

# Design and Appraisal of Rural Transport Infrastructure

Based on World Bank Technical Paper no.496

PIARC International Seminar on Rural Transport  
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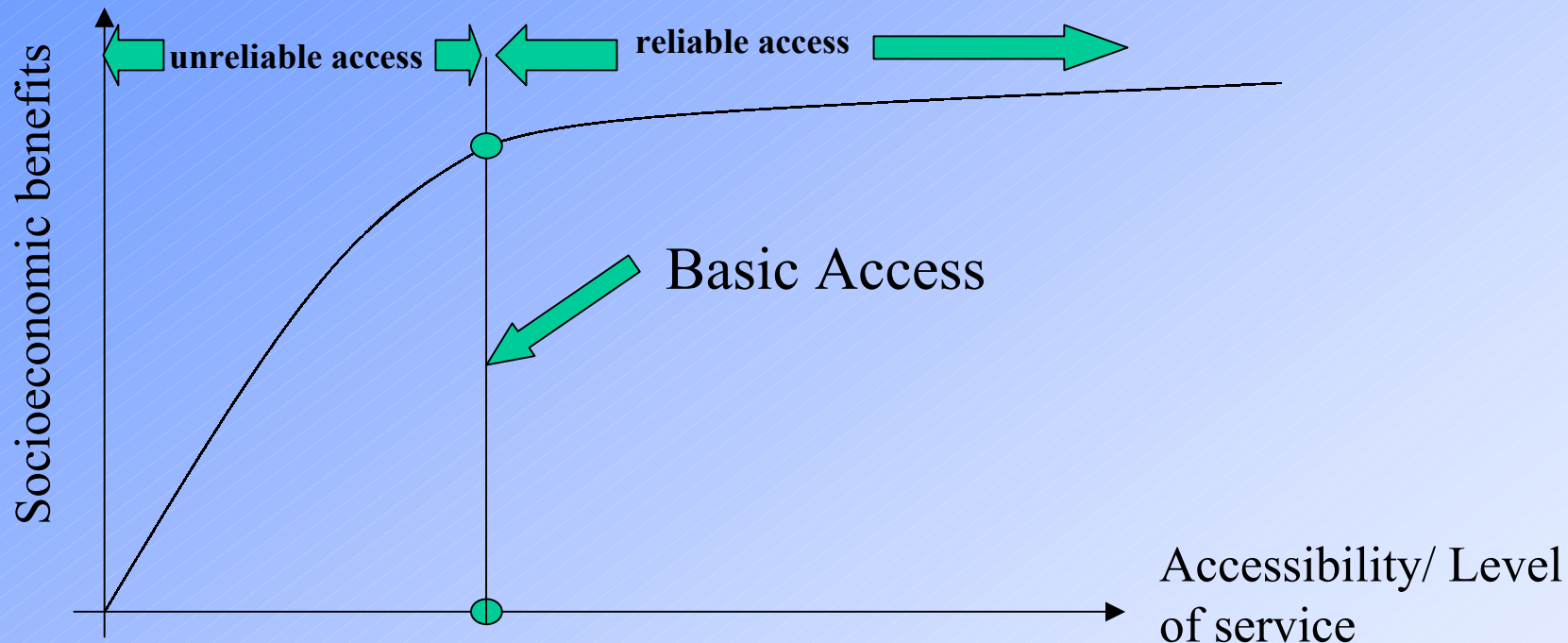
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# Paper Series on Rural Transport published or planned by World Bank

No	Title	Status	Authors
1	Options for the Managing and Financing of Rural Transport Infrastructure	Published in 1998 as WB Technical Paper no. 411	Malmberg-Calvo
2	Design and Appraisal of Rural Transport Infrastructure	Published in 2001 as WB Technical Paper no. 496	Lebo, Schelling
3	Improving Rural Mobility	Being published	Starkey, Ellis, Hine, Ternell
4	Developing Rural Transport Policies and Strategies	Draft stage, planned to be published in 2003	Banjo, Robertson
5	Assessing Socio-economic Impact of Rural Roads and Transport	Draft stage, planned to be published in 2003	Grootaert

