



India

The Role of Infrastructure in Alleviating Poverty

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Field Survey: January-November 2005

Outline and Objectives

The millennium development goals (MDGs) present a targets that the whole world should tackle together and state that eliminating extreme poverty and starvation is among the primary targets. Economic and social infrastructure is critical to economic growth and to sustainable poverty reduction in developing countries, and in recent years, its significance as a contributor to the MDGs has been recognized by the global community. Notwithstanding, the channels from infrastructure development to poverty reduction are highly complex, and it is necessary to develop new evaluation methods that are capable of verifying effectiveness. This evaluation was conducted with a view to developing a quantitative method of analyzing the contribution that infrastructure development makes to poverty reduction, utilizing the Poverty Analysis Macroeconomic Simulator (PAMS), an economic technique used to analyze poverty.

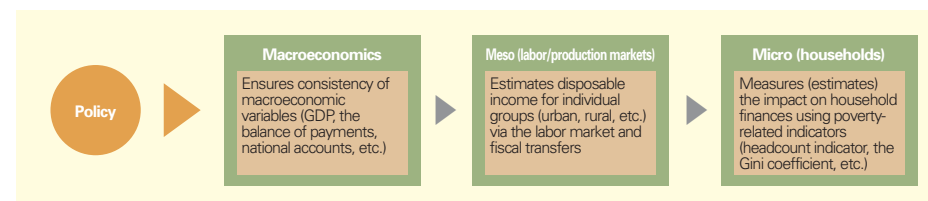
The list of projects targeted for evaluation

Project Name	Loan Amount (million yen)
Calcutta Metro Railways Construction Project	4,800
Teesta Canal Hydroelectric Project	14,247
Haldia Port Modernization Project	3,791
Bakreswar Thermal Power Station Project	118,187
Purulia Pumped Storage Project	44,098
Industrial Pollution Control Project	4,525
West Bengal Transmission System Project	14,214
Calcutta Transport Infrastructure Development Project	10,679
Total	214,541

Evaluation Method

This evaluation was conducted by utilizing the five DAC criteria and the Poverty Analysis Macroeconomic Simulator (PAMS), a method of analyzing poverty developed by the World Bank, to make an attempt to measure the impact on poverty reduction of these 8 projects quantitatively. All of the selected projects were implemented in West Bengal. PAMS is an example of so-called Poverty and Social Impact Analysis (PSIA), characterized by measuring impact through macro level - meso level (predominantly labor market) - micro level in a consistent manner (see Figure 1).

Figure 1: Schematic Diagram of PAMS



Since PAMS was predominantly developed as a means of measuring micro-level impact on poverty indicators and income distribution ahead of any change in economic policy (e.g. reductions in military expenditures targeting education), there was difficulty utilizing PAMS without modification in assessing the impact of infrastructure projects as ex-post evaluation. Accordingly, it was decided that the evaluation should be conducted with the methodology illustrated Figure 2 to estimate the impact of infrastructure development on poverty reduction, while maintaining the macro-micro consistency that is characteristic of the PAMS model.



One of the power plants evaluated



The control room

Evaluation Results

(1) Macro-Level Impacts

The macro-level analysis focused on the impact of the 8 projects on GRDP (gross regional domestic product) in West Bengal. A regression analysis of GRDP was conducted on project inputs (investment amounts), outcomes (power generation in the case of power sector projects), and on each sector (agriculture, industry and services) to obtain a relational expression (a correlation coefficient). It was estimated that the gap between GRDP figures assuming these projects were not implemented and actual GRDP would be the impact of the projects.

	Agriculture	Industry	Services
Project effects*	8.1%	30.0%	9.7%

* Percentage increase in GRDP derived from the projects

(2) Meso-Level Impacts

The meso-level analysis focused on the impact of GRDP fluctuations in each sector (agriculture, industry, services) on labor population distribution through increases in employment. Target groups were classified into six by sector (agriculture, industry, services) and urban/rural. A regression analysis was used as at the macro level to obtain a relational expression (correlation coefficient) of GRDP and the number of households belonging to each target group. It was estimated that the gap between labor populations in each target group assuming the projects had not been implemented and actual labor populations would be the impact of projects.

	Rural			Urban		
	Agriculture	Industry	Services	Agriculture	Industry	Services
Labor population share	51.1%	10.4%	14.6%	1.0%	8.0%	14.9%
Labor population share (assuming project not implemented)	48.5%	10.3%	15.7%	0.9%	8.6%	16.0%

(3) Micro-Level Impacts

For the micro-level analysis, a statistical method was used to ascertain the impact, if any, of GRDP fluctuations at the macro level and the changes in labor populations (increases) obtained at the meso level, on poverty reduction at household level.

	Rural			Urban		
	Agriculture	Industry	Services	Agriculture	Industry	Services
Percentage poverty	15.8%	5.3%	5.9%	8.3%	0.9%	3.0%
Percentage poverty (assuming project not implemented)	21.0%	16.5%	9.4%	9.3%	5.5%	4.6%

Challenges in Applying this Technique

(1) Simplification of the Impact Route Due to Data Restrictions

To measure macro-level impact, i.e. the first tier in the PAMS model, the initial plan was to obtain the relational expression (correlation coefficient) of input/outcome increases and GDP increases from West Bengal industrial tables, which would then be used to compute project-induced increases in GRDP in the state; however, because existing tables were extremely dated, a new regression analysis was conducted in constraint on data resource to obtain the relational expression (correlation coefficient).

(2) Scope of Analysis

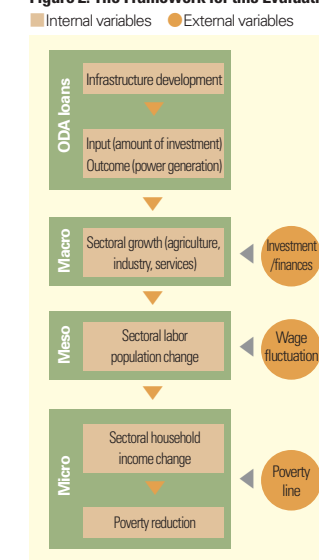
The PAMS model is limited by the fact that it only analyzes poverty impacts in terms of income poverty. In consequence, in the case of the subway construction project, for example, time savings, increased access to schools or hospitals, and other improvements in convenience should be analyzed using the survey of beneficiaries in order to give a more comprehensive perspective on project impact.

(Please refer to Expert Evaluations p. 21)

From JBIC

This survey constitutes the first attempt to analyze the route from infrastructure development to poverty reduction in quantitative terms and, as stated in "Challenges in applying this technique" above, this evaluation technique will need to be refined in the future. The macro, meso and micro-level results of this survey are based on the draft final report compiled by the external evaluator. We are awaiting further verification and feedback from representatives of the West Bengal State government before drawing final conclusions.

Figure 2: The Framework for this Evaluation



Poverty impact based on shifts in income distribution

