

## **INFRASTRUCTURE INVESTMENT AS “SUSTAINABLE DEVELOPMENT”: A BANGLADESH CASE STUDY**

**Karen Coelho**

*Research Associate, Bureau of Applied Research in Anthropology, University of Arizona, USA*

**Keywords:** Bangladesh, infrastructure, road projects, impact evaluation, social impacts, ethnographic study

### **Contents**

1. Introduction
2. Roads and Rural Development in Bangladesh: Shifts in Goals and Orientation
  - 2.1. Road Saturation Debates
  - 2.2. Care and Rural Road Projects in Bangladesh.
  - 2.3. Implications of the Shift from IFFW to IFFD
3. A Summary of Impacts of Road Improvements on the Livelihoods of Local People
  - 3.1. Changes in Market Facilities, Modes and Costs of Transport
    - 3.1.1. Factors Shaping Market Preference, and Impacts of Road Improvements on Market Options
    - 3.1.2. Changes in Modes and Costs of Transport
    - 3.1.3. Women’s Mobility
  - 3.2. Changes in Cropping Strategies and Agricultural Production
  - 3.3. Diversification of Income-Generating Opportunities, Expansion of Non-farm Opportunities
    - 3.3.1. Rickshaw-Pullers
    - 3.3.2. Shopkeepers and Mill-Owners
    - 3.3.3. Women Entrepreneurs.
  - 3.4. Access to Institutional Resources
    - 3.4.1. Credit
    - 3.4.2. Education
    - 3.4.3. Health
4. Conclusions
- Acknowledgements
- Bibliography
- Biographical Sketch

### **Summary**

The focus and design of infrastructure projects have shifted toward building high-quality, targeted and sustainable assets, building institutional capability in service provision, and fulfilling measurable goals. This paper reports on ethnographic case studies of the impacts of rural road improvements in Bangladesh, outlining the implications of such a shift. The case studies also outline patterns of rural-urban linkages facilitated by improved roads, and the effects of integration into urban, national and global economies on rural livelihoods. They suggest that sustainable infrastructure assets do not always accompany sustainable development processes. The detailed

approach of the case studies helps to unpack and challenge assumptions built into the design of infrastructure projects and their evaluations, especially the assumption of linear flows of urban-rural products and relationships.

## 1. Introduction

Recent articulations of “best practice” in the field of infrastructure development in developing countries stress quality, optimum capacity utilization and demonstrable long-term returns on investments over quantitative increases in infrastructure stocks. This has engendered shifts in objectives, design and programming of road projects since the late 1980s and early 1990s, from ad hoc, relief-oriented and transfer-based interventions toward more systematic, strategic, and development-oriented approaches, geared toward sustainable asset-building. The notion of sustainability here, premised on the identification of key hardware assets as the pivot for a range of social and economic transformations, and backed by massive investment in these assets, reverses the traditional labor-intensive orientation of road projects. It also entails a reconfiguration of the institutional frameworks under which projects are designed, funded, implemented and managed: commercial contractors and local government bodies are seen as more appropriate agencies than the centralized government bureaucracies that were traditionally responsible for the bulk of these activities.

This paper reports on ethnographic case studies of the impacts of one instance of infrastructure investments, namely rural road improvements, on a sample of eight roads in different parts of Bangladesh. The studies were carried out in 1998/99. The improvements, carried out under USAID/CARE, Bangladesh’s Integrated Food For Development (IFFD) project, in collaboration with the Government of Bangladesh, were designed to facilitate year-round accessibility on a key category of rural roads that connect important village markets to subdistrict (*thana*) headquarters, growth centers, or feeder roads. The interventions are closely tied into Bangladesh’s national development strategies that prioritize agricultural modernization as the driver of growth, targeting the agricultural sector with a package of reforms including the elimination of subsidies and deregulation of input distribution. The overall vision is, in the words of the World Bank, of “a more competitive internal marketing system with a greater role for the private sector (and) an improved rural transport sector.”

This paper uses data from the ethnographic impact evaluation to discuss the implications of this shift in design and resource allocation for the nature of the infrastructure link created between urban centers and the rural hinterland (section 2 below). “Urban” in the case studies here refers to small semi-rural towns usually located at the head-end of the improved roads, possessing a large market and important links to larger towns and cities, and serving as the administrative headquarters for the subdistrict. The paper also examines more closely the meanings and implications of rural-urban linkages within the framework outlined above, and outlines some effects of integration into urban, national and global economies on rural livelihoods and lives (section 3 below).