# The Basic Access Concept

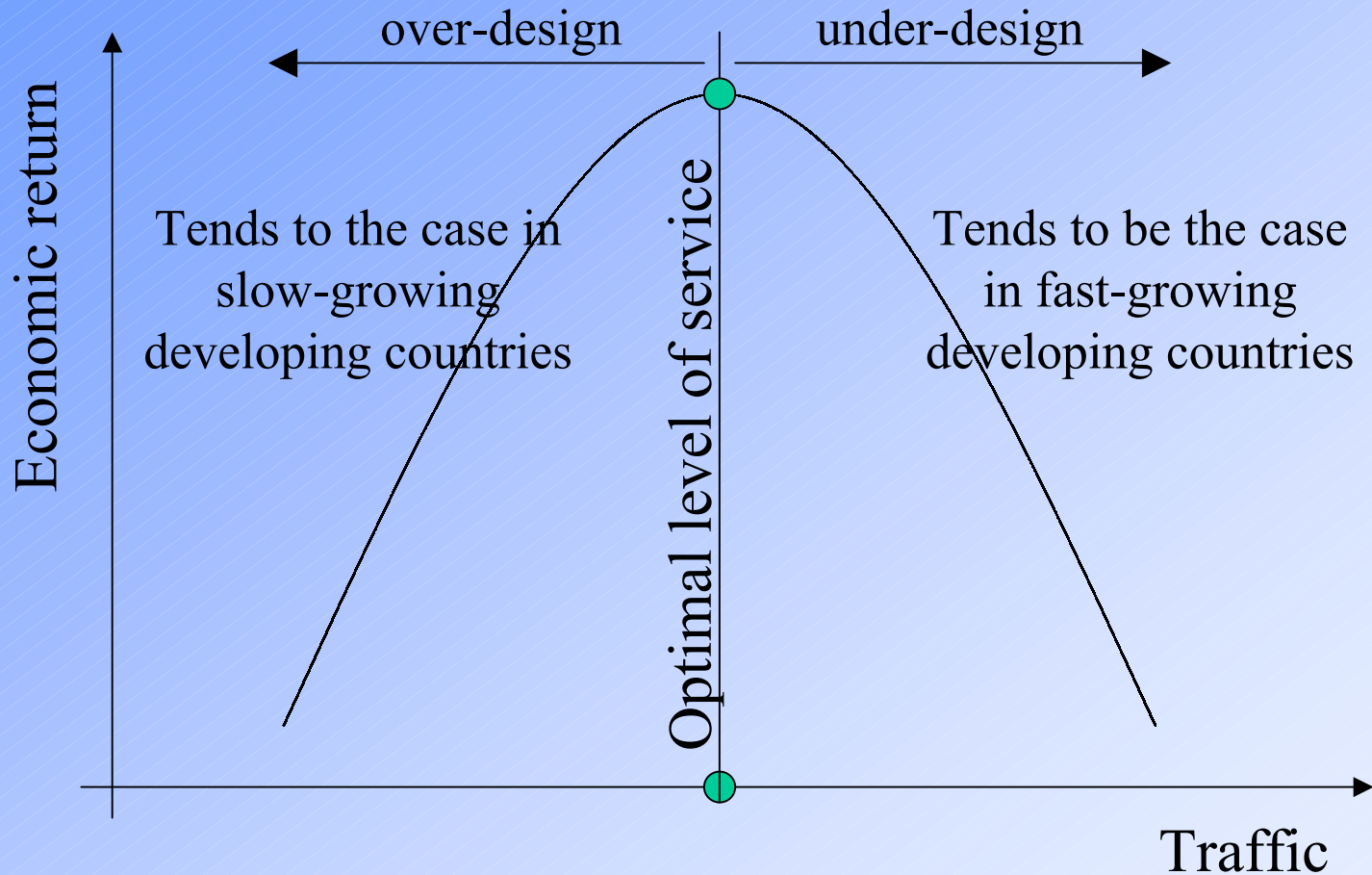


- Basic Access means reliable access at least cost
- Basic Access should be considered a human right
- A basic access intervention is the least life-cycle cost investment for ensuring reliable all-season accessibility for the prevailing means of transport
- All roads with less than 50 vehicles per day should be built at least to basic access standard

# Basic Access Standard

- Basic Access must be defined for each country individually (in the Rural Transport Policy of the country)
- Depends on wealth, culture, and geography
- Suggested definition for LDCs:
  - Basic Access is achieved if reliable access is available for the prevailing motorized means of transport within 1 kilometer of household. Reliable access means all year round access with exception of limited periods during inclement weather
- Basic Access roads in most cases are single-lane, spot improved earth roads, provided