling and testing, awareness and sensitivity about the epidemic and knowledge of and access to Anti-Retroviral Treatment (ART).

Table 5: Enrolment, drop-out and attendance rates in the SP

	Enrolment rate (%)		Drop-out rate (%)		Attendance rate (%)	
	Before	After	Before	After	Before	After
Bhengri village	65	70	60	45	68	98
Char Satra village	30	65	76	49	70	95

Source: Bangladesh Country Study

The Zambia Country Study has addressed the first and the third of these issues in the context of two health projects included in the study, the Mtendere and the NG'ombe Health Projects. Access to voluntary counselling and testing facilities has increased tremendously for all socio-economic groups in both projects. Community facilities are now used more than outside facilities. The community clinics today accounted for 83 percent of the counselling and testing in Ng'ombe and 71 percent in Mitendere.

As for the ART treatment, the better-off in both projects are significantly more knowledgeable than the other socio-economic groups. But compared to the knowledge on ART treatment before the project started, the situation has improved considerably. The treatment itself is now considered to be much more accessible.

Working on the assumption that knowledge can lead to prevention, the Doi-Tung Project in Thailand concentrated on awareness building for HIV/AIDS, education about it, removal of stigma. The project has been able to enhance knowledge in the project area on all relevant issues across the board—causes of death, syringe-based infection, sexual intercourse, infection in pregnancy, social inclusion, risks among sex workers etc. (**FIGURES 5 AND 6**). The figures also indicate that significant progress has been made in areas of infection in pregnancy. What is most encouraging is that misconceptions and social stigma seem to have been reduced as knowledge of social inclusion has risen.

Awareness about the epidemic of HIV/AIDS, access to counselling and testing and knowledge of and access to ART treatment have significantly reduced the vulnerability of people with regard to HIV/AIDS. People feel more secure as they become more knowledgeable, receive better advice and have improved access to treatment.



Small-scale infrastructure can move forward gender equality and women's empowerment

Most of the projects assessed in the country studies clearly indicate two major trends with regard to gender equality and women's empowerment. The first one is that these interventions can really help remove gender inequality in capabilities and opportunities, and the second one is that in order to achieve the first goal, the design and location of these infrastructures should be such that women with all their socio-cultural constraints can derive full benefits from them. For example, whether or not women can make maximum use of a community's drinking well depends on its location: is it near an open public place where women feel comfortable and secure?

The Local Development Fund (FENU) project in Senegal particularly aimed at promoting local communities' essential functions as grass roots-actors for the coordination of the local economic life. Its major focus was women. It involved women in the community management of lands, enhanced their capabilities as economic and social actors and identified them as the anchorage of rural communities, coordinating the economic and social life between many villages. It used instruments like a local development fund, microfinance lending facilities, particularly geared towards women's needs.

The project built a total of 92 infrastructure facilities. In addition to this physical infrastructure, women were trained in various activities—61 in natural resource management, 81 in financial management and 30 in communal administrative work. More than 1,000 community groups were brought under the project, imparting literacy to 443 women, setting up 67 bushfire fighting committees, developing 75 hectares of land, planting 23,635 small trees and financing nine revenue-generating projects.

Women benefited widely from investments financed by the project. Among public infrastructures, the building of health huts and the drilling of wells were extremely significant for women. Women were also the main beneficiaries of micro-finance. The training of community health workers, matrons, rural midwives, veterinary auxiliaries, contributed to capabilities of women and created opportunities for using those capabilities. The public provisioning of school books and the building of classrooms for female students in rural areas helped to improve girls' access to school and their performances. All these had positive impacts on poverty.

Women also took active parts in drafting documents on local planning including the Annual Investment Plans, and in setting up management, follow-up, maintenance and

Figure 5: Knowledge on HIV/AIDS of Dwellers in Doi-Tung Project (1993), Thailand

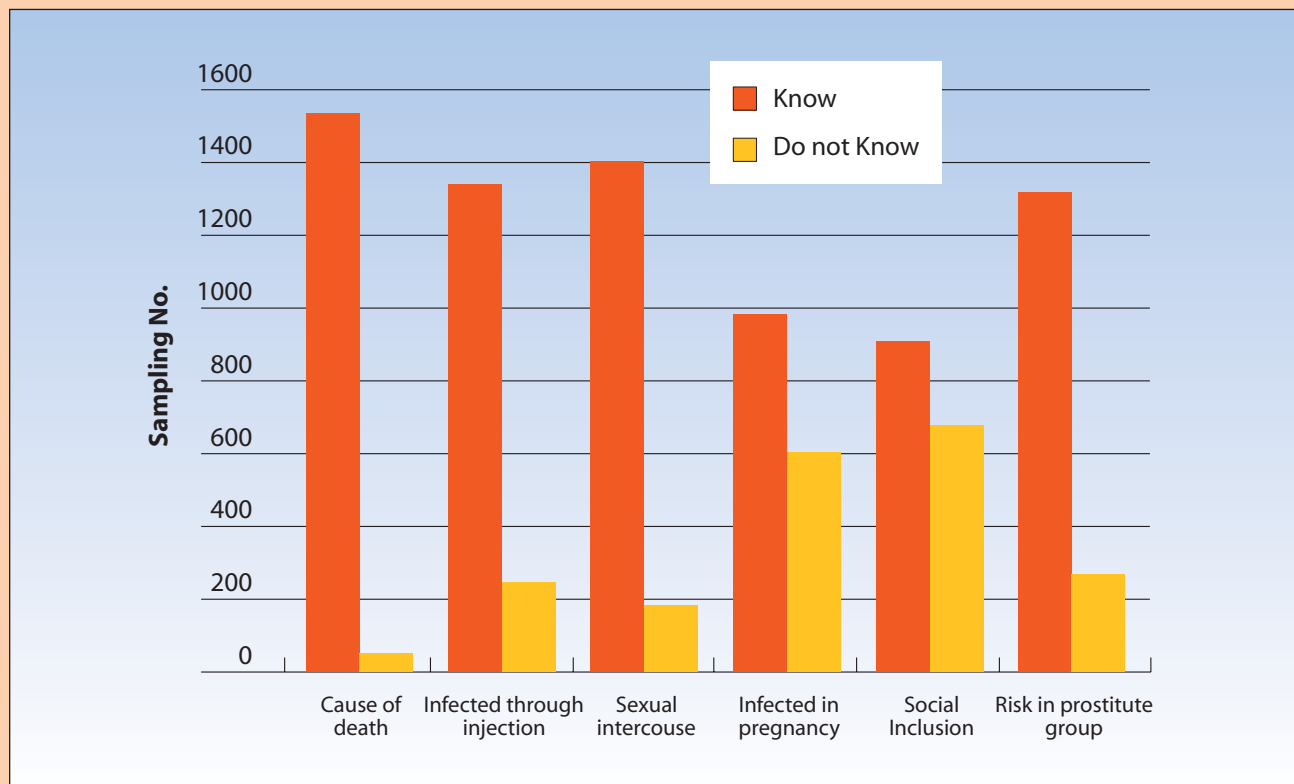
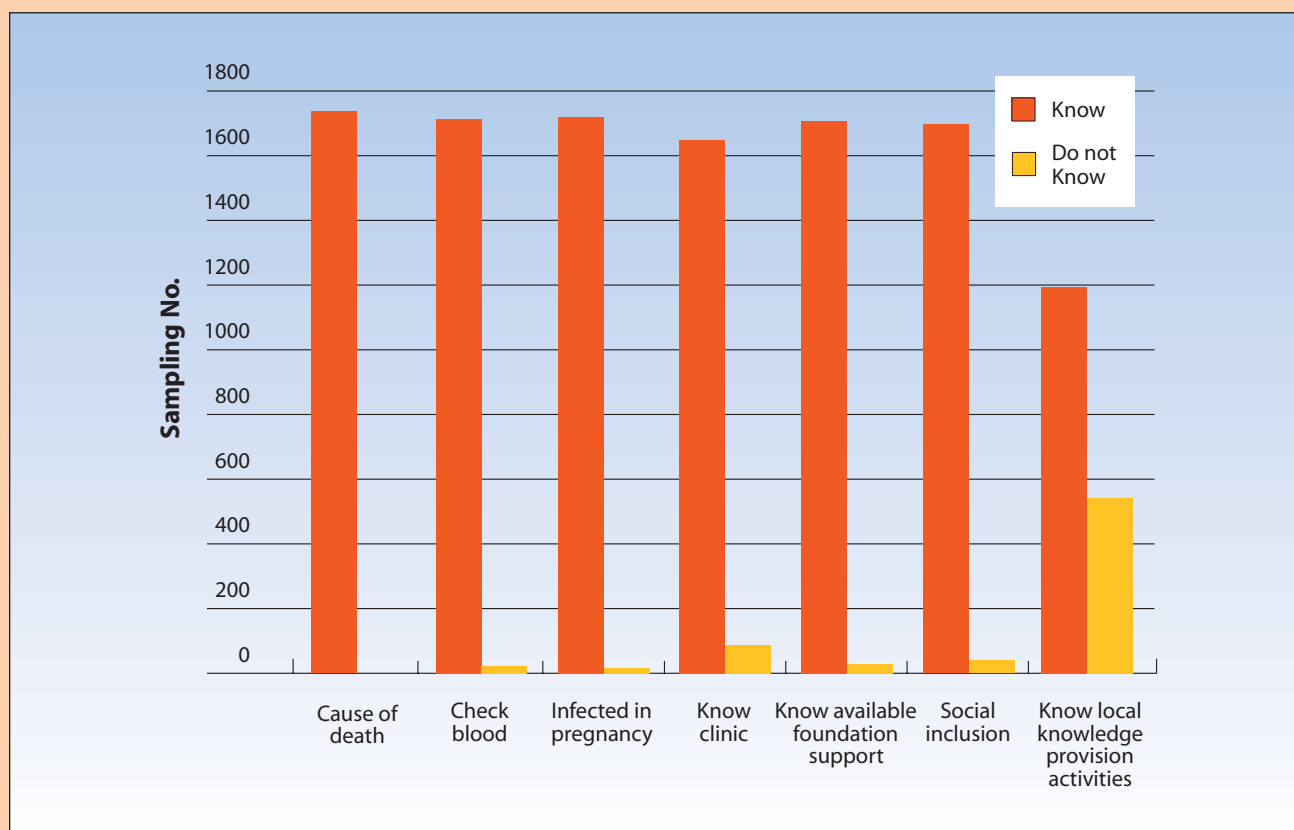


Figure 6: Knowledge on HIV/AIDS of Dwellers in Doi-Tung Project (2001), Thailand



dialogue committees. They emerged as community leaders, and grass root actors-facilitating dialogues among the various actors at the national, regional and community levels. Women also significantly contributed in the infrastructure building process and maintenance, rehabilitating priority socio-collective structures, elaborating and implementing eco-development modules, examining how to set up hollows and irrigated village perimeters (lands) and supporting initiatives meant for protecting and recovering natural resources.

Women benefited from various types of training including leadership training and acquired some very useful knowledge (planning, calls for tenders) through practice. The project also helped to reinforce local communities as institutions with women leading the process. Women were also found to be good managers of natural resources, even though the positive impact of the project in this regard was modest. Trees were planted and village committees are trying to see how to help to fight bush fires. Some of the lessons regarding women's leadership and their positive contribution to local level development were taken to the macro-level.

Gender issues, women's well-being and empowerment and human security

Even though many projects studied under the four country studies focused on gender equality, women's well-being and human security, some of them have been quite successful in bringing them together in a comprehensive way. The Potable Steel Bridge (PSB) project, funded by Government of Japan in Bangladesh is a prime example.

The project highlights as to how small-scale infrastructure can contribute to gender equality and women's participation. First of all, the sites of these bridges have been selected in such a way so that they are accessible by women and the surroundings are safer for them. As a result, one can see a lot of women walking on the bridge. Second, the size of the bridge and its design do not intimidate women. Third, most of the transportation modes used on the bridge are familiar to women.