The new strategic approach in infrastructure programming entails a close specification (and quantification) of the linkages to be addressed and the outcomes expected, which

in turn calls for systematic monitoring and evaluation based on measurable indicators. As the case study here shows, however, measurement of impacts of road improvements through independent “before” and “after” variables can be an almost hopelessly complex, and, more importantly, a misguided exercise. The impacts of road improvements on household livelihoods are rarely manifested as independent phenomena, but are mediated, positively or negatively, through a variety of other effects, most of them very specific to local contexts. Several recent studies have noted the difficulty of assessing impacts of infrastructure investments from standard economic models, and stressed the need for detailed on-the-ground data. These studies also note that estimates of user-cost savings typically used to measure impacts are not adequate for measuring the profound structural changes brought about by the construction of infrastructure in developing countries.

The findings of this ethnographic study also revealed problems with many of the assumptions made by traditional models of planning and assessment of road projects. The principal assumption challenged is that of the direction of causality of changes. Economic appraisals of transport projects model a strict set of effects whereby rural hinterlands focus their marketing progressively toward the urban center, and the fruits of modernization, the services of health, education, agricultural outreach and credit emanate out from the center to the peripheries. This study found, however, that transactions occur across the rural economy in dispersed and dynamic ways, and that factors such as seasonality, and the compound effects of responses to improved access conditions (e.g. effects of credit institutions entering the villages, of small local markets being improved, of traders traveling to farms to purchase crops) confound any simple models of linkage effects.

Overall, however, this study found that the road improvements largely served to facilitate or accelerate processes of change already underway in rural-urban or inter-village relations. In Bangladesh, ongoing processes of monetizing the rural economy, moving farms toward export-oriented cash crop production, and forcing people off the extraordinarily fertile land into service jobs have indeed been ably assisted by improved roads, as witnessed by the legions of manually-pedaled rickshaws jostling each other on the congested streets of small *thana* towns. Questions of sustainability of hardware assets, thus intersect with questions about the overall sustainability of the development paradigm they are designed to underpin—the case studies remind us that these two dimensions of sustainability are far from being always compatible.

## **2. Roads and Rural Development in Bangladesh: Shifts in Goals and Orientation**

Road construction has for decades remained a central pillar of national development spending in Bangladesh, coming to represent a stereotype of massive modernizing development efforts funded through foreign aid and implemented via public works programs. However, based on recent re-examinations of the relevance of physical infrastructure development to poverty alleviation, rural employment and household livelihood security, road works have been re-prioritized in altered formats as a critical part of poverty alleviation efforts. The Bangladesh Planning Commission in 1984, after reviewing earlier development projects, identified three priorities aimed at alleviating rural poverty: development of physical infrastructure including roads, storage facilities

and markets; expansion of irrigated agriculture; and production and employment programs for the rural poor. The emphasis on physical infrastructure as part of the three-pronged strategy arose out of an analysis of the characteristics of the rural economy in Bangladesh: high population density; high productivity of land; intensive, small-scale cultivation; vigorous trading including the routine seasonal sale by households of even subsistence-level production; large scale sale of labor; seasonal employment-seeking and an active non-farm sector—in other words, a highly active rural cash economy in which mobility and trading are of crucial importance.

	Category	Length (km)	Definition	Institution Responsible
1.	National Highway (NH)	2,539 (2.5%)	connecting national capital with divisional headquarters, port cities and international highways;	Roads and Highways Department (RHD), Ministry of Communications
2.	Regional Highway (RH)	2,670 (2.6%)	connecting different regions with each other, which are not connected by the national highways;	RHD
3.	Feeder Road Type-A (FRA)	10,008 (9.9%)	connecting <i>Thana</i> Headquarters to the arterial network;	RHD
4.	Feeder Road Type-B (FRB)	8,403 (8.3%)	connecting growth centers to the RHD network (FRA or arterial road) or to the <i>Thana</i> Headquarters;	Local Government Engineering Department (LGED), Ministry of Local Government, Rural Development and Cooperatives
5.	Rural Road Class 1 (R1)	32,674 (32.3%)	connecting union headquarters/local markets with the <i>Thana</i> Headquarters or road systems;	LGED
6.	Rural Road Class 2 (R2)	44,861 (44.3%)	connecting villages and farms to local markets/union headquarters; and	LGED
7.	Rural Road Class 3 (R3)	29,450	roads within villages.	LGED

