

Infrastructure for Human Development Notions, Linkages and Policy Options

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Abstract: The present paper discusses the analytical inter-linkages between infrastructure and human development through the lens of human poverty reduction and human security and presents some policy options as to how to use infrastructure for enhancing human development. In that context, the paper first examines the various notions related to infrastructure and human development, followed by an analytical discussion of their inter-linkages. In that discussion, the issue of governance of infrastructure will also be brought in. The last section of the paper presents some policy options for mutually reinforcing the linkages between infrastructure and human development.

Keywords: poverty reduction, human development, infrastructure

Introduction

Infrastructure is a broad concept, which encompasses such physical infrastructures 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 importantly, it is not infrastructure per se, but infrastructure *services*, which are more relevant for poverty reduction. Infrastructure can be lumpy, huge, nation-wide, but they can also be small, local and community-based and maintained.

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The benefits from the first type of infrastructures may trickle down to poor people through generation of growth, but it is the small, local and community-based infrastructure, which can make a *direct* contribution in raising the well-being of poor people. Moreover, poor people should not only be beneficiaries of the process, but should also be active participants in decision-making with regard to infrastructure development and its services.

Infrastructure growth and services can play a critical role in economic growth and poverty reduction – but the links are neither automatic nor unidirectional nor simple. Complex issues are involved in the process: non-economic rationale dictating infrastructure projects, lack of a proper feasibility study and cost-benefit analysis, inadequate provision for operations and maintenance (O & M) and so on. Even though infrastructure development and services have contributed, in some cases, to economic growth, its benefits have often not been translated into improvements in the lives of poor people. This has happened partly because of design problems, non-participation of poor people in the formulation and implementation of these initiatives, their adverse social and environmental impacts, and largely because they were not local and community-based.

Infrastructure development and services also enhances human security, particularly of poor people, by contributing to food security, job security, health security, community security, personal security, and environmental security. Infrastructure development and services assume a special role in the post-conflict transition stage of conflict-ridden countries.

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 investments were argued to have had little relevance to poverty reduction. *Second*, actual benefits from infrastructure were viewed as significantly less than anticipated. Too often, there have been negative rather than positive consequences for poor people, including

environmental damage to which the poor 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 the poor.

Nevertheless, it is now widely recognized that if governance and institutional frameworks are strengthened and capacities are developed, the linkage between infrastructure and reduction of poverty can become stronger. Infrastructure has been identified to bring in multiple benefits – both economic and human development. 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 development at the macro-level, developing countries are in need of capacity development and institutional reform for infrastructure development and services at the community level – governance of infrastructure development at the local level. This will, on the one hand, lead to infrastructure development, which will be participated by poor people and whose benefits will mainly accrue to them, and on the other, it will also complement the initiatives undertaken by other development actors at the macro level.

Infrastructure and Human Development: Concepts and Linkages

What is an 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 characterized by economies of scale and externalities; hence they are mostly but not all 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 interurban 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). There is a wide range of institutions that play a decisive role in supporting economic and social infrastructure and ensuring that economic growth is sustainable in the long-term.

Economic infrastructure varies by size, purpose, usage and organization of project aspects such as ownership, financing, monitoring and evaluation.¹ 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. Infrastructures are capable of yielding services and commanding scope that can vary from the global to the local, and can

¹ The discussion of the type and scope of infrastructure follows Prakash (2003).

also cut across the rural-urban divide. Some facilities may be exclusively dedicated 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, the project seeks to 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 infrastructures such as roads, bridges and highways, transport and ports, basic utilities such as power, water, and sanitation, and schools, health care facilities, and public buildings. Research and country studies focus on three things:²

- Physical infrastructure, not 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 big, national and lumpy infrastructure

² Jahan and McCleery (2005)

(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.

Different infrastructure projects can interact to provide greater or lesser benefits than anticipated. These interactions have to be explicitly considered as an essential component of any poverty reduction strategy. A few obvious examples of such synergies are provided below, to illustrate the point. Synergies exist between multiple connections in the 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.