The PSBs along with the network has increased the mobility of women tremendously. In Savar and Chandina sites, male movement increased by a factor of less than 5, compared to a factor of 8 for women. Women can now visit clinics/hospitals, markets and houses of their relatives with a sense of security. They can also purchase their daily necessities from local markets in the absence of their male counterparts. Thus PSBs have helped women participate more in social and community activities.

But their improved mobility also has economic and human development implications. For example, after the construction of the bridge at Savar, female workers were in a position to commute to and from their workplaces. This has facilitated and encouraged women to take wage employment. This had particular implications for women working in garment factories, a number of which are located in Savar area. Nearly 300 women in that area are employed as garment workers. Now they can go to their workplace by rickshaw and can return the same way. This saves them time and provides them with security as many of them finish work at night.

With better communications because of PSBs, a number of NGOs have moved into the areas served by these bridges. This has particular implication for women, many of whom do not want to or cannot go out of home for various reasons. With the NGOs coming to their doorsteps, the microfinance and self-employment of women have increased significantly in various project areas. The NGOs are also undertaking training for income-generating activities for women in such areas as poultry, cattle rearing, vegetable gardening, handicrafts, pond-fish culture and a series of other activities.

Due to better communication because of the construction of PSBs, school enrolment rate of girls has increased significantly. This has happened not only at the primary level, but also at the secondary level. For example, in the Savar area, the secondary female enrolment rate has gone from 55 percent to 85 percent, while in the Chandina area, it has increased from 45 percent to 80 percent. The drop-out rate for girls has decreased from 50 percent to 10 percent at the secondary level.

The PSB Project, included in the Bangladesh Country Study, really contributed to enhancement of human security in a comprehensive way. First, with the construction of the bridges, the mobility of people at a cheaper cost has increased significantly. This can be deduced from **TABLE 6**. Three implications are obvious. First, easier and cheaper access to markets has made it possible for farmers to move their products (particularly perishable products) in time to markets for good price and profits. This has improved their income security. Such access has also enabled poor people to move around in search of job opportunities, with positive impacts on job security and income. Second, faster access to hospitals is critical to health security. Third, faster and cheaper access to schools impacted positively on enrolment, drop-outs and attendance.

All these issues have important gender implications. The PSBs have provided easier, cheaper and safer mobility for

Table 6: Time and cost of mobility in Savar area, Bangladesh

	Time (minutes)		Cost (taka)	
	Before	After	Before	After
Nearest schools	60	15	15	5
Nearest hospital	75	22	20	7
Nearest market	60	15	15	5

Source: Bangladesh Country Study

women. Before the construction of such bridges, parents were afraid of sending their children, particularly daughters, to school due to the risk of crossing rivers by boats as well as insecurity in roads, etc. With better security now, more girls are going not only to primary schools, but also to secondary schools. The saving in time because of better mobility due to the improved network of roads and PSBs has benefitted women, who can now have more time for various socio-economic activities they want to pursue. Last but not the least, improved mobility has had an impact on economic opportunities of women in terms of jobs and income.

Access to police stations and other law enforcement agencies has improved under the PSB project. This has also enhanced personal security of people. Planting trees near the bridges has helped the environmental security as well.

Small-scale infrastructures can enhance environmental sustainability

From an environmental point of view, small-scale infrastructures are often thought to produce a win-win situation—achieving the economic goals and at the same time maintaining environmental sustainability. The Thailand Country Study includes such a project: Kung Krabeen Seawater Irrigation Development Project (KKSIDP).

The purpose of KKSIDP is two-fold: shrimp farming and ensuring supply of good quality water. Before 1999, the main causes of failure in the shrimp farms in Kung Krabaen Bay were poor environmental conditions and weaknesses in the farm management system that allowed for infection of the shrimps by yellow head bacuvirus. The problem of water quality deterioration in Kung Krabaen Bay occurred mainly in the canals and in the inner coast region. The lack of separate fresh seawater resource and wastewater discharge canals exacerbated the problems of obtaining good quality water for efficient shrimp farming.

The KKSIDP was implemented in 1999, promising a suitable new water resource for shrimp farming. The

seawater irrigation has prevented any negative impact of water discharging from the shrimp farming activity. This result was supported by the views of the seawater irrigation members (66.3 percent of the respondents said after the operation of the project the environment is better). The members' capability to manage the seawater irrigation system, as measured by the willingness to pay operation and maintenance costs, remain high. More than 60 percent of the respondents were willing to cover the cost of operation and maintenance.

The important criteria for the success of the Seawater Irrigation Project are (a) the mode of shrimp culture being practised, (b) the water resource management system, (c) preservation of the water quality in the Gulf of Thailand, and (d) research and extension activities of the project. Today, farmers have access to good quality water year round; strong network of canals make irrigation very successful and easy to access; low cost, as well as fertiliser are being created from sludge produced by shrimp farms and farmers are satisfied with results. Environmental awareness among the farmers has increased. **TABLE 7** indicates the improvement in water quality because of the project.

Small-scale infrastructure, if properly oriented, contributes to community building and social capital

One perceived value-added of small-scale community-based infrastructure is that people feel a kind of collective ownership and this helps consolidate community feeling and build social capital. This has happened in the Rural Communities Promotion (RCP) project included in the Senegal Country Study.

The overall objectives of the project were to improve rural populations' living conditions and strengthen local communities' political voice. The project followed a participatory approach through the development of local development plans, community-based investment plans and priority

Table 7: Water quality index around the KKSIDP, Thailand

Water quality Index	Before seawater irrigation (1995-1998)	After seawater irrigation (1999-2002)
Transparency (cm.)	108.97	123.26
Temp (°C)	29.18	28.52
Suspended Solid (mg/l)	17.14	13.87
PH	8.18	8.13
Alkaline (mg/l)	113.54	111.02
NO3- (mg/l)	0.0074	0.0139
PO43 (mg/l)	0.0041	0.0021
SiO2 (mg/l)	0.438	0.519
Total Ponds/m	73.61	117.60

Source: Thailand Country Study

investment plans. Local communities contribute up to 15 percent of the total cost for income-generating projects (commercial equipment), and up to 10 percent of the total cost for other social projects. In-kind contributions namely in form of participation in works are accepted. The management and maintenance of the infrastructures built are carried out by local communities that should include in their annual running budget funds needed for that purpose. Funds meant for maintenance are deposited in a bank account. Those infrastructures, sustainability and perpetuation mechanisms are supplemented by the setting up of management committees.

There is no doubt that implementation of the project helped build and rehabilitate many infrastructure services, namely health, education, water, sanitation, cleaning, production support (cattle-breeding, agriculture), socio-collective infrastructure, etc. The results analysis shows the emphasis was mostly on the building of new structures rather than on rehabilitation. More specifically, the project emphasised water, health and cleaning facilities, as well as commercial and educational facilities. A total of more than 515 structures were either built or reconstructed or equipped, and this effort contributed to local development and poverty reduction.

In addition to physical achievements, the programme helped to reinforce the technical capacities of local leaders, project members, and coordinators (training, support in the project management), to set up operations, sustainability and perpetuation through the planning process, interactive radio programmes, infrastructures management and maintenance tools, the increase of local communities financial resources (access right, rent, tax on commercial infrastructures).

But the real value-added of the project extended beyond the physical building efforts. By making the community partially responsible for the financing of the project and its operations, a sense of ownership was created. Local communities had full responsibility for the identification and the choice of activities, and partial responsibility for the infrastructure management. They were fully involved in the building and follow-up activities of the project, and partially involved in assessment activities. They play a full role in the supervision of maintenance activities, and a partial role in maintenance activities. **TABLE 8** identifies the role played by the community in various aspects of the project.

All these created a kind of community solidarity and bonded the community members strongly. As a result, they started acting as members of the same family-inquiring about each others' well-being, providing help to each other, mobilising their resources for collective initiatives. This spilled over to a number of other initiatives that the community has taken. For example, a group of members of the community started crop-husking operations, a child care facility was opened at someone's place so that mothers who work on the field can leave their babies there; a primary school was set up through community efforts for younger children. The social capital created by the RCP project was applied outside the project itself.

The project, in a sense, helped address the issue of human security on a larger scale. At one level, it helped improve environmental sustainability. On the other, by contributing to building roads and bridges, the project also helped enhance health security, job and income security as well as personal security. But in a larger sense, by forging community solidarity, the project helped build social capital and community security. People belonging to that community feel part of a

Table 8: Roles and responsibilities of the beneficiaries in RCP Project, Senegal

Activities	Communities
Identification of needs and choice of activities	Fully responsible
Identification of needs	full
Identification of activities	full
Planning	full
Validation	full
Building of the infrastructures	Fully Involved
Calls for tenders	full
Execution	full
Works follow-up	full
Delivery acceptance	full
Maintenance of the infrastructures	Fully involved
Monitoring	full
Execution	partial
Management of the infrastructures	Partially responsible
Financial management	partial
Administrative management	partial
Technical management	partial
Perpetuation of the infrastructures (financial articipation)	Role
Running costs	full
Investment expenditures	full
Follow-up /assessment	Involved
Ex - ante assessment	full
Half-way assessment	partial
Final assessment	full
Regular follow-up	full

Source: field survey, 2005, Senegal Country Study

secure system, one that bestows a sense of collective security upon its members.

Small-scale infrastructure projects can be quite innovative with significant macro linkages

Often people think that small-scale infrastructure follow some traditional paths-rural feeder roads, small irrigation

projects, primary health care facilities-and cannot be innovative. But more to the point, the traditional wisdom seems to be that small-scale infrastructure initiatives may work fine locally, but have little to offer in terms of scaling-up or macro replication.

The Krai Kang Won Distance Learning Programme (KKWDL), included in the Thailand Country Study, provides some exciting evidence to counter the conventional

wisdom. Under this project, funded through the Krai Kang Won Foundation, poor and vulnerable groups in Rajabhachanukraow Schools use the programme in support of a full curriculum while regular schools use it as to complement an independent curriculum. The system is available 24 hours a day, seven days a week. There are no costs charged to the users in the school, as the Foundation covers all relevant costs. The system is reliable, meets the standards of the Ministry of Education, and the students enjoy learning from the system.

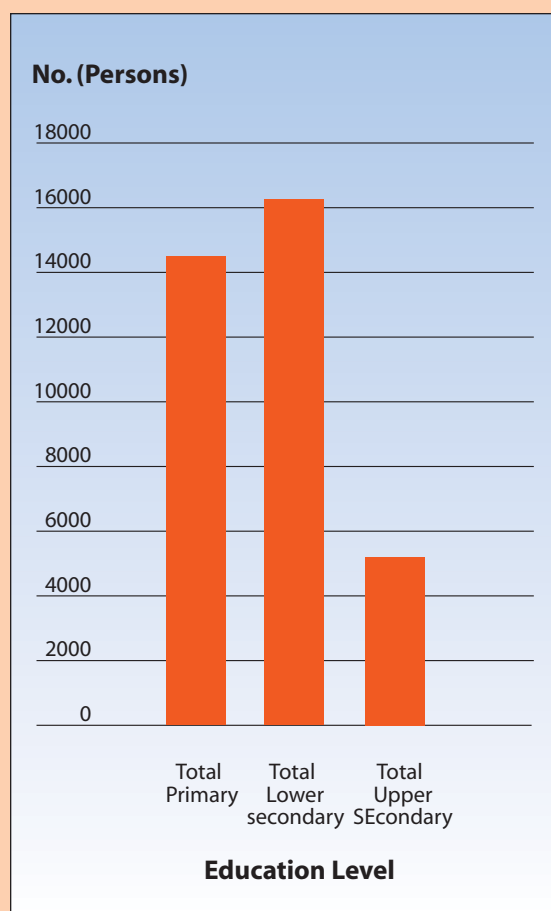
The project helps at-risk youth attend school (**FIGURE 7**). And the schools continue to work towards higher enrolment rates through recruiting those who are most at-risk. Retention rates are 95 percent at the special schools, higher than the national average. The female to male student ratio in the Rajabhachanukraow schools is also higher than in regular schools (**FIGURE 8**). Females tend to stay in school longer as well.

