RURAL TRANSPORT TRAINING MATERIALS



Module 2: Planning, Design, Appraisal and Implementation Economic Analysis of a Rural Basic Access Road Project: Andhra Pradesh, India

Session: 2.3 Part 2 – Case Study #2

Presentation: 2.3b (#2)









1. Introduction

Learning Objectives

By the end of the session participants will be able to:

- Describe key indicators that may be used to assess the potential impact of road improvements
- Explain how the CBA and CEA methods were used in the case study
- Analyse the components of the spreadsheet CBA
 programme
- Identify lessons learnt from the case study and how these may apply to their own project work



Session Overview

- The rationale for using CEA and CBA in Andhra Pradesh
- Project background and overview of economic analysis
- Village and household transport survey results
- The spreadsheet CBA programme
- Key lessons learnt



2. The Rationale for using CEA and CBA in Andhra Pradesh

- Rural road projects aimed at improving basic road accessibility from villages to markets & social services are expected to provide:
 - savings in vehicle operating cost (VOC) and roaduser travel time cost (TTC)
 - socio-economic opportunities for the rural population
- Most rural access roads have low-traffic volumes
 - social benefits are often more important than the direct road-user cost savings
 - But! cost-benefit analysis that quantifies road-user benefits as VOC and TTC savings is unsuitable for evaluating rural basic access road projects for financing



more of the rationale

Alternative methodologies should be adopted, such as

 cost-effectiveness analysis (CEA) to supplement cost-benefit analysis (CBA)

This case study examines the application of such methodologies in Andhra Pradesh, India



3. Project background and overview of the Economic Analysis

The project area = 3 poor rural districts:

- Adilabad, Karimnagar, and Warangal
- total population of 6.8 million

The project proposes to:

 improve the rural road network to at least basic, all-weather passable standard

The role of economic analysis is to assist the design, prioritisation, and selection of road works for financing under the project.



The project area road network

The rural road network

- = 15,000 km
 - mostly in poor condition
 - neither tracks nor earth roads are allweather passable



Both gravel and WBM roads can be all-weather passable, but many do not meet the all-weather standard due to broken or missing cross-drainage facilities.



The dilemma ...

- Demand for network investment greatly exceeds the project budget
- The key to maximising investment is to
 - focus on the improvement of a core network
 > to ensure minimum connectivity for *each* village to a nearby main road or market centre
- The core network is identified through a rural road master planning process
 - links that do not meet the basic all-weather standard are identified as candidate roads for improvement

➤ economic analysis is only applied to these roads



Road works for candidate roads fall into two major categories:

(a) basic accessibility works

- upgrading tracks & earth roads to gravel or WBM roads
- all cross drainage works on existing gravel & WBM roads
- carried out as part of poverty reduction

(b) black-topping works

- existing earth, gravel, and WBM roads
- carried out primarily for economic reasons, and must be economically justified
- when traffic volume on an unpaved road reaches a certain level ...
 - it is more economical to pave the road rather than to keep restoring the unpaved road to all-weather condition



This project used CBA and CEA methodologies

CBA

- Used for black-topping works
- Minimum traffic thresholds determined using spreadsheet CBA programme
 - combination of motor vehicle (MV) & nonmotorised vehicle (NMV) traffic levels at which black-topping would be justified

➤at the minimum economic rate of return (ERR) of 12 %

- Candidate roads with traffic levels below the thresholds are
 - dropped from the list of black-topping works
 - ... but considered for upgrading to basic access standard and evaluated in the category of basic accessibility works



Minimum Traffic Thresholds for Rural Road Paving





CEA

- Applied to the selected basic accessibility road works
- All roads proposed for basic accessibility work are ranked by
 - simple cost-effectiveness measure-total population provided with basic access per \$2,500 equivalent of expenditure
- The top-ranking least-cost works are financed
 - with a maximum of \$50 equivalent per person served used as a final restrictive measure to ensure cost-effectiveness



CBA and CEA has produced ...

- A list of basic accessibility road works ranked by costeffectiveness
 - 1,700 km of rural roads selected
 > cost-effectiveness ratio from \$14 to \$50 outlay/person served
- A list of black-topping works ranked by ERR
 - 1,300 km of roads are selected
 > with ERRs range from 12 to 90 % with an overall ERR of 24 %
- This project does not deal with the optimal budget allocation between the two categories of road works
 - allocation is decided through a stakeholder participatory process

2 million people are expected to benefit from the project.



4. Village and household transport survey

The likely impact of basic road access on the welfare of rural households was also assessed (along with the CBA & CEA)

Data was collected from 40 villages

 10 households/ village were randomly selected for the household level survey





Impact of road improvements

Group Activity

- A. What are the problems faced by villages not connected by an all-weather access road to a major road or market centre?
- B. What social and economic indicators can be used to assess the expected impact from the improvement of roads?



Andhra Pradesh survey results: constraints

Major obstacles to village accessibility in unconnected villages

- poor road conditions
- seasonal road closures
- Iack of motorised access
- high cost of freight delivery
- Source of the second closure during the rainy season causes
 - produce spoilage
 - delay of freight delivery
 - Iabour unemployment
 - Iower school attendance



Expected impacts from improved roads

- Households in connected and unconnected villages predicted:
 - more seasonal work taken outside villages
 - higher intensity of cultivation
 - expansion of cultivated land

The survey results provided strong empirical evidence to support the social and economic justifications for the provision of basic allweather access to these villages





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