Human development

Human development is simply defined as a process of enlarging choices. Every day human beings make a series of choices – some economic, some social, some political, some cultural. The ultimate objective of development is not to create more wealth, or to achieve a higher growth, but to enhance this range of choices for every human being.

Human development is both a process and an outcome. It is concerned with the process through which choices are enlarged, but it

also focuses on the outcome of enhanced choices. Human development, thus defined, represents a simple notion, but with far-reaching implications:

- *First*, human choices are enlarged when people acquire more capabilities and enjoy more opportunities to use those capabilities. Human development reflects a balance between the two and if there is mismatch between the two, human frustration may result.
- *Second*, according to the concept of human development, economic growth is just a means, albeit an important one, not the ultimate goal for development. Income makes an important contribution if its benefits are translated into human lives, but the growth of income is not an end by itself. The focus of development must be people.
- *Third*, human development, by concentrating on choices, implies that people must influence the process that shapes their lives. They must participate in various decision-making processes, the implementation of those decisions, and their monitoring.

In the ultimate analysis, human development is development *of* the people, development *for* the people, and development *by* the people. Development of the people refers to building of human capabilities through human resource development. Development for the people implies that the benefits of growth must be translated into the lives of people. And development by the people emphasizes that people must participate actively to influence the processes that shape their lives.

One particular notion related to human development is that of human security. Human security is security of people in every aspect of their lives and it is more than territorial security. It combines 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, which enhances human development. On the other hand, human development, by enhancing people's capabilities, also contributes to improving human security.

Infrastructure-human development nexus³

The infrastructure-human development nexus is a multidimensional one. Infrastructure services impact human development by enhancing *human capabilities* through health and education, creating *opportunities* through poverty reduction and empowerment, and ensuring *human security* through reducing risks and vulnerabilities. Infrastructure contributes to all these *directly* and *indirectly*. For example, it helps enhancing human capabilities by directly improving access to health and educational services. But it also contributes to human capabilities indirectly. For example, 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 productive as well as reproductive, and educational or leisure activities (Calvo et al 2002).

Infrastructure-health linkages

Having access to clean sources of potable water ensures safe access to sanitation services and prevents parasitic infections. A survey of 49 studies on diarrhoeal morbidity showed an average 22 per cent reduction, with the 19 most rigorous of those studies showing a 26 per cent reduction as a result of improved water and sanitation. Estimates show that in South America, bringing water and sanitation coverage to 100 per

³ Unless otherwise stated, the data in this section are from Jahan and McCleery (2005)

cent would decrease child mortality due to diarrhoea by 22 per cent; in South Asia and West Africa, it would decrease by 21 percent.

In Albania, 60 per cent 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 per cent of households report illnesses due to unsafe drinking water. This was especially true among people earning less than 100,000 manat per month, 19 per cent 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 centers are hard to reach, many poor people stop seeking health care altogether. In Jamaica, 73 per cent of women reported that mobility was a problem with respect to access to prenatal healthcare services. About 12 per cent 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 centers can help make it easier to establish and staff health-care centers 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-education linkages

Good transportation links reduce the time it takes to go to school. Better roads and transportation can improve the enrollment 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' education. Adequate transport lowers the cost and increases effectiveness of other support for school services.

Having access to potable water reduced involuntary absenteeism and improves educational performance of children. In Africa, access to piped water has been found to increase school attendance between 2 and 16 per cent. In Nigeria, it was estimated that Guine Worms, a parasitic infection, caused by poor quality of drinking water, was responsible for 60 per cent of all school absenteeism. 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 by 20 per cent.