Table 1. Classification and composition of the road network in Bangladesh

Rural roads in particular were identified as key to the easing of constraints on agricultural production and exchange in the country. Despite the growing demand for better transport conditions in rural areas, however, the issue of road construction in particular has been at the center of considerable debate in Bangladesh since the late 1980s. Road projects have had a long and checkered history in the country's foreign-assisted development since its independence in 1971. From 4 000 km. of primary and secondary highways in 1971, the network has grown to 5 200 km. of national and regional highway, 10 000 km. of sub-regional roads, 8 400 km. of rural feeder roads and 77 530 km. of rural earthen roads (see Table 1). According to a 1996 World Bank study, Bangladesh has the highest density of roads to land area in developing countries of Asia: 70.2 km per 100 sq. km (excluding village footpaths).

## 2.1. Road Saturation Debates

Given the limited land area in the country, debates arose in the 1980s about whether the country was saturated with road projects. At the center of the debates was the need to establish the specific parameters within which road projects could justifiably be seen as (i) still necessary and cost-effective and (ii) serving the goals of poverty alleviation. The outcome of the debates was a recognition that the real problem was not the length of the road network, but its functional condition. In the context of Bangladesh, this means year-round passability, and, for categories R1 and higher (see Table 1), permitting vehicular access. A nationwide road condition survey in 1993 found that only 6% of R1 roads could be classified as being in good condition, with 79% in average condition, and 15% in poor condition. In fact, a World Bank study found that the very density of the rural road network made it difficult to maintain them at acceptable conditions. Thus projects began to focus on improvement and maintenance of the existing road network, rather than extension of its length.

In addition, the constant deterioration of roads due to washout and erosion by monsoon rains and cyclones, recurrent flooding and compaction of the earthen surface makes the concept of saturation a dynamic one. Traditional improvements on the predominantly earthen roads, consisting mainly of filling gaps and increasing width and elevation, typically last from three to six years without ongoing maintenance, so that any given section of road cycles back at a fairly rapid rate into the backlog needing reconstruction. It became clear that the target of achieving "good roads" must include a component of concrete structures (bridges, culverts and drains, sometimes metal palisades against erosion) where needed.

Finally, in seeing physical infrastructure investment as a pillar of rural development and poverty alleviation, the concept of "economically needed" roads came to the center of the discussion. Road construction and repair efforts implemented through Food For Work projects in the 1970s and 80s were designed primarily as relief programs, aiming to provide off-season employment to poorer sections of the populations, and consequently targeted on the basis of distress levels of regions and populations groups. There was little attempt to target road investments towards more durable outcomes such as reduction in transport costs, stimulation of agricultural production and expansion of non-farm opportunities. In 1984, the Government of Bangladesh (GOB) adopted a "growth center strategy" which identified about 1 400 important markets and trading nodes across the country to be developed as focal points for rural development, with improvement of infrastructure such as markets, electrification and roads concentrated around these centers. Road improvements were geared toward integration and coordination of rural-urban communications within this growth center plan, focusing on alignments that link important village markets to growth centers, administrative headquarters and other transport networks. In 1994 an additional 700 markets were identified as growth centers by the Planning Commission, raising the total to 2 100.

Thus, in the process of disputing claims of road saturation, the Government of Bangladesh and donors took a closer look at exactly how improved "economically needed" roads affected rural livelihoods and poverty. Several studies commissioned by CARE in the 1980s found evidence of reduced time and travel costs and higher farm

revenues along alignments that had been upgraded. Most influential was the study conducted by the International Food Policy Research Institute and the Bangladesh Institute of Development Studies (Ahmed and Hossain 1990), which caught the attention of World Bank, Asian Development Bank and other donors. The study found that not only did the development of rural infrastructure have critical impacts on farm incomes via better farmgate prices for crops and inputs and increased use of productivity-enhancing practices, but it also caused increases in household incomes across the board, including for the landless poor, via the multiplier effects of increases in agricultural incomes and expansion of opportunities for nonagricultural employment.

All this convinced the government and donors to continue spending on rural infrastructure. Between 1990 and 1995 the GOB dedicated over \$500 million under various Rural Development Projects (RDP) to assist sub-districts (*thanas*) with reconstruction, rehabilitation and maintenance of rural roads and growth center markets. But partly as an outcome of the debates on road saturation, the GOB sharpened the focus of infrastructure programming in Bangladesh in the 1990s to pay closer attention to the design and impacts of projects. Consequently, road projects have adopted a much more reflexive, limited and strategic agenda in the context of overall development efforts. As a movement in the direction of sustainability, they now spell out a clear and bounded set of objectives based on an analysis of linkages within rural livelihood systems and the economic impacts that improved roads are projected to have on local and regional markets and services.