The KKWDL provides opportunity to vulnerable groups, which empowers them and helps them improve their livelihood and dignity. As the programme has been designed and based on a deep understanding of the educational problem existing in remote areas, the modalities provided have been targeted to the groups considered most in need. When a vulnerable group has gotten a better education and learned to live with others in a classroom setting, peace and conflict prevention are possible. The programme seeks to build future leaders and strengthen peace in society at the same time. Improving education is a direct way to raise the standard of human capital in society. Human security is obviously strengthened.

The plan to have the KKWDL programme available in more than 23,000 schools by the end of the programme reflects the scale-up target. An effort to cover locations outside Thailand, such as Lao PDR and China, is also considered a scale-up initiative. Although a subsidy may be needed at the initial step, it is significant and necessary that the local people support and welcome the programme.

The idea of constant, lifelong learning is another key aspect for a scale-up, as people can have access to learning materials 24 hours a day and the contributions of the programme can be passed from one generation to the next. The programme associated with the Rajbhachanukraow schools will thus be linked to large-scale efforts to raise living standards for people in remote areas and those considered vulnerable groups. The project helps create graduates who can support themselves as productive members of their communities. The learning pattern of these groups will not change much as

Figure 7: Number of vulnerable students at primary level, 2003, KKWDL, Thailand



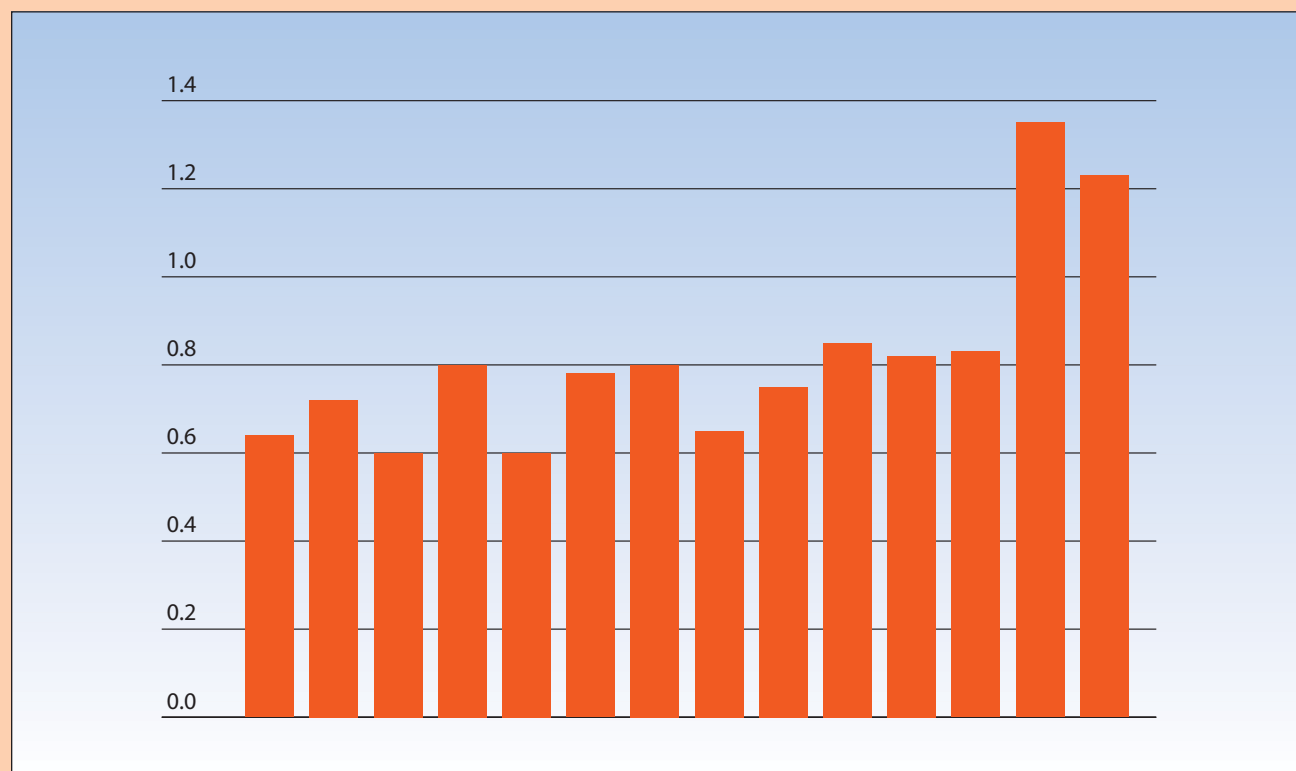
the students grow more accustomed to the KKWDL. Their involvement in the community and their work would spread information about distance learning and help to induce more and more people to participate in this valuable resource.

Small-scale infrastructures contribute to MDGs Achievement

Small-scale infrastructures in public works programmes, income-generating activities and irrigation projects directly contribute to income and employment creation, reduction of poverty and hunger. They also help in terms of job, income and food security. Initiatives in areas of health, apart from helping achieve the relevant MDGs, also contribute towards achieving other MDGs.

All the projects covered under the four country studies have contributed to some MDGs. But some specific projects have achieved them in a comprehensive manner. One can

Figure 8: Sex ratio among vulnerable students, KKWDL, Thailand



illustrate the Participatory Rural Development Project (PRDP) of Bangladesh.

Under the PRDP, small roads, culverts and bridges were built; schools and rural markets were reconstructed, rural health clinics were set up. Since a major part of the population under the project are poor, PRDP helped address the issue of human poverty and promoted progress towards the MDGs. In the project area, the daily income of a labourer increased from less than BTK 50 to more than BTK 70. With irrigation, increased crop intensity and crop diversification, agricultural production increased. Better roads and transports acted as a catalyst not only for better agricultural marketing, but also for creating non-farm employment opportunities in terms of rickshaws, rickshaw-vans, petty trades, etc. All these helped to reduce income poverty; but more importantly, the infrastructure improvements increased access to food. Thus progress was made to the achievement of MDG 1.

With the building of schools and their reconstruction, better roads and transportation facilities and enhanced incomes of households, educational outcomes have improved in the project area (TABLE 9). It not only shows overall improvements for boys and girls, but also indicates greater improvement for girls in some indicators. The project has thus contributed to

both MDGs 2 and 3.

Villagers also appreciate how the construction of the connecting roads to the main road has enabled them to access health centres more easily. Where it once took villagers three hours to get medical services, now they get it in 30 minutes. Better health clinics with more trained health personnel, better equipments and medicines have contributed to improved health outcomes-including mortality rates (TABLE 10). These have helped towards achieving MDGs 4 and 5.

Discussions on the governance of small-scale infrastructures mainly concentrate on three overall issues:

- ❖ Is it top-down or bottom-up? A project is generally described as a top-down initiative if it is centrally perceived, implemented and managed and the funds come from the top. A project is said to be bottom-up if it is perceived, implemented and managed at the community-level and the funds come from local sources.
- ❖ What is meant by community-owned? Does it mean that communities will be involved fully in every stage of the project or does it mean that the communities will be involved fully in certain stages and only partially in certain stages?

Table 9: Enrolment, drop-out and attendance rates in the PRDP, Bangladesh

	Enrolment rate (%)		Drop-out rate (%)		Attendance rate (%)	
	Before	After	Before	After	Before	After
Male						
Poshon village	70	88	50	44	80	94
Dakshin Chamuria village	80	90	40	30	80	92
Female						
Poshon village	60	82	66	52	72	85
Dakshin Chamuria village	70	90	52	28	71	93

Source: Bangladesh Country Study

Table 10: Reduction in child and maternal mortality in the PRDP, Bangladesh

	Child mortality rate (%)		Maternal mortality ratio (%)	
	Before	After	Before	After
Poshon village	10	3	7	3
Dakshin Chamuria village	10	5	80	5

Source: Bangladesh Country Study

❖ What is meant by the sustainability of small-scale infrastructure?

All these overall issues were deconstructed and were assessed in details in the light of the experiences of the projects included in the four country studies.

Both top-down and bottom-up small-scale projects have their pros and cons and there cannot be a generalised preference for one or the other in the absence of additional considerations

It is often argued that top-down projects may be more efficient and may be ensured of adequate financing, but they may not be owned by the community. On the other hand, bottom-up projects are owned by local people. Furthermore, it is argued that bottom-up projects are more capable of safeguarding the pro-poor criteria for the most disadvantaged than top-down projects. Furthermore, top-down projects do not have any accountability to the community. On the other hand, proponents of the top-down initiatives have argued that the formal arrangements within top-down approaches ensure efficiency and delivery.

In the context of all these, certain issues have come out quite strongly from the projects. First, as has been documented in the three water projects in the Zambia Country Study, there

was much more involvement of the community in the bottom-up infrastructure compared to the top-down. It was clear from the results that the arrangements in the bottom-up schemes led to a higher demand for accountability by the community. But at the same time in the Ng'ombe Health Project, it was apparent that this demand for accountability has led to problems as the community wants to become too involved in the day-to-day running of the health centre. This seems to be a case of lack of understanding of the role of the management of the scheme. On the other hand, in a top-down initiative like the George Water Project, the management arrangement was formal and was considered superior to bottom-up alternatives as it was run by the Lusaka Water Supply Council which gets frequent expert technical help in this regard.

Second, even though the bottom-up approach is more inclined to a participatory approach, the depth of participation is a major issue. Even in such bottom-up projects as Kanyama and Chipata water projects in Zambia, people perceive that their influence in decision-making is low. The depth of participation, however, depends on the processes of communications and decision-making. But the perception about shallow participation raises a number of issues. If people do not perceive that they have influence, can they develop a sense of ownership? Or, is it realistic to expect deep community participation? And is community owner-

ship indeed necessary for a well-functioning and sustainable small-scale infrastructure? Some of these issues will be taken up later on in the context of determining an appropriate level of community participation.

Third, because an initiative is bottom-up does not necessarily mean that it is targeted at poor people, either as decision makers or as the beneficiaries. This is true of the poorest of the poor. For example, in both the Mtendere and the NG'ombe Health Projects, a substantial number of poor people reported their health conditions are as bad now compared to before the project. Without deliberate efforts to bring in local clients, even bottom-up small-scale infrastructure projects may bypass the poor, not to speak of the poorest of the poor.

The involvement of the community in small-scale infrastructures is a must for specific aspects of such projects; while for other aspects, the nature of involvement may vary depending on the nature of the project.

On the issue of defining what community involvement means, there is an extreme view—that is, that the community must be involved in every aspect of the project. A pragmatic approach reveals that there are certain technical areas which may be beyond the expertise of a particular community; there may be other areas, where too much community interference will just create problems for the project; and there should be a differentiation between an owner of a project and the manager of it.

All the projects included in the Senegal Country Study have looked at this issue in detail. While the study recognises that every project has its own specificities, there are certain areas, where community must be fully involved, irrespective of the nature of the project. **TABLE 11** provides a summarised generic version of various aspects of community involvement as brought out in the Senegal Country Study. There is a clear consensus that the communities must be fully involved in the identification of needs and choice of activities, which also include planning and validation. Similarly, it is also clear that communities should be involved in a major way in maintenance of infrastructures, operations and maintenance and major parts of assessments. There is, however, a difference of opinion in such areas as building of the infrastructures as well as the management of them. In some cases, it has been argued, given the nature of infrastructures, communities should not be involved at all in the building of infrastructures.

Institutional and financial sustainability of small-scale projects are essential for small-scale infrastructure projects for the expected development impacts

Institutional and financial sustainability of small-scale projects demand three issues: provisions of funds inclusive of O&M, a solid institutional framework and transparency and accountability.

Whatever the source of initial funding, financial sustainability requires that adequate provisions be made through revenue generation by charging appropriate user fees and earmarking adequate funds for O&M. The Lomsak Primary Health Care Project in Thailand has mobilised community funding amounting to 700,000 Thai baht (THB) per year. The funds are used to hire doctors (THB 30,000 per month) and skilled nurses (THB 10,000 per month). The funds are also used for purchasing ambulances and dental equipment, and to support campaigns against HIV and dengue fever. The issue of weak O&M is highlighted by the SREP in Bangladesh. A maintenance committee or community participation is absent from this project. During the field visit only 2 of the 72 lightbulbs had been found working at the Asrayan project site. Most of the bulbs has been damaged after just one year of operation, and were never replaced. At the Kamarul helath clinic, only four of 20 bulbs were working well during the field visit.