One of the major uses of energy by the poor is for lighting. Collecting traditional fuel (usually done by children) is time consuming and operating it is expensive and inefficient. Lack of electricity prevents 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, thereby 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 to students 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-poverty reduction linkages

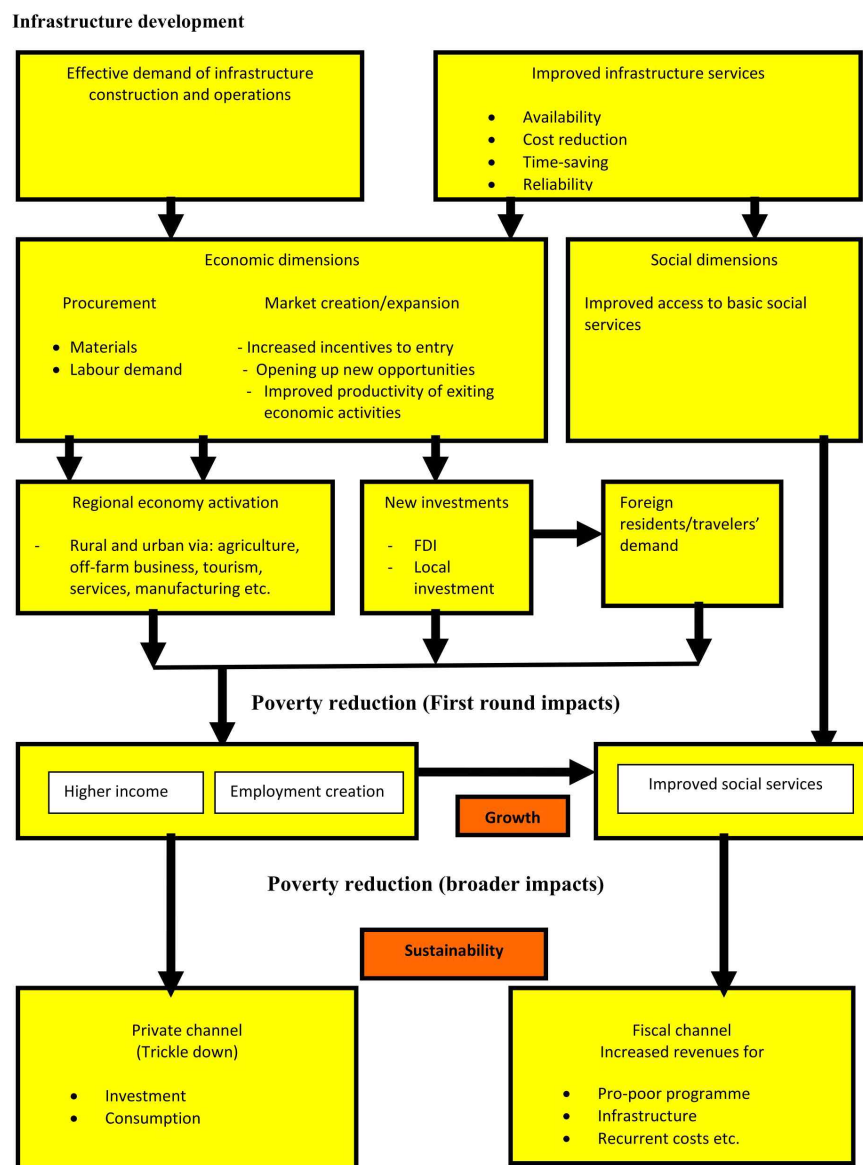
Poverty reduction requires economic growth which, when accompanied by sound macroeconomic management and good governance, results in sustainable and socially inclusive development. The impacts of infrastructures on economic growth and poverty reduction occur in a multiplier way – there are *first-round* effects, followed by subsequent impacts (Figure 1).

The first-round impacts on human poverty reduction are more *direct*, while the subsequent effects, realized 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 *supply-side* and *demand-side* effects. On the supply-side, improved infrastructure services in terms 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 (FDI) and domestic investment could promote industrial growth and generate jobs and incomes at newly-invested firms and in related industries and services through increased procurement of local inputs and services.