In addition, the GOB, in partnership with donors, has redesigned the institutional framework within which rural infrastructure projects are designed and implemented. Outlined within a comprehensive National Perspective Plan (1995-2010), the new framework categorizes, prioritizes and selects key alignments for improvement by appropriate agencies, sets guidelines for establishing feasibility and cost-effectiveness, specifies mechanisms for ensuring ongoing maintenance, and lays emphasis on capacity-building in local government to coordinate and implement the projects. Table 1 outlines the responsibility of various government agencies in the overall infrastructure plan.

## **2.2. Care and Rural Road Projects in Bangladesh.**

CARE itself has been a central player in road works projects in Bangladesh through massive Food For Work (FFW) programs since 1975. In 1989, a study commissioned by CARE reported that Bangladesh had the world's largest FFW program, about half of which was supported by USAID and channeled through CARE, working through the Ministry of Relief of the Government of Bangladesh. In 1983-84 CARE added a structures program and a maintenance component (the Rural Maintenance Program or RMP) to its activities, and the package came to be known as the Integrated Food for Work Program or IFFW.

In the context of the national debate on road saturation in Bangladesh, CARE itself went through considerable soul-searching and commissioned several studies to assess the achievements and problems of its road projects. Among the major issues identified were environmental problems associated with the earthen FFW roads, such as waterlogging

due to poor drainage structures. In many cases the roads created dam effects, inhibiting the flow of water, this in turn interfering with fish migration patterns and lowering species diversity. These effects translate into livelihood issues in a setting where open water capture fishery is a major source of food and income for large proportions of the rural population for several months every year. Other issues identified were the low durability of earthwork improvements, and the need to target "needed" roads at the *thana* level to ensure better socioeconomic returns on investments.

On the basis of these recommendations the International Food For Development (IFFD) program was initiated in 1993. A major thrust of the IFFD program was to move toward more development-oriented programming by conceiving of road improvements as efforts in sustainable asset-building rather than employment generation. This meant focusing on construction of technically sound roads and adding components for road maintenance and mitigation of negative environmental effects of road construction.

-  
-  
-

TO ACCESS ALL THE 25 PAGES OF THIS CHAPTER,  
Visit: <http://www.eolss.net/Eolss-sampleAllChapter.aspx>

### Bibliography

Ahmed, Raisuddin and Mahabub Hossain. 1990. *Developmental impact of rural infrastructure in Bangladesh*. Research Report 83, International Food Policy Research Institute and the Bangladesh Institute of Development Studies, October, 1990. Washington, DC: IFPRI. [This book examines the effects of rural infrastructure on agricultural production, employment, income, consumption, savings and investment, and market and social development, focusing on household economies in Bangladesh. Based on data collected from about 640 households through five questionnaires administered during calendar year 1982. Ahmed is Program Director of the Food Production Policy Program at the International Food Policy Research Institute. Hossain is a senior research economist at the Bangladesh Institute of Development Studies.]

Cernea Michael. 1987. "Farmer Organization and Institution Building for Sustainable Development." *Regional Development Dialogue* 8(2): 1-24. [The author examines impact evaluation studies conducted on 25 agricultural and rural development projects financed by the World Bank between 1969 and 1980 in Africa, Asia and Latin America, and argues for the necessity of establishing adequate patterns of social organization and building institutional and organizational structures at the grass-roots level to ensure the long-term sustainability of agricultural development projects. Comparison of the projects reveals 5 main factors important to success: (1) institutional buildup & participation of beneficiaries, (2) technological improvements, (3) socioeconomic compatibility, (4) favorable policy environments, & (5) recurrent cost financing/recovery. He also points out that sociological & anthropological research and methodologies are needed to plan institutional/organizational development strategies and ensure their successful implementation.]

Egger, Philippe. 1992. "Rural organizations and infrastructure projects: Social investment comes before material investment." *International Labour Review*, 131(1): 45-61. [Using a comparative analysis of several projects drawn mainly from the ILO's technical cooperation program in the rural infrastructure field, the author highlights the chief elements in community participation. He breaks the types of projects up into microproject, user groups, self-development organizations and trade unions/similar bodies, and examines the interaction between the principal organizations involved and the external support programs.]