The issue of institutional sustainability can be highlighted by the Panasnikom Pipe Water Supply (PPWS), included in the Thailand Country Study. PPSW provides water supply in Tambon Narek area. A management committee for the Narek water supply project was elected in 1992 to take responsibility for management, operation and maintenance of the project, according to the Office of the Prime Minister's Regulation on Management and Maintenance of Rural Water Supply System.

The Narek water supply project's elected management committee comprises representatives of various groups of local stakeholders, including a member of Narek TAO, the local administrative organisation, head of villages, chief of Narek Tambon, university lecturers and local villagers. The committee is planning how to manage the project in case of the drought that causes inadequacy of water supply. It has planned to extend the areas of reservoir to extend the water supply service. This shows indirect participation of local people in the management and operation of the project. Beneficiaries of the project have also indirectly participated in the project by applying to be one of the committee members, or to participate in the committee meeting, or to

elect persons to the committee. From the interviews, 18.75 percent of the beneficiaries participated in this project by means of being part of the maintenance team and attending the management committee's meetings.

This project yields very high financial return as investment costs are from the central government's annual budget. Its retained profit has reached over THB 2,600,000 in 2004. Operating profit totalled THB 511,914 and THB 378,841 in 2003 and 2004 respectively. In terms of transparency, management committee has published its cash flow information. This however is not certified by State Audit Office or any certified public accountant (CPA). Either of the above should be brought in to certify the management committee's accounts.

The main source of revenue for the Narek water supply system is a water tariff. The tariff rates, however, seem to lack rational support; the rates were merely agreed amongst management committee members. Meanwhile, the manage-

ment committee may have incurred a problem in tariff collection, as tariff revenue fell by 7 percent from 2003 to 2004, despite an increase in the number of users. Improvement in the collection system and tariff rates increase may be necessary as the system will require major maintenance within a few years. In particular, the tariff rates should be differentiated among activities: residential versus agricultural/industrial. Furthermore, the capacity of the system will need to be increased to cope with periodic shortages and the increasing number of users.

The Lomsak PCU in Thailand provides a good example of accountability. The facility is run by an administrator who has worked in public health administration for an extended tenure and uses a highly structured approach to the delivery of care. Health personnel have skills to make maternal risk assessments or detect childbearing complications early on. In addition, maternity care is not left entirely to health personnel; it is a shared responsibility with parents-to-be.

Table 11: Roles and responsibilities of communities in small-scale infrastructure projects - lessons from the Senegal Country Study

Activities	Communities
Identification of needs and choice of activities	Fully responsible
Identification of needs	full
Identification of activities	full
Planning	full
	Validation full
Building of the infrastructures	Fully/partially involved and no involvement
Calls for tenders	full/partial/none
Execution	full/partial/none
Works follow-up	full/partial/none
Delivery acceptance	full/partial/none
Maintenance of the infrastructures	Fully/partially involved
Monitoring	full
Execution	Full/partial
Management of the infrastructures	Fully/partially responsible
Financial management	full/partial
Administrative management	full/partial
Technical management	full/partial
Operations and maintenance	Role

Source : Bangladesh Country Study

Health personnel regard maternity and family education as an important part of their work and women with lower education levels are given special attention. Village health volunteers play an important role in ensuring that these women have necessary and timely information and take appropriate actions to protect and improve their health and well-being. Family files are created to collect maternal data, which is used to develop the planning of appropriate actions suitable to each area/population group.

Revenue-generating infrastructure facilities, by their very nature, create scope for major corruption and financial mismanagement. Communities can play an effective watchdog role, thereby promoting transparency and accountability. They can develop a framework for transparency in management and finance and a mechanism for holding people accountable.

Capacity development is a crucial element for the sustainability of small-scale infrastructures

Small-scale infrastructures cannot be sustainable and the notion of community ownership does not mean anything unless capacities are developed locally. The experiences of the Zambian water projects provide some useful pointers in this area.

Throughout the construction of the water infrastructure, communities have learnt how to mobilise and democratic values have taken hold. All the area-based committees (ABOs) are elected and elections are held regularly. These ABOs serve as the origins of the sub-district structures that are set to be created as the decentralisation policy is implemented.

Because of the capacity development activities that were undertaken by CARE, a sense of responsibility has been inculcated into the community. Capacities were developed so that people can articulate their needs better and also demand accountability from their leaders and those managing the infrastructure.

In the water projects, community leaders were trained in plumbing, business management and community leadership. There were other capacity development programmes for the community such as training in production of building materials. Capacities were also developed for managing credit and running businesses.

In both the health projects, programmes have been put in place by donors such as JICA where training was held in

environmental health. This has been done in the George Water Project, which was used as a pilot. An important part of the JICA's Primary Health Care Project in Ng'ombe and Mtendere has been the strengthening of the management capacity of community-based organisations to ensure sustainability of community-based health activities.

Women are counted as beneficiaries, but they seldom count in decision-making process for small-scale infrastructures

In small-scale infrastructure projects, women are mostly seen more as beneficiaries, and they are not involved significantly in the decision-making process. Three projects in Bangladesh-PRDP, SWRDSP and SP-are exceptions, which have taken considerable initiatives to bring gender in the mainstream development agenda.

The SWRDSP project evolved from its initial philosophy of women in development (WID) to a much broader gender and development (GAD) approach to make women an active partner of the development process. Women have been engaged in various sub-committees under the Water Management Cooperative Association (WMCA). These, amongst others, take over the infrastructure projects for O&M works and oversee the micro-credit programme. In many cases, women are leading the WMCA successfully.

The PRDP and SP have also put special emphasis on the participation of women in various stages of planning and implementation activities. While in SP, the provision of women members have been specifically stipulated in the formation of the union, ward and scheme selection committees, at PRDP projects, the village committee which is responsible for the identification of infrastructure projects, comprised women representatives.



Proper linkages of local initiatives with national ones bring good results to the local ones

As feeder roads can bring more value-added when they are connected to national highways, small-scale infrastructure can really be useful if they are linked to national initiatives. The National Rural Infrastructures Programme (PNIR) in the Senegal Country Study is a good example. The implementation of this involves many structures at the national level (Directorate of Local Communities, Rural Civil Works Directorate, the National Coordinating Unit) as well as at the regional level (regional coordinating offices, local communities, businessman/businesswomen, engineers, counsellors, public technical services, companies and consultants). At the local level, the infrastructure building process involved concentrated technical services, forums and committees that have been created (dialogue and management committee, calls for tenders commission, building and follow-up committee, and management and maintenance committee).

The implementation of the programme helped to build and to rehabilitate many infrastructure facilities, namely health education, water, commercial, cleaning, production-supporting, socio-collective infrastructures and production trucks. The emphasis was more specifically on production-supporting (agriculture, cattle-breeding), health and education facilities. The particular focus of that project is on startup efforts (an important production trucks building programme has just been launched in all regions). Those results translate the will of the project to contribute to poverty reduction in rural areas by improving incomes and the access to basic social services.

In addition to physical achievements, the programme helped to reinforce the capacities of the members of calls for tenders commissions, community assistants and local leaders (motivating training), revamp local planning, local training plans, carry out two surveys respectively on the reform of the local communities equipment fund, the rural tax reform. However, the results of field surveys show that many obstacles (see §: limits and weaknesses) delay the implementation of the programme in few areas, for example: the delay in the opening of PNIR bank accounts, the length of planning processes, etc.

These results were achieved because of the closer and stronger collaboration between the national and local infrastructure projects. The local projects benefited from the externalities created by national initiatives. The backward and forward linkages between local projects and national



ones produce value-added for local initiatives. They also learned from national experiences, particularly in areas of planning and implementation, management, monitoring and training.



VI. POLICY OPTIONS AND RECOMMENDATION

Key findings from the projects covered in the four country studies and the lessons learned provide a number of insights into recommended policy options with regard to small-scale infrastructure. Of course, these options are based on the experiences of pre-specified projects in a handful of selected countries. They thus cannot claim broad applicability. Yet they can still be useful in similar situations. Some of the policy options are in overall strategies, some are in areas of governance and some are in areas of monitoring and evaluation. The policy options can be approached from another angle: strategies for policy makers, tasks for people responsible for formulation and implementation of infrastructure projects, and activities in relation to monitoring and implementation.

Overall policy approaches

The four country studies and the lessons learned from them imply the following overall policy approaches:

- ❖ Pursue small-scale infrastructure initiatives which either have complementary components and/or aim to achieve multiple objectives. For example, a composite infrastructure project may include infrastructure building for education and health sectors. Or, a good feeder road project with networks with main roads may achieve multiple objectives of job and income creation, better educational and health

services, better mobility for women and better human security. The advantages of either a multi-component infrastructure project or an infrastructure project with multiple objectives are that they make sense under resource constraints; they can build on synergies of policies, benefit from all kinds of externalities and cost-reducing economies of scale.

- ❖ Pursue synergies. In most projects, synergies appear almost by chance, and are unanticipated in the design phase. In other cases, potential direct and indirect benefits were lost due to lack of attention to synergies. This is unfortunate, since in many cases those synergies can have far-reaching implications when they are systematically pursued.
- ❖ Even when there is a one-to-one relation between the activities of a small-scale infrastructure project and its objectives, make sure that all the necessary complementary elements are in place. For example, an irrigation project will not be able to achieve the maximum results, if it is not complemented with other input packages such as better seeds, fertilisers, pesticides or agricultural extension work.

- ❖ Integrate gender issues through policies into small-scale projects at all levels. Women should not only be beneficiaries of the project, they must be active stakeholders in the design, implementation and management of the project. Women should only be counted in the area of project benefits, but they must count in all decision-making processes.
- ❖ If small-scale infrastructures services are to contribute significantly to poverty reduction, policies must be pursued to ensure the five As: availability to poor people, accessibility to them, affordability to them, acceptability by them and adaptability for them.
- ❖ Small-scale and large-scale infrastructures are complementary. Adopt policies to forge that complementary relationship so that large-scale projects can learn from the experiences of the small-scale ones and replicate it at the macro-level, while the small-scale infrastructures can take advantage of the externalities created by large-scale initiatives.
- ❖ Create a wider recognition of dependence of almost all MDGs on infrastructure. Achievement of the MDGs is



partly dependent, and in some cases critically so, on infrastructure, just as the poverty-reducing effects of infrastructure are often partly dependent on levels of attainment of some of the MDGs, notably those relating to education. Attempt to capture the relevant synergies as infrastructure's contribution to MDGs is sometimes direct (e.g., effect of safe water supply on child mortality) and in other cases, mediated through other services (e.g., effect of electric power supply on quality and range of health services).

- ❖ Recognise and help clarify within the political process the important choices that are sometimes faced in infrastructure between maximising growth and improving income distribution. The dilemma should be confronted squarely. If growth maximisation is pursued, there should be adequate provisioning for redistribution and if income distribution is pursued, there should be proper scope for endogenising growth. In the end, with proper policy choices and mixes, a win-win situation can be reached.

Overall governance issues

Looking at the governance issues highlighted in the four country studies, the following implications become quite clear:

- ❖ Small-scale infrastructures do not automatically ensure the inclusion of poor people in them either as beneficiaries or as decision makers. Projects that reduce poverty meaningfully succeed by pursuing deliberate and conscious efforts to reach poor people undertake such projects.
- ❖ Define, monitor and measure participation: It is not always clear how different community groups are to be incorporated in the governance structure and what their specific role and participation levels are. There are certain aspects where their full and effective participation is essential (e.g., need assessment, design and location), but in other areas, participation may vary on the nature of the project. One thing is to be ensured: the participation by various groups should be real and poor people's voices should be heard. The following policy options are important:
 - ❖ Set up or strengthen the participatory process: Contact local community (leaders and the traditionally marginalised groups) using people who understand how local governance works and how things get done. There is a potential for alienation if participatory projects are proposed by outsiders. Quite frankly, local elites will recognise the threat to their control, and may use their con-

siderable power and influence in the old system to short-circuit a truly representative and participatory process. Paradoxically, the more pro-poor the proposed participatory development project, the less existing local elites may feel they have to gain by supporting (or at least failing to block) the project. Clarifying the expected governance outcomes and carefully establishing a constituency of beneficiaries in support of the project are necessary steps prior to the release of major funding for a project.