Figure 1: Infrastructure, economic growth and poverty reduction: hypothetical illustration of inter-linkages



- Regional economy activation effect: Through this channel, 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.
- *Agricultural productivity*: The provision of rural infrastructure has been linked to agricultural growth in numerous studies. Improved access and density of roads has been shown to reduce transaction cost of accessing both inputs and outputs leading to increased agricultural output, increased crop area and yield (Binswanger et al 1987). Improved transportation and electrification are associated with an increased use of high yield varieties and an extension of area under irrigation (presumably because reduced transport cost and availability of electrical pumps make it worthwhile to irrigate lands that were not previously ‘economical’, and provide greater returns to improved seeds) (Barnes and Binswanger, 1984). Transport and telecommunication services also promote communication and information flow between communities and between rural and urban centers, fixing information asymmetries and linking farmers to markets for goods and input supply as well as agricultural extension advice. This has resulted in reduced transaction costs and increases in agricultural productivity (Fan, Hazell and Thorat, 1999) through technological innovation, improved farming practices and diversification. Cellular pay phones in rural Bangladesh have also helped to lower the cost of information gathering, and this has been reflected in lower prices for poultry feed, more stable diesel prices, and less spoilage of perishable goods due to more precise shipment dates (WDR, 2000).

- *Non-farm sector:* Perhaps more significantly, although less studied, infrastructure services have been shown to stimulate the non-farm sector and support the emergence of small businesses in rural areas which can be a significant source of employment and income for poor people. In India, reduced transaction costs from the provision of serviceable roads was found to lower banks' costs of doing business, expanding the availability of credit to the rural population (Binswanger, Khandker and Rosenzweig, 1989). Reliable energy supply—particularly grid electrification—has been strongly correlated to the proliferation of non-agricultural businesses (Lamech et al 2000). In Ecuador, those businesses established as a result of electrification accounted for 40 percent of rural incomes, employing 40 percent of the men and 50 percent of economically active women (Lanjouw and Lanjouw 1995). Water and sanitation services also impact rural household income through improved health and reduced illnesses, which increases worker productivity and wage earning potential.

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 would 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. Investment in infrastructure services can contribute to growth (and thus poverty alleviation) by: reducing transaction costs and facilitating trade flows within and across borders; enabling economic players to respond to new types of demand in different places; lowering the costs of inputs used in the production of almost all goods and services; opening up new opportunities for entrepreneurs or making existing businesses more

profitable; providing employment in public works both as social protection and as a counter-cyclical policy in times of recession; and enhancing human capital, for example, by improving access to schools and health centers (DFID, 2002).

One of the major impacts of infrastructure is employment creation. Labour-intensive technologies in infrastructure create jobs for people. This is quite evident in road-building technologies. In capital-intensive road technology options, equipment typically represents 80 percent of the total cost, while the labor costs are only about 10 percent to 12 percent. For the labor-intensive option, the equipment would represent about 30 percent to 40 percent of the total cost, while labor costs would be 50 percent to 60 percent. Labor will be mainly unskilled or semi-skilled, often offering opportunities to women.

An International Labor Organization (ILO) review of experience with labor-based road construction in countries as different as Cambodia, Lao PDR, Ghana, Lesotho, Madagascar, Rwanda, Thailand, and Zimbabwe showed that the labor-based option is about 10 percent to 30 percent cheaper than the capital-intensive equivalent, reducing foreign exchange requirements by 50 percent to 60 percent while creating between three and five times the amount of employment for the same investment. In Ghana, it was estimated that if 20 percent of public investment and 10 percent of private investment in infrastructure were in labor-based projects, this would amount to about \$100 million a year, and would create 50,000 direct and 75,000 indirect jobs more than with conventional construction.⁴

The impact of infrastructure on poverty reduction 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.

⁴ Jahan and McCleery (2005)

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 emphasize 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 a major determinant of whether infrastructures would make an impact on poverty reduction.

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 investments 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 related 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 security⁵

Infrastructure services contribute to human security. Access to health services ensures health security, while access to education ensures

⁵ Data for this section, unless otherwise stated, are from Jahan and McCleery (2005)

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 soon, thereby reducing many risks and vulnerabilities that affect poor people in particular.