He demonstrates that the existence of a grassroots organization is necessary to get maximum return from any investment in material infrastructures, and thus the main objective of any technical cooperation project conducted in rural areas should be to start by developing rural organizations. Material investment, he argues, should itself be conceived primarily as a means of creating organizations and developing their members' capacities.]

Jimenez, Emmanuel. 1988. “Urban Services and Rural Infrastructure.” *Finance and Development*, September 1988, 25(3):6-8. [The author shows how tightening fiscal constraints in the mid and late 1980s posed a great challenge in public sector finance, and argues that private firms should be encouraged to provide bus services and other transport rather than relying upon heavy government subsidies for these services. In improving rural infrastructure, he argues that decentralization of public responsibility allows for better planning and sharing of responsibilities by local communities. Instead of direct provision, government should help local communities organize themselves.]

Ostrom, Elinor, Larry Schroeder and Susan Wynne. 1993. Institutional Incentives and Sustainable Development: Infrastructure Policies in Perspective. In *Theoretical Lenses on Public Policy*, ed. Paul A. Sabatier. Boulder: Westview Press. [The authors present a method for systemically comparing alternative institutional arrangements for the development of rural infrastructure].

Platteau, Jean-Phillipe. 1996. “Physical Infrastructure as a Constraint on Agricultural Growth: The Case of Sub-Saharan Africa.” *Oxford Development Studies*, 24(3): 189-219. [Reviewing data on sub-Saharan Africa, the author argues that investments in physical infrastructure, particularly transport and communication facilities, improve the responsiveness of farmers to price incentives. Apart from lowering per capita costs of inputs, marketing and access to services, they enhance seasonal food security in contexts of uneven agricultural productivity, allow use of machinery in periods of labor bottlenecks, and promote domestic trade in staples. His recommendations emphasize consolidation, maintenance and rehabilitation of existing facilities rather than new construction. He also stresses the importance of mobilizing local resources for maintenance of rural roads and ensuring maximum participation of agricultural officers and local communities at the route selection stage.]

Swanson, Louis E. 1996. “Social Infrastructure and Economic Development.” Chapter 7 in Rowley, Thomas D., David W. Sears, Glenn L. Nelson, J. Norman Reid, and Mervin J. Yetley, eds. 1996. *Rural Development Research: A Foundation for Policy*. In Contributions in Economics and Economic History. [The author stresses the significance of social phenomena, such as individual and community capacity, in determining the outcome of development interventions, and discusses the relationship between social and physical infrastructure. The context is rural development efforts in the United States.]

World Bank. 1994. *World Development Report, 1994: Infrastructure for Development*. New York: Oxford University Press. [The book is part of the World Bank's series of annual development reports, containing comparative tables on a wide range of development indicators from all countries in the world. This volume focuses on the role of infrastructure in poverty alleviation and growth, and reviews the experiences of state-built and -managed infrastructure facilities in developing countries over the past fifty years, concluding that the current problem is not one of stocks or quantity, but of quality: lack of capacity utilization, inefficiency, and waste due to lack of maintenance. It traces a revolution in recent thinking that stresses institutional aspects of infrastructure stocks and services, pointing toward user-responsive, environment-friendly and innovative delivery mechanisms. Its main message is that infrastructure services need to be run like a business, not a bureaucracy.]

World Bank. 1996. *Rural Infrastructure Strategy Study*. SAI Infrastructure Division of the World Bank in association with Local Government Engineering Department, Ministry of Local Government, Rural Development & Cooperatives, and Rural Infrastructure Development Wing of the Planning Commission, Bangladesh. Dhaka, Bangladesh: The University Press Ltd. [The study assesses the achievements of the physical infrastructure development component of Bangladesh's 1984 “Strategy for Rural Development.” It corroborates the main thrust of the strategy, of investing strategically in key rural roads linked to “growth centers” as a means of promoting agricultural productivity. The study also concludes that rural road development has been a critical factor in increasing farm and non-farm employment and income, especially of the rural poor and women. The study points out that it is the condition and not the size of the rural road network that has the greatest impact on agricultural productivity.]

### **Biographical Sketch**

**Karen Coelho** is a Research Associate at the Bureau of Applied Research in Anthropology at the University of Arizona, with a background in development studies and several years' experience working with and consulting for NGOs in Asian countries. Her areas of scholarship include the anthropology of development, critical perspectives on neoliberal reforms in the state sector, the anthropology of urban infrastructure services, and gender issues in public policy. She is the author of FAO monographs on gender and agricultural policy, and the co-author of a book on the history of cooperatives in India.