- ❖ Monitor the participatory process: Ensure that participation is genuine and on-going by monitoring the process. Improving governance in many cases involves changing long-standing, deep-seated practices and attitudes, and will not happen overnight. As we note elsewhere, an effective participatory process will generally require greater time and up-front costs, particularly in the early stages. Where needs are clear and urgent, there may be a temptation to short-circuit the new processes for the most noble of reasons.
- ❖ Facilitate and promote the formation of effective interest groups: A useful distinction should be made between public construction and its staffing (police stations, courts, and even legislatures) and voluntary, participatory, private associations (producer groups, labour unions, and a plethora of generally single-issue groups) that are the seedbed of equitable democracy and foundations of an effective civil society. Only after associations of voters are established do aspiring politicians come promising programmes for the farmers, workers, aged, etc. that have formed these groups, seeking support. Until a pluralistic, participatory society emerges, government tends to remain dominated by existing elites who resist any project that will radically alter the existing status quo.
- ❖ Establish rules of engagement: Some general guiding principles can be provided, but the precise types of rules and their contents will be largely a function of local conditions (cultural practices, willingness to accept change, etc.). Some types of rules can be promulgated and enforced at the local level, while others (such as a national legal system) must ultimately be enacted at the national level. As in the case of infrastructure networks, linking local, regional and national levels is important and often challenging. At the very least, local groups can be made aware of the constraints a lack of rules or adequate enforcement places on their activities, creating local agents for broader reform.

- ❖ Adopt appropriate policies for both financial and institutional sustainability of the project. Financial sustainability will require strategies for fund replenishments, adequate funds for O&M, adoption of financial rules and a framework for financial transparency and accountability.

For institutional sustainability, pursue policies for institutional reforms, capacity development and building a mechanism for transparency and accountability in management. Institutional reform would require restructuring of management, building on existing but effective institutions and if necessary, creating new institutions. Capacity development would encompass training, expansion of capabilities, knowledge dissemination and network development.

Sustainability will also require policies for oversights in terms of coordination and to ensure transparency and accountability both in financial and management areas.

- ❖ Attempt to identify a middle ground between a top-down and a bottom-up approach to small-scale infrastructures. That may provide an optimal governance framework that will benefit from incorporating the positive elements of both approaches. Policy dialogues should follow that path.
- ❖ Experiment with various forms of public-private partnership in infrastructure development and provisioning of infrastructure services. But in such experiments, the importance of competition and minimising exclusivity must be emphasised.
- ❖ Use small-scale projects to develop community solidarity and build social capital. This may be used in other initiatives as well.

Approaches to design, implementation and monitoring of infrastructure projects

The four country studies have emphasised different approaches towards formulation, implementation and monitoring of small-scale infrastructures. But from all these diversified experiences, the following common grounds can be identified:

- ❖ In the design of small-scale infrastructure, the following actions should be taken:
 - ❖ Do a need assessment carefully with full and effective participation of communities, particularly poor people and women.

- ❖ Prepare a design, taking into account the advice and guidance from local people, local realities and cultural constraints, and the concerns of women.
- ❖ Specify the technology options.
- ❖ Spell out properly the financial and human resource requirements of the project-specifying both requirements in cash and kind-and adopt from all the possible options the most effective and efficient and equitable one.
- ❖ Stress ways to achieve recovery of costs of services from existing consumers. This not only helps with the operations and maintenance of the infrastructures, it also fosters a sense of ownership by those who are served by them.
- ❖ Strengthen the coordination between improvements of infrastructure services in an area and the provision of services which will maximise their impacts. Success and failure in achieving poverty reduction from infrastructure investments in developing countries is often attributable to the presence or absence of timely and effective improvement of other services, in the same geographical area-which, in turn, yield benefits that are greater than they would be absent the improved infrastructure.
- ❖ In choosing the location of the project, again a few actions need to be taken:
 - ❖ Identify an location which is supported by the local community.
 - ❖ The location must be sensitive to women's needs.
 - ❖ The chosen location should have the least economic, human and environmental negative impacts.
- ❖ On the financial side, the following can be done:
 - ❖ Get access to resources given to the project and mobilise the required resources locally as counterpart funds.
 - ❖ Adopt the required financial rules. Develop the necessary financial transparency and accountability framework.
 - ❖ Formulate a multi-year expenditure plan with adequate provisions for O&M.
- ❖ Formulate an implementation plan for the project with the following:
 - ❖ Develop a workplan with clear identification of responsibilities.

- ❖ Formulate a management framework for the project.
- ❖ Identify the transparency and accountability mechanisms in the management area.
- ❖ Develop a monitoring and evaluation plan ensuring the following:
 - ❖ Prepare a baseline survey.
 - ❖ Create a framework for collection of project data and information for monitoring, evaluation and impact analysis.
 - ❖ Develop analytical framework for monitoring and evaluation, selecting evaluation criteria in advance.

Issues for external development partners

As the four case studies indicate, infrastructures are often financed in developing countries through external financing. It is, therefore, imperative that the external development partners also take note of certain issues that are relevant for the effectiveness of infrastructure services:

- ❖ When selecting among aid interventions pay particular attention to their relative impact on poverty reduction and the relative likelihood these impacts will be sustained. Progress in reducing poverty depends both on the efficiency and quality of services provided by the infrastructure services to the existing consumers and on extension of services to new areas and new consumers previously excluded. On both scores, the performance of the government departments and public enterprises which are responsible for these services has often been very weak. Improvement depends upon institutional reform and strengthening, normally centering around the issue of better aligning incentives to management and staff with quality of services to users. Aid agencies can pursue three alternative types of interventions (sometimes in partial combination) in pursuit of poverty reduction:
 - ❖ ones that specifically target poor people
 - ❖ ones often termed inclusive because they aim at improving services to a wider range of people including substantial numbers of poor people
 - ❖ ones focused mainly on reform of a whole system or branch of the economy.

All these approaches can contribute to the core task of strengthening countries' capacities for running infrastructure services more efficiently and in a manner more conducive to poverty reduction. Choosing which among them

is the best response to a country's concrete needs should depend on the scale of poverty reduction that could result (from physical investments and policy/institutional changes supported) and on the likelihood that the government and other relevant bodies will over time take various decisions and actions needed to support attainment of such results.

- ❖ Ensure better coordination among different external development partners working in the same infrastructure sector in a country. For example, various partners may seek a joint agreement with the host country on user fees that will apply in the sector, and systematically support application of such principles.
- ❖ Actively encourage use of private sector entities-suppliers, contractors and operators- both domestic and foreign, competitively selected-in the infrastructure sectors. In many instances private sector participation has led to sharp improvements in efficiency and customer-responsiveness of services. Poorer consumers have benefited when contracts were awarded competitively, effectively structured and fairly supervised. But all these require a conducive regulatory framework to be provided by the state.
- ❖ Recognise that developing-country markets for infrastructure services have different segments that may require meeting technical standards different from developed-country markets. Relatively light economic regulation is appropriate for all elements other than those that necessarily remain monopolistic (e.g., power transmission grids and local telephone exchanges) or when open competition has severe negative side effects (e.g., bus services in overcrowded areas). The different standards that different utility customers can afford, and the initiatives the private suppliers have shown in some places in responding to those needs, indicate the need for a multi-tiered regulatory structure.

Scaling up: concerns and options

Policy options should also assess the issue of scaling up small-scale infrastructure projects. The small-scale community-based projects may be extremely effective at meeting the development needs of a village or small community, but are there lessons that can be taken for investments to better meet national development goals? There are several possible ways in which lessons learned from small-scale projects could be applied to national development goals.

- ❖ First, are small-scale community-based infrastructure projects replicable? Can the projects assessed be replicated throughout a country, with similar local benefits for a

wide range of poor regions in a country? Perhaps, but generally not. Such an approach would tax the capacities of donors and coordinating bodies, even if a particular type of project could be cost-effectively replicated on a national scale. Of the projects themselves, only distance learning suggests internal economies of scale that would lend itself to cost-effective scaling up. On the other hand, some water and rural electrification programmes explicitly do not lend themselves to national expansion, since they represent relatively high cost alternatives specifically for communities that cannot easily be connected to national service grids in which economies of scale can be captured.

- ❖ Second, the issue of broader relevance should be addressed. Many of the process lessons from small-scale infrastructure projects can be applied to national-level problems, however. A focus on effective, representative governance is clearly crucial to efficient infrastructure development at any level. Attention to potential synergies and connections between projects can also be valuable at any level.
- ❖ Third, local successes with infrastructure development create demonstration effects, rising expectations in surrounding communities, and pockets of development (improvements in the socio-economic indicators contributing to the MDG, as well as increases in human security and improved governance). Demonstration effects encourage decentralisation of governance in ways that promote development by establishing the competence of local governments. Surrounding communities will feel more confident in taking on the responsibilities and challenges of small-scale community-based infrastructure projects, and their residents will demand those opportunities as well. Pockets of development will draw mobile, motivated migrants from other areas in response to greater opportunities (to earn, learn, participate in governance, and be more healthy and secure), potentially creating a positive cycle of economic growth and social development in the communities. Successful projects may produce individuals who can provide lower cost training and technical assistance for the next round of projects.
- ❖ Fourth, the issue of scaling up is also relevant for governance. The benefits derived from it involve a different but equally important set of concerns. Representatives from, say, a village council to the next higher level of local government must have an incentive to represent more than their personal interest. One possibility is a system in which village representatives

appear periodically before the village council (or councils, if they represent multiple villages) to justify their actions, and can be easily replaced, losing the money, power and prestige of the position, if the villagers feel their representation is not appropriate or effective.

- ❖ Fifth, another concept important to scaling up the impacts of small-scale infrastructure development is leveraging. Leveraging can potentially multiply the impact of a given amount of donor funds, through: labour and other in-kind contributions, reduced waste and corruption due to more effective governance structures, enhanced local government legitimacy, competence and credibility in public finance management, which can be a source of funding for additional and complementary infrastructure projects.



VII. CONCLUSIONS

The preceding discussion clearly indicates that the four country studies-Bangladesh, Thailand, Senegal and Zambia-have been quite useful in analysing the linkages of small-scale and community-based infrastructures and human poverty reduction. They also demonstrated how such infrastructures can enhance human security. One major dimension of these studies has been the analysis of the governance structures of these infrastructures in their various dimensions. The studies have been quite effective in highlighting various lessons, policy implications including the issue of scaling up. Yet there are certain areas of weaknesses:

- ❖ First, in each country study, projects have been chosen from various sectors. This has provided diversity to analysis and results, but in spite of some common ground, it has sometimes become difficult to do a comparative analysis of projects.
- ❖ Second, the number of projects in each country study is relatively small. Thus any conclusions derived from the studies may not claim the broad applicability that one would hope for.
- ❖ Third, all the country studies have tried their best to be faithful to a common analytical framework and as such tried to use a common methodology. Yet for all practical reasons-ranging from data availability to nature of projects, they sometimes have been forced to deviate in their methodologies. As a result, inter-country comparisons have become difficult.

- ❖ Fourth, it would have been extremely useful if in each country study, comparative analysis could have been made and complementary linkages could have been identified between small-scale and large-scale infrastructures. Since the mandate of each country study was to focus on small-scale infrastructures, that could not have been done.
- ❖ Fifth, the issue of scaling up, even though has been touched on, has not been addressed in terms of coverage and depth that it deserves.

Some of these issues can be dealt with in future work in this area. Similar studies can be undertaken in a larger number of countries. Furthermore, some other studies have been done on the issue of infrastructure-poverty reduction linkages (e.g., the Asian Development Bank-Japanese Bank for International Cooperation-World Bank study; study by United Nations Capital Development Fund). A comparative synthesis of these studies can be useful to policy makers. It is also important to start a dialogue and discussion on the lessons and policy implications of these studies at the country-level with various stakeholders.



MAKING INFRASTRUCTURE

WORK FOR THE POOR



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ANNEX 1: MILLENNIUM DEVELOPMENT GOALS (MDGS)

By 2015 all 189 United Nations member States have pledged to:

Eradicate extreme poverty and hunger

- ❖ Reduce by half the proportion of people living on less than a dollar a day
- ❖ Reduce by half the proportion of people who suffer from hunger

Achieve universal primary Education

- ❖ Ensure that all boys and girls complete a full course of primary schooling

Promote gender equality and empower women

- ❖ Eliminate gender disparity in primary and secondary education preferably by 2005, and all levels by 2015

Reduce child mortality

- ❖ Reduce by two-thirds the mortality rate among children under five

Improve maternal health

- ❖ Reduce by three-quarters the maternal mortality ratio

Combat HIV/AIDS, malaria and other diseases

- ❖ Halt and begin to reverse the spread of HIV/AIDS
- ❖ Halt and begin to reverse the incidence of malaria and other major diseases

Ensure environmental sustainability

- ❖ Integrate the principles of sustainable development into country policies and programmes; reverse loss of environmental resources
- ❖ Reduce by half the proportion of people without sustainable access to safe drinking water
- ❖ Achieve significant improvement in lives of at least 100 million slum dwellers, by 2020

Develop a global partnership for development

- ❖ Develop further an open, rule-based, predictable, non-discriminatory trading and financial system
- ❖ Address the least developed countries' special needs
- ❖ Address the special needs of landlocked countries and small island developing states
- ❖ Deal comprehensively with developing countries' debt problems
- ❖ In cooperation with the developing countries. Develop decent and productive work for youth
- ❖ In cooperation with pharmaceutical companies, provide access to affordable essential drugs in developing countries
- ❖ In cooperation with the private sector, make available the benefits of new technologies-especially information and communications technologies

Source: <http://www.undp.org/mdg>

ANNEX 2: MAIN WAYS THAT INFRASTRUCTURE SERVICES ASSIST PROGRESS TOWARDS THE MDGS

	MDG 1: REDUCE INCOME POVERTY AND HUNGER	MDG 2: FULL PRIMARY EDUCATION COVERAGE	MDG 3: GENDER EQUALITY IN EDUCATION
Transport Local (Village to Township or Main Road) -	+++ Improvements to low-volume local roads and associated networks of village tracks/paths can significantly reduce poor farmers' transaction costs and expand their production possibilities (incl. non-farm)	++ Village roads significantly affect school enrolment and attendance	++ Girls' attendance significantly increased by safer roads
Transport Trunk (Beyond the Township) -	+++ Availability of competitive transport services on adequately maintained trunk network is critical to the effective participation of an area in national and international markets	+ Quality of link to regional centre significantly affects quality of teacher who can be attracted and his/her attendance	+ Helps secure better quality of teacher
Modern Energy	+++ Rural electrification often correlates with sharp increase in regional incomes and growth of non-farm activity. Reliability of modern energy supply strongly affects investment in, and competitiveness of local enterprises	+ Availability of modern energy increases enrolment and attendance rates, and home electrification raises time devoted to study	++ Modern technology helps families release girls for school: less time collecting fuel-wood and water, and schools improved
Telecoms	++ ICT significantly improves the efficiency of most service-sector activities (incl government) and can in particular reach poorer people with information of direct use for improving their economic situation	++ ICT helps expand and improve teacher training and can make classes for interesting	+ ICT can make school more worthwhile attending by strengthening students' exam performance
Household Water	++ Convenient, good water can substantially reduce morbidity and mortality, time spent fetching water, enterprise interruptions and improve nutrition with significant effects on poor people's productivity	++ Good home water supply increases school attendance (especially by children with literate mothers) and increases learning capacity	+ More convenient home water supply facilitates release of girls for school and reduces absences due to sickness
Sanitation	+ Adequate sanitation sharply reduces illness and expenditure on medical treatment (itself a significant factor in poverty)	+ Good sanitation/water Helps attract good teacher	++ Good school sanitation and water facilities increase girls' attendance
Water Management Structures	+++ Irrigation and flood control structures can greatly increase incomes and nutrition levels of the poor if they are managed to maximize benefits to the community as a whole, and specially if they support production of labour intensive crops		+ Less drudgery for women in obtaining water for household needs
Public Markets	+ Reduce transaction costs for small producers and help ensure competitive prices for consumers	+ Make centre at which schools, etc benefit from same good access	

Source: Willoughby, C. 2004, Infrastructure and the MDGs, paper for InfraPoor Berlin meeting

ANNEX 2: MAIN WAYS THAT INFRASTRUCTURE SERVICES ASSIST PROGRESS TOWARDS THE MDGS

	MDG 4: REDUCE < 5 MORTALITY	MDG 5: MATERNAL MORTALITY REDUCTION	MDG 6: COMMUNICABLE DISEASE	MDG 7: ENVIRONMENTAL PROTECTION	MDG 8: FRAMEWORK FOR DEVELOPMENT
Transport Local (Village to Township or Main Road) -	+ Increases use of primary healthcare facilities and facilities access to better water	+ Positively affects antenatal care and share of deliveries professionally attended		+ Care needed to maximize compatibility of engineering design with local environment	+ Work on local roads/transport can generate much youth employment
Transport Trunk (Beyond the Township) -	++ Vaccines/drugs supply, visits by more skilled health personnel and emergency evacuations	+ Increases in-hospital deliveries and often critical when emergency obstetrics required	+ Important for drug supply and higher-level diagnostics care need- ed to avoid stimulation AIDS spread	-- Great care needed in fragile ecological environments to minimize risks and compensate people who suffer	+++ Essential facility to enable area to benefit from international trade opportunities
Modern Energy	++ Sharply reduces indoor smoke pollution & impurities in water/ food consumed, the two major mortality factors	+ Reduced stress of household chores, and electricity improves medical services (hours, equipment, refrigeration)	+ Improved medical services, incl. from attraction of more qualified personnel	++ Reduces pressure on land resources (by moving water and reducing fuel-wood need), but care needed to avoid ill-effects of large dams	+ Small quantities of electricity essential for use of modern ICT
Telecoms	+ Can promote better health practices and ensure timely availability of life-critical diagnostic info and drugs	+ ICT enables efficient arrangements for emergency treatment	+ Reduce drug stock-outs and make efficient referrals o higher med- ical institutions	+ Record keeping and retrieval services of importance for environmental protection	++ Essential to target for ICT's supply and for participation in international economic opportunities
Household Water	+++ Good home water supply greatly reduces child mortality, especially if mother is literate	+ Water improves general and maternal health and deliveries	+ Clean water important for disease treatment and for formula milk (HIV mothers)	+++ Crucial for meeting the household water target under this goal	+ Water improvement much needed in least developed countries
Sanitation	++ Improved sanitation decreases child mortality and improves nutrition	+ Improved sanitation reduces maternal illness	+ Effective water disposal reduces malaria mosquito breeding	++ Crucial for meeting the sanitation target and combating urban environmental degradation	+ Sanitation high priority in least developed countries
Water Management Structures	+ More ample supplies of water for household use		-- Care needed to avoid adverse health consequences of man-made changes in water regimes	++ Sound planning, design and op. of water-related structures are key in protecting environmental resources and accommodating growing populaions	
Public Markets	+ Help ensure clean food supplies				+ Makes centre for ICT-based activities

APPENDIX 3: COUNTRY CONTEXTS

Bangladesh

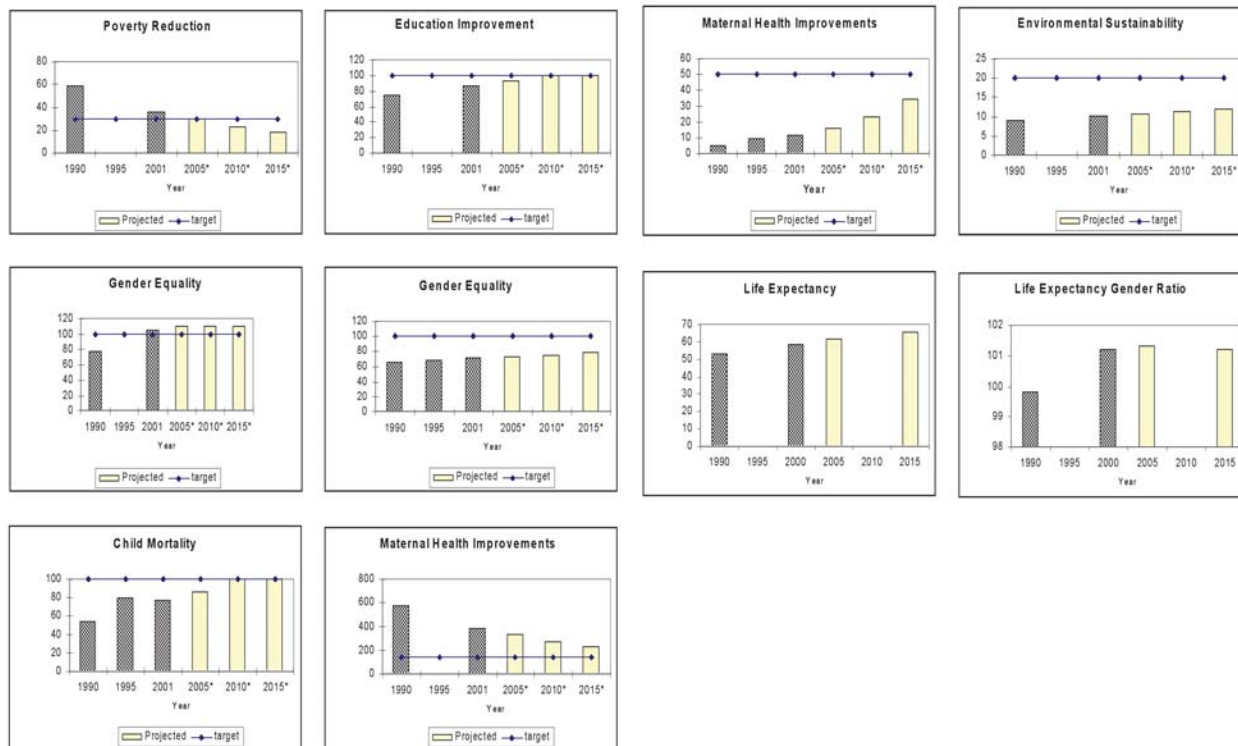
Bangladesh is located in South Asia. One of the most densely populated countries in the world, it packs over 140 million people into its 144,000 Km². Bounded by India on the east, north and west, it also shares a border with Myanmar to the southeast. The Bay of Bengal lies to the south. Bangladesh is a land of many rivers. This is both a blessing and a curse. The yearly flooding of the rivers brings a layer of fertile silt to the country's farmlands. These lands can yield up to three crops per year. Very little foodstuff is exported, but the country recently reached self-sufficiency in grain production. The flooding, however, also makes building and maintaining infrastructure like transportation and communication systems difficult and diverts badly needed resources toward repeated recovery efforts. Flood control efforts must be tempered in view of the people's dependence on the fresh silt for agriculture and land restoration.

Bangladesh has made progress in checking its population, with its growth rate down to a respectable 1.6 percent in 2003/2004. Per capita GDP is \$1,900, but the rate of un- and underemployment stood at 40 percent in 2002. A high rural-to-urban migration rate has added to the country's dif-

ficulties. Income inequality continues to worsen, and nearly 40 percent of the population remained below the poverty line in 2001, despite relatively strong economic growth since the early 1990s. The infant mortality rate is just under 26 deaths per 1,000 live births with a life expectancy of 61 years. The literacy rate is just over 43 percent. Heavily dependent on garment exports, Bangladesh is vulnerable to competition from China. It is currently seeking ways to diversify its exports to minimise this threat.

A cursory overview of Bangladesh's infrastructure indicates that as of 2002, there were about 2,700 km of railroads and over 200,000 km of highways. The consumption of electricity was about 14 billion kWh. In terms of transportation hubs, Bangladesh has four ports and 15 airports with paved runways. The telecommunication infrastructure counts 740,000 phone connections over landlines and about 1.4 million cell phone users. Although the number of international internet hosts is limited, there are currently over 240,000 internet users, what is to say that only 1 in 560 Bangladeshis have access to the internet.

Bangladesh: MDG: Targets and Performance



Senegal

Senegal, covering 196,722 Km² is located in Western Africa. It is bounded by Mauritania in the north, Mali in the east, Guinea and Guinea-Bissau to the south and the Atlantic Ocean to the west. Except for a short Atlantic coast, Senegal completely surrounds the country of Gambia, which extends along both sides of the Gambia River for 320 km into Senegal. Senegal's 10,800,000 people are mainly rural, living in roughly defined tribal areas. The Wolof makes up over a third of the population, and lives mostly in the area between the colonial capital of Saint-Louis and the current capital, Dakar. The Lebu live in the Dakar area, the Serer between Dakar and Gambia, the Tukulor and Fulani live in the Senegal River Valley, while the Mandinka-Bambara live in the southeast. South of Gambia live the Diola. Cut off from much of the rest of the country by Gambia, the Diola had recently been seeking independence from the rest of Senegal, until signing an agreement in late 2004. The non-African population is approximately 1 percent of the total, and is mostly concentrated in the larger cities. Despite their minority status, they exert a disproportionate amount of influence over the large commercial houses and industries.

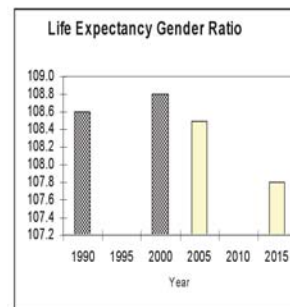
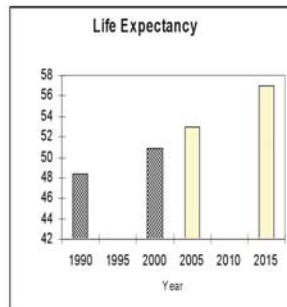
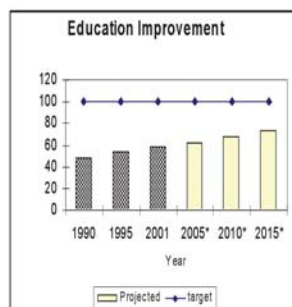
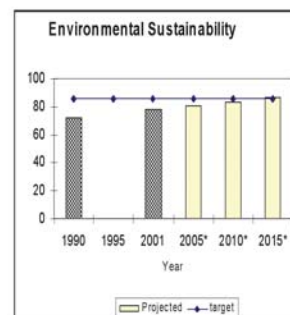
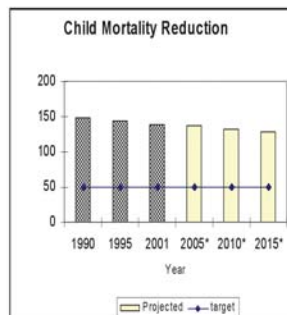
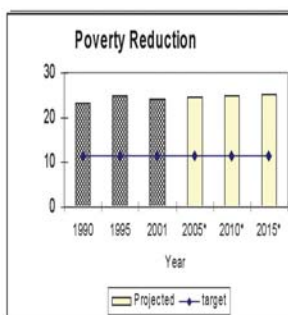
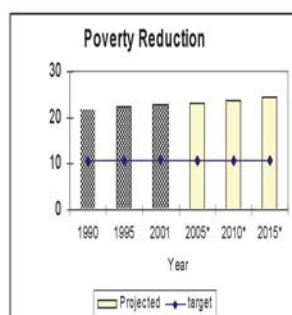
Poor in natural resources, Senegal relies heavily on fishing, agriculture and phosphate mining to produce exports although small deposits of iron ore, gold, petroleum and

other minerals exist. The semi-Saharan north and the central parts of the nation are prone to droughts, which can make farming difficult.

Senegal suffers under a 48 percent unemployment rate, with 54 percent of its population living under the poverty line in 2001. Its population growth rate is still a rather high 2.52 percent, despite population control efforts. Senegal has been fortunate to escape the scourge of HIV/AIDS, which has ravaged much of the continent, although infant mortality rates are over 56 deaths per 1,000 live births. Its life expectancy is 63. Its literacy rate was estimated at just over 40 percent in 2003. The scattered population makes infrastructure planning and implementation difficult. Tribal loyalties add another layer of complexity to the problems facing the country.

There are just 906 km of railroads in Senegal, and about 14.5 thousand km of highways. The transportation infrastructure is complemented by seven ports and nine airports with paved runways. The consumption of electricity reached 1.4 billion kWh in 2001. Over 220,000 phones are connected to land-lines, and over half a million cell phone subscribers exist. About 670 internet hosts serve a user community of about 220,000 or almost 1 in 50 inhabitants.

Senegal: MDG - Targets and Performance



Thailand

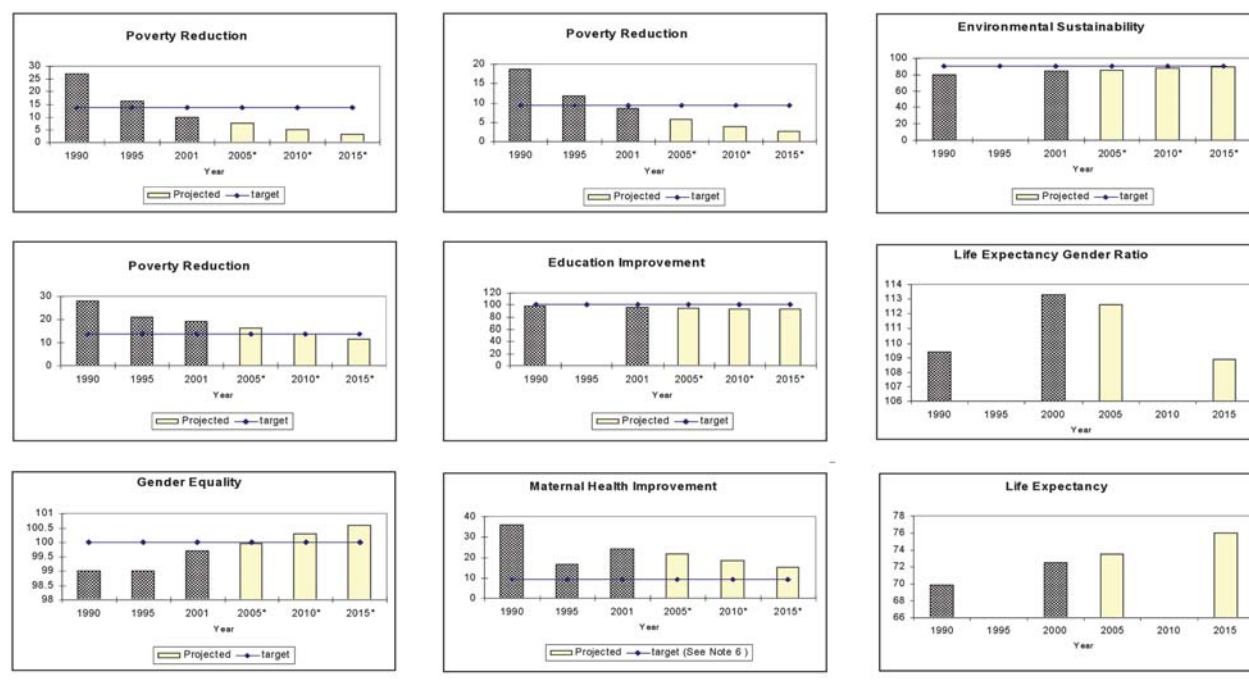
Thailand covers 514,001 Km² in Southeast Asia. Its neighbours are Myanmar to the north and west, Laos to the north and east, Cambodia to the southeast, and Malaysia to the south. It covers roughly 1,700 km from north to south, and the nation has five main geographic regions. The northern part of the country is mountainous and steep. It is home to small hill tribes largely isolated from the main population. The majority of the people live on the fertile central plains. To the northeast lies the Korat Plateau. Containing about a third of the country's area, it rises 340 m above sea level and is prone to droughts, making it the country's poorest region. The coastal plains west of the Gulf of Thailand support fisheries and aquaculture. The southernmost part of Thailand is an area of tropical forests. This area is troubled by some racial tensions, as ethnic Malay Muslims struggle to make their voices heard. The population is estimated at nearly 65 million people, with a growth rate estimated at 0.9 percent in 2002. Unemployment stood at only 2.2 percent in 2003, with 10.4 percent of the people below the poverty line in 2002. The literacy rate was estimated at 92.6 percent in 2002. The infant mortality rate is still rather high at 21 deaths per 1,000 live births, although life expectancy is a respectable 70+ years.

Thailand has a diverse economic base, exporting both raw materials and finished products to the rest of the world. It is

a major exporter of tin and tungsten but also manufactures electric appliances and components, computers and parts, and machinery and equipment. The sheer size and geographic diversity of the country presents challenges for those planning and maintaining the infrastructure. Each region has its unique sets of requirements, making central planning difficult. The population distribution dictates that a vast majority of all available resources will be concentrated in the areas around Bangkok, leading to marginalisation of the more remote areas of the country. Political and economic instability in surrounding nations also add to the problems facing Thailand, as refugees attempt to enter the country either legally or illegally.

Historically, infrastructure service provision in Thailand has been plagued by innumerable institutional hurdles that need to be overcome for a successful completion of the announced plan. Those failures were usually associated with the lack of integration in infrastructure planning and provision, slowness in the approval process and low level of user fees. Another report by the ADB, JBIC, and World Bank indicates that private sector involvement in infrastructure projects is contingent on policy improvements and a reduction in the level of risk.

Thailand: MDG - Targets and Performance



Zambia

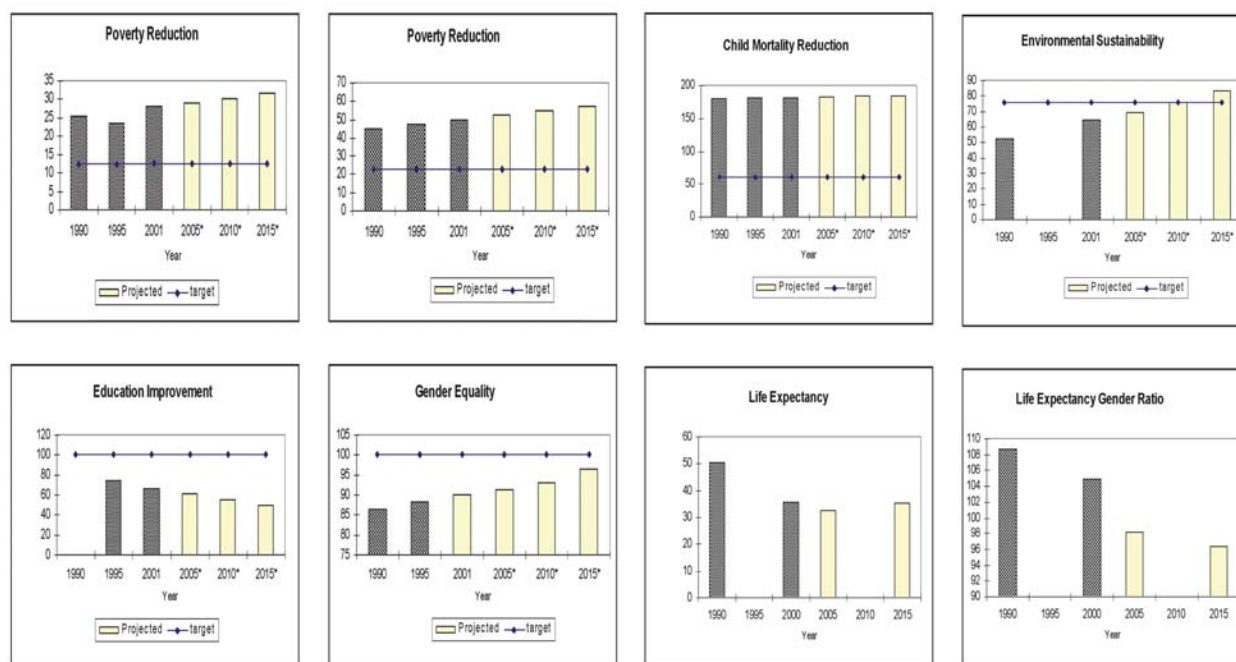
Zambia is located in Central Africa. A landlocked nation, it is hemmed in by the Democratic Republic of the Congo on the north, Tanzania on the northeast, Mozambique and Malawi on the east, Zimbabwe to the southeast, Botswana to the southwest and Angola to the west. Located largely on a plateau, Zambia's 752,614 Km² is mostly 900m to 1,500m above sea level, which makes the climate cooler than its tropical location would suggest. It is home to over 70 ethnic groups. Approximately 7 percent of its land is arable, with grains, peanut, and tobacco and a variety of other crops are grown. Most of the produce is consumed locally, although tobacco is exported.

Over half the population of about 10.5 million lives in urban areas, with many having worked in the copper industry until its recent collapse. Unemployment was 50 percent in 2000, with a staggering 86 percent of the people living below the poverty line in 1993. Literacy was estimated at a respectable 80.6 percent in 2003, but the country suffers from the deaths of many people in the prime of life from AIDS. Hard hit by the epidemic, 16.5 percent of all adults were estimated to be HIV/AIDS positive in 2003 and the expected life span has plunged to 37 years. Infant mortality rates were estimated at more than 98 deaths per 1,000 births in 2004 and it was estimated by the UN that over 650,000 children had been orphaned by the AIDS epidemic by the end of the 1990s.

Rich in natural minerals, Zambia is one of the world's top exporters of copper, and is still recovering from the collapse of the copper market in the 1990s. It has the capacity to generate hydroelectric power, but does not have the infrastructure in place to either use it domestically or effectively export it. Lacking a seaport, Zambia is dependent on the goodwill of its neighbours to move products into and out of the country. In the recent past, Zambia has received funds from the World Bank, the IMF and other donors mainly for debt service relief. To a lesser extent, funds have been available for institutional and policy reform, and protection of environmental reserves. Relatively small amounts have been devoted to physical infrastructure.

A summary of the current conditions of Zambia's infrastructure shows that there are almost 2200 km of railroads, over 66 thousand km of highways, just one river port and about 10 airports with paved runways. The consumption of electricity in 2001 was just under 5.5 billion kWh. Opportunities for additional hydroelectric power generation exist, but weak national and regional demand make new investments unattractive. A total of 88,000 phones were connected to land-lines, and about 241,000 cell phones were in service. Almost 1,900 internet hosts provide service for about 68,000 users, or about 1 in 150 Zambians.

Zambia: MDG - Targets and Performance



ANNEX 4: SUMMARISED OUTLINES OF PROJECTS SELECTED IN EACH COUNTRY STUDY

Bangladesh

Name of the Project	Location	Objectives	Duration of the Project
Portable steel bridges (PSB)	Low lying flood-prone areas of all over Bangladesh. A total of 154 steel bridges will be erected by the end of the project, of which the present study focuses on two bridge areas in Savar and Chandina upazilas under Dhaka and Chittagong divisions, respectively.	<ul style="list-style-type: none"> To improve rural communication through construction of simple and relatively small steel bridges To facilitate and establish rural road network with the growth centres To improve the marketing of agricultural products and thus encourage farmers to increase production To generate employment opportunities for rural poor 	The Phase I of the project was implemented during 1993-97 with the construction of 74 bridges. The Phase II, 2000-05, is to construct another 80 bridges.
Small-scale Water Resources Development Sector Project (SWRDSP)	In 280 locations in the western part of Bangladesh. The present study focuses on two sub-projects- Rampur (under Natore district) and Nabaganga Khal (under Chuadanga district)s	<ul style="list-style-type: none"> To develop sustainable stakeholder-driven small-scale water resource management system To support sustainable increase in agricultural and fisheries production and incomes of small farmers in support of the government's poverty reduction efforts 	Commenced in 1996 and completed in December 2002
Participatory Rural Development Project (PRDP)	Two unions of Kalihati upazila under Tangail district. For the present study, two villages were selected: Poshon and Dakshin Chamuria	<ul style="list-style-type: none"> To develop and strengthen coordination, cooperation, collaboration and partnership among the stakeholders To develop and implement micro-infrastructures through local level bottom-up planning To strengthen monitoring, transparency and accountability through active participation of the stakeholders To develop capacity through human development training 	From 2000 to 2004
Sirajganj Project (SP)	Unions of Sirajganj district. For the present study, the focus has been on two project villages: Bhengri and Char Sartia	<ul style="list-style-type: none"> To develop participatory local governance for socio-economic development and poverty alleviation To deliver sustainable infrastructure and socio-economic services, which meet local priorities To build the capacity of elected local government bodies to plan, finance, implement and manage service delivery in response to local needs To derive lessons of wider relevance to the local government reform process 	Commenced in July 2002, the project is scheduled to be completed by December 2005
Sustainable Rural Electrification Project (SERP)	In 13 locations under 10 districts. For this study, two projects were selected-Nalitabari (under Sherpur district) and Kamarul (under Khulna district)	<ul style="list-style-type: none"> To assess the potentials of the solar energy technology in improving the quality of life of the very poor people in targeted 60 households at Nalitabari To deliver an adequate level of health care services by providing electricity to a community health clinic at Kamarul 	The solar electrification system was installed at Nalitabari project site in 1999, while the Kamarul community health clinic was brought under such system in 2001

Senegal

Name of the Project	Location	Objectives	Duration of the Project
The Health Integrated Development Programme (PDIS)	National-urban and rural	<ul style="list-style-type: none"> To improve provide greater access to good quality health care to the majority of poor and vulnerable groups To help decrease the fertility rate and the high population growth rate by improving the management of and access to reproductive health To improve the financial management and sustainability of the public health system 	1998 - 2005
The Town Councils Support Programme (PAC) / Municipal Development Agency (ADM)	National-urban and rural	<ul style="list-style-type: none"> To back up the decentralization policy and gradual transfer of functions and responsibilities To improve administrative and financial management of town councils To improve urban priority investments programming To rationalize and simplify the financing of urban investments To improve rural communities' basic infrastructures 	1998-2005
The Local Development Fund (FDL) (Kédougou)	Region of Tambacounda (Departments of Kedougu and Tamba)	<ul style="list-style-type: none"> To increase job opportunities To promote local communities' essential functions as grassroots actors for the coordination of the local economic life To valorize the villages' production areas in a community management of lands To anchor rural communities in the rural society as coordinating unit of the economic and social life between many villages 	From 2000 to 2004
Rural Areas Decentralization Support Programme (PADMiR)	Departments of Kaffrine and Kebemer	<ul style="list-style-type: none"> To improve governance in rural areas To contribute to poverty reduction in rural areas To reinforce the project management skills of rural counselors To promote social actors' involvement in local development 	2000 - 2006
The Poverty Fighting Programme (PLCP)	Regions in Dakar, Thies, Tambacounda, Kolda (urban and rural areas)	<ul style="list-style-type: none"> To contribute to poverty alleviation To raise the educational level, the technical and professional skills and target groups' self-promotion capacities To increase their income-generating capacities To improve the access to basic social services 	2001-2005
The National Rural Infrastructures Programme (PNIR)	National (urban and rural areas)	<ul style="list-style-type: none"> To reduce poverty and improve living conditions of rural people To promote decentralized rural development and reinforce governance at local level To improve the regulatory, institutional and budgetary framework at the local level To set up rural and community-based investment programmes financing and implementation mechanisms To facilitate the access of the poorest rural communities to basic infrastructures 	12 years (4 years stages)
The Drinking Water For All Project and Support to Community Activities (PEPTAC)	Regions of St. Lounga, lous, Matam, Tamba	<ul style="list-style-type: none"> To improve living environments of people through sustainable water system 	
Programme of Building of Hydraulic Infrastructures	All regions of Senegal except Dakar (in rural Senegal)	<ul style="list-style-type: none"> To improve the hygienic conditions of the populations by setting up a good quality water To improve the level of servicing in rural areas with ensuring a minimum of 35 liters of water per day per capita in rural Senegal To contribute to the lessening of female time-use in water collection and enhance their possibilities for education 	1979 - 2003 (24 years)
Rural Communities Promotion (PROCR) / The Groundnut Basket Project	Regions of Kaolack and Fatick (rural and urban)	<ul style="list-style-type: none"> To improve living conditions and community organizations of rural people To develop capacities for local leadership To fight against rural poverty To fill in the infrastructure gap 	2004 - 2016

Thailand

Name of the Project	Location	Objectives	Duration of the Project
Doi-Tung Development Project	Doi-Tung an area made up of 27 villages and located in Mae-Sai district of Chiangrai Province, covering an area of more than 93,000 Rai of Northern Thailand.	<ul style="list-style-type: none"> • To reduce deforestation and build necessary public infrastructures (Phase I) • To help nurture a higher quality of life and self-sustainable, sufficient income through employment (Phase II) • To accumulate human capital through training and knowledge (Phase III) 	The Doi-Tung has been organised in three phases: 1988-1993; 1994-2002; and 2003-2007
Krai Kang Won Distance Learning Programme (KKWDL)	All over Thailand covering three types of school-primary, secondary and extension schools	<ul style="list-style-type: none"> • To ensure access of children from poor families and vulnerable groups to education, who otherwise are excluded from the formal educational system • To provide basic education to all people, especially the poor and vulnerable groups using new technology to create a live, 24-hour distance-learning program 	The Programme has been divided into two phases: 1996-2002 (First Phase) and 2003 - 2011 (Second Phase)
Kung Krabaen Seawater Irrigation Development Project (KKSIDP)	Chantaburi Province covering an area of 640 hectares	<ul style="list-style-type: none"> • To promote effective management of coastal fishery and to provide and effective programme of integrated environmental management practices in order to increase villagers' incomes • To provide local poor farmers with the land and extension support to develop shrimp farming 	1999 -
Lomsak Primary Care Unit (PCU)	Lomsak district (population 162,970) in Petchaboon with 22 sub-districts, 242 villages and 1 municipality	<ul style="list-style-type: none"> • To develop a countrywide general practice for the implementation of proposals contained in the blueprint "Universal Coverage in Thailand" • To bring healthcare closer to the people by providing at home-care, reduce stress on resources at the district level, and teach about proper nutrition and the importance of exercise. • To deal with individual groups with special needs, such as pregnant women, single mothers and people with serious illness, such as HIV/AIDS. 	2002 -
Panasnikom Pipe Water Supply (PPWS)	Tumbon Narek, 8 km from Ampur Panasnikom, Chonburi province	<ul style="list-style-type: none"> • To adequately provide clean water supply in Tambon Narek 	1995 -

Zambia

Name of the Project	Location	Objectives	Duration of the Project
Linda Water Project	South of Lusaka near Kafue Town	<ul style="list-style-type: none"> To increase availability and improve access of clean water supply in Linda 	1984 - on going
Kanyama Water Project	Old Kanyama in the peri-urban area of Lusaka	<ul style="list-style-type: none"> To increase availability and improve access of clean water supply in old Kanyama 	1997 to completion of construction in 2001
Chipata Water Project	Chipata community with 39 zones, which initially were small catholic communities known as infitente	<ul style="list-style-type: none"> To increase availability and improve access of clean water supply to the community 	From 2000 to 2004
George Water Project	George-the largest peri-urban area in Zambia	<ul style="list-style-type: none"> To increase availability and improve access of clean water supply to the community 	1994 - 2000
Mtendere Health Centre Project	Mtendere (population of 130,000)-one of the densely populated settlements in Lusaka	<ul style="list-style-type: none"> To act as a link between the clinic management and other key stakeholders such as communities, government and donors 	1995 - on going
Ng'ombe Health Centre Project	Ng'ombe-originally an illegal settlement	<ul style="list-style-type: none"> To act as a link between the clinic management and other key stakeholders such as communities, government and donors 	1999 - ongoing