Energy-food security linkages

Energy affects the food security of the poor, 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 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 heavy male 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 diarrhea 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- empowerment linkage

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. Access to electricity can also be important for broadening access to electronic communication and radio. Indirectly, 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-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, as their farms are at the periphery of irrigated areas and are the first to be hit by drought. On top of that, 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 and banning construction in hazard zones and establishing robust design standards can help to mitigate the impact of natural disasters, although at considerable cost. Others 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), they 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 stabilizing 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 the poor may be. Infrastructure maintenance is neglected due to chronic funding shortages leading to deterioration of existing assets that become 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, because of its employment-creation potential, infrastructure works programmes can be important components of crisis mitigation packages during times of economic shock. Although the primary aim of such programs is to provide poor households with income during crisis, well-designed programs—such as the Maharashtra Employment Guarantee Scheme in India and the Trabajar in Argentina—can also

provide low-cost infrastructure development. Workfare programs, however, are not always cost effective, and the quality and productivity of infrastructure investments made under these programs are not always satisfactory (Calvo et al 2002).

Infrastructure-Human Development Nexus: Governance Issues

Governance of infrastructure encompasses many areas. On one hand, it covers issues like nature, 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). Still in 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.

All these intended benefits cannot be reaped unless infrastructures are 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.

On the other hand, governance also refers to implementation, operations and maintenance of the infrastructure. Sometimes, the implementation plans are made without adequate financial resources or institutional set-up. The quality issue of the infrastructure itself and its services are also overlooked. Infrastructures are built without adequate financial and organizational provisioning for O&M.

Finally, there should be proper monitoring and evaluations of infrastructure in terms of its impact and sustainability. This requires existence of bench-mark surveys, methodologies and indicators for monitoring and evaluation. The need for reliable data can hardly be overemphasized.

Good governance for infrastructure

There is a strong two-way link between infrastructure and governance: good governance is necessary for the successful implementation of infrastructure programmes, and, conversely, infrastructure programmes can be important vehicles in the improvement of governance. Without people's participation in decision-making process in terms of location, design and nature of infrastructure, without their involvement in the implementation and operations and maintenance of them and without adequate financial and human resources, the infrastructure can neither provide maximum benefits, nor can they be sustainable. Governance of infrastructure requires institutional reforms and capacity development. On the other hand, when good infrastructures such as roads and transportation, electricity are put in place, it greatly enhances the efficiency and effectiveness of local government and administration.

The governance of infrastructure should focus on a series of issues: public and community participation, privatization, decentralization, corruption, polarization, capacity development, institutional reforms and gender issues.

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 1** describes the typologies of participation.

Box 1 :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-mobilization – people participate by taking initiatives independent of external agencies, particularly if governments, NGOs or private companies provide an enabling framework.

Source: ODI (1998)

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, it is about empowering all those parties influential in and/or affected by a project, in defining and realizing the project’s objectives, ensuring sustainable benefits, and avoiding or mitigating harmful economic, social and environmental impacts. The operationalization 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 smallholder agriculture, community forestry,

health care, education, urban poverty and small-scale water supply. Until recently, relatively little attention had been paid to PP in economic, particularly large-scale, infrastructure projects (OECD, 2005).

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 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 - often supported by 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 organizations, often form the technical and organizational 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 decentralization program with its own resources and greater autonomy. Local governments thus strengthened can support community based programs. Even in India, where local *panchayats* do not have as much autonomy, the relations between local governments and user groups are evolving. Where neighboring small towns have effective providers, these can be contracted in by rural local governments to support their communities.

The local externalities and the need to understand and draw on local conditions and knowledge suggest that local governments are the appropriate policymaker 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 organization. In Vietnam some local governments have used a program 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 organized to take on operational responsibility on a concession basis. In each case, the process is organized through group consultation and endorsement. While small systems can be contracted by community organizations, village-wide systems may again require the support of policymakers at the local level. For rural systems—community-managed systems and self-provision—the challenge is to seek mechanisms for the policymaker to support client power, using local governments, regional utilities, and independent providers.

Privatization

To better understand the connections between governance and infrastructure provision, two attributes of infrastructure services are 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 categorization 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 privatized, while low rivalry goods, like street signs and lighthouses, should generally be provided by

the public sector.

Even more so than privatization or decentralization, *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 also determined the structure, complexity and hierarchical organization 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 limited 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 privatization 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 privatization 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 privatization process itself and the subsequent regulation of the private companies providing infrastructure services are required, if privatization is to improve the quantity, quality, and accessibility of infrastructure services, as advertised.

Decentralization

Another process, which accelerated almost concurrently with privatization, is decentralization, 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 decentralization efforts can be subsumed in one word: incompleteness. For the decentralization 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 decentralization process: political, administrative, and fiscal. Incomplete decentralization 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 for a road linking a village

to a secondary road to as little as a few dozen for 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 further enhance 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. In the face of an implicit lack of ability to do anything about it, poor governance thus becomes an accepted 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 the less fortunate having much of a chance of making any counter-prevailing views heard. 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 operation and maintenance (O&M). The impact of bad governance contributes to a pervasive feeling of social injustice. In addition to being first hand 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 more inferior services.

If indeed governance improvement starts with showing people whose mindset assumes that corruption, mismanagement, 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-root 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 importance causes of the collapse of development strategies. However, it is not as clear how those coordination failures can be prevented or their impact reduced. 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.

Polarization

A common attribute of underdeveloped polities is the prevalence of high level of fragmentation, either along racial or ethnic fault lines, or those created by class polarization. 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 polarization. When politicians take advantage of this polarization, 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 practice 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.

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. This is because nation-wide, big and lumpy infrastructures involve huge financial resources, their benefits sometimes are not as direct as those of small-scale ones on poverty reduction, their management is rather complex and the potentials for lack of oversight is rather larger for such infrastructures.

Compared to large-scale infrastructures, small-scale community-based infrastructures present more insights with regard to poverty reduction and governance:

- Because of the nature, location, design and implementation process, small-scale infrastructure may bring more direct impact on the lives of poor people. Small irrigation projects contribute immediately to agricultural productivity bringing in tangible benefits to local farmers. Rural feeder roads improve mobility of local communities and reduce transportation costs which impact 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. There is no doubt that large-scale infrastructures also create some of these impacts, but in most cases, the benefits come through indirectly through the economic growth or the gestation period is long or the benefits are not targeted. A small-scale infrastructure raises overall productivity of local economy through the construction and maintenance of local roads, the water supply systems, small bridges and local agricultural electrification projects, etc. (Swada, 2000). There be a high possibility to contribute directly to chronic poverty reduction through improving an average income in infrastructure development.
- In cases of small-scale and community-based infrastructure, local communities take part directly in the decision-making process in areas of nature of the infrastructures, their locations and designs. And since it is they who can make the best judgments of what they need and what would serve them best. In small-scale community based infrastructure, local communities can take part in the implementation process. They can also be involved in the operation and maintenance of the infrastructures through mobilization of financial and human resource 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 infrastructures.

- Small-scale community-based infrastructures help reinforce social capital and consolidate community organizations. For example, if there is a local-level small-scale electricity generation project in a community, on one hand, it can help reducing poverty by contributing to irrigation of agriculture to productivity increase in self-employed enterprises, but on the other, when local people, particularly the poor, are given a chance from the inception stage to the effective management of the project, it contributes to strengthening the communities and thus the social capital.

The small-scale community-based infrastructures are complementary to large-scale infrastructures in many ways.

- *First*, it fills in the gaps which large-scale infrastructures may fail to do. Generally speaking, there are four effects in the infrastructure development: the effect of inducement to investment, the effect of enhancing the productivity, the effect of creating effective demand and the effect of improving social and public service. It is the fourth effect where small-scale infrastructures contribute the most to improving people's living standard.
- *Second*, there are complementarities between large-scale and small-scale infrastructures. Improvement of access to a high-quality main road and a transportation system enables improvement of agricultural technology, 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, expands the acquisition chance to higher pay, enables the diversification of an economic activity, and finally raises the income level significantly.
- *Third*, some of the governance lessons from small-scale community based infrastructures may be replicated and scaled up in large-scale infrastructures.

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. Needless to say, these options are based on the experiences of pre-specified projects in a handful of selected countries. They thus cannot claim some generalized use, but they can still be useful in similar situations. The recommended policy options are:

- 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 multi-component infrastructure project or infrastructure project with multiple objectives are that they make sense under resource constraints; they can build on synergies of policies and benefit from all kinds of externalities and reduce costs.
- Pursue synergies. In most projects, synergies appear almost by chance, not anticipated and purposefully introduced 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.
- Use small-scale projects to develop community solidarity and build social capital. This may be used in other initiatives as well.

- 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 there. 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, fertilizers, pesticides or agricultural extension work.
- In the design of small-scale infrastructure, the following issues should be followed :
 - 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, concerns of women
 - Specify the technology option
 - 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.
- In choosing the location of the project, again a few issues need to be pursued :
 - 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 mobilize 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 work plan 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 issues :
 - 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 with selecting evaluation criteria in advance
- Integrate gender issues through policies into small-scale projects at all levels. Women should not only be beneficiaries of the project, but they must be an active stakeholder 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.
- Small-scale infrastructures do not automatically ensure the inclusion of poor people in them either as beneficiaries or as decision-makers. Pursue deliberate and conscious efforts in that respect and without the inclusion of poor people in the project, it would lose a lot of its relevance for poor people.

- If small-scale infrastructures services are to contribute significantly to poverty reduction, policies must be pursued to ensure five *As* – *availability* to poor people, *accessibility* to them, *affordability* to them, *acceptability* by them and *adaptability* for them.
- 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, it 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 the local community (leaders and the traditionally marginalized groups) through people who understand how local governance works and how thing get done. There is a potential for alienation if participatory projects are proposed by outsiders. Quite frankly, local elites will recognize the threat to their control, and may use their considerable 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, labor 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 programs 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 engagements: 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 (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 better aware of the constraints a lack of rules or adequate enforcement places on their activities, creating local agents for broader reform.

- 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.
- 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.
- Policy options should also assess the issue of scaling-up of small-

scale infrastructure projects. These 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 them could be applied to national development goals.

- Are SSCBIP 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 programs 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.
- Broader relevance: 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.
- 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 decentralization 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 SSCBIP, 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.

- Scaling up governance: These benefits involve a different but equally important set of concerns. Representatives from, for example, 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.
- 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: labor 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.

References

- Asian Development Bank, Japanese Bank for International Cooperation and World Bank. (2005). *Connecting East Asia: A New Framework for Infrastructure* ADB: Manila, March 16.
- Ali, Ifzal and Ernesto M. Pernia. (2003). *Infrastructure and Poverty Reduction – What is the Connection* Asian Development Bank ERD Policy Brief Series: 15, ADB: Manila.
- Aschauer, David Alan and Alicia M. Munnei. (1990). *Why Is Infrastructure Important? Is There a Shortfall in Public Capital Investment* Federal Reserve Bank of Boston: Boston .
- Bhalla, G.S. (2002). *Evaluation of Infrastructural Interventions of Rural Poverty Interventions* UNESCAP: Bangkok.
- Binswanger, Hans P. Shahidur R. Khandker and Mark R. Rosenzweig. (1989). “How Infrastructure and Financial Institutions Affected Agricultural Output and Investment in India”, Latin American and Caribbean Country Department II, World Bank, Washington DC.
- Binswanger, Hans P. and John McIntire. (1987). “Behavioral and Material Determinants of Production Relations in Land-abundant Tropical Agriculture” *Economic Development and Cultural Change*, Vol. 36, No. 1 (October): 73-99.
- Brenneman, Adam and Michel Kerf. (2002). *Infrastructure and Poverty Linkages – Literature Review* World Bank: Washington DC.
- Calvo, Christina Malberg et. al. (2002). *Rural Infrastructure Services for Development and Poverty Reduction: A Note*. World Bank: Washington DC.
- Canning, David and Eara Bennathan. (2000). *The Social Rate of Return on Infrastructure Investments*. World Bank Research Project – Infrastructure and Growth: A Multi-Country Panel Study. World Bank: Washington DC.
- Campos, Jose Eduardo L. and Hilton Root. (1996). *The Key to Asian Miracle: Making Shared Growth Credible* Brookings Institution: Washington DC.
- Commission on Human Security. (2003). *Human Security Now* UN Commission on Human Security: New York, May.
- Department for International Development. (2002). *Making Connections –*

- Infrastructure for Poverty Reduction* DFID: London.
- Hanmer, L., Booth, and E. Lovell. (2000). *Poverty and Transport* Report prepared for the World Bank in collaboration with DFID, Overseas Development Institute, World Bank: Washington DC.
- Esfahani, Hadi Salehi and Maria Teresa Ramirez. (1999). *Institution, Infrastructure and Economic Growth* Social Science Research Network: November.
- Fan Shenggen, Peter Hazel, S. Thorat. (1999). "Linkages between Government Spending, Growth, and Poverty in Rural India," Research Report 110, International Food Policy Research Institute, Washington DC.
- Financial Times. (2005). "*Rich nations consider more generous financing rules for big dam projects.*" 19 April 2005.
- Gramlich, Edward M. (1994). "Infrastructure Investment: A Review Essay". *Journal of Economic Literature* September.
- Holtz-Eakin, Douglas and Amy Ellen Schwartz. (1994). *Infrastructure in a Structural Model of Economic Growth* Syracuse University Working Paper Number 4824.
- Jahan, Selim and Robert McCleery. (2005). *Making Infrastructure Work for the Poor: Synthesis Report of Four Country Studies - Bangladesh, Senegal, Thailand and Zambia* United Nations Development Programme. New York.
- Jalan, Jyotsna and Martin Ravallion. (2001). "Does Piped Water Reduce Diarrhea for Children in Rural India" Policy research Working Paper 2664, Development Research Group World Bank: Washington DC, August.
- Jayasuria, Rwan and Quentin Wodon. (2003). Efficiency in Reaching the Millennium Development Goals, World Bank Working Paper No 9, World Bank: Washington DC
- Lamech, Ranjit and Kyran O'Sullivan. (2000). "Chapter 21: Energy" Poverty Reduction Strategy Paper Vol. II: Macroeconomic and Sectoral Approaches World Bank: Washington DC, June.
- Lanjouw, Jean O. and Peter Lanjouw. (1995). "Rural Nonfarm Employment: A Survey" Policy Research Working paper 1463, Office of the Vice President, Development Economics, World Bank: Washington DC, May.
- Overseas Development Institute. (1998). *Mainstreaming Public Participation in*

- Economic Infrastructure Projects* ODI Briefing Paper.
- Organization for Economic Cooperation and Development. (2005). *Evaluating Public Participation in Policy Making* OECD: Paris, August.
- Prakash, Bkram. (2003). *Are Infrastructure Investments Poverty Reducing* Draft Asian Development Bank: Manila.
- Pouliquen, Louis. (2000). *Rural Infrastructure and Governance* World Bank: Washington DC.
- Redclift, Michael. (1992). "The Meaning of Sustainable Development" *Geoforum* 25(3):395-403.
- Swada, Yasuyuki. (2000). "Dynamic Poverty Problem and the Role of Infrastructure" *Journal of Research Institute for Development and Finance* November.
- Willoughby, Christopher. (2002). *Infrastructure and Pro-poor Growth : Implications of Recent Research*. DFID: London.
- World Bank. (2000). *World Development Report 2000/2001: Attacking Poverty* World Bank: Washington DC.
- World Bank. (1994). *World Development Report 1994: Infrastructure for Development*. World Bank: Washington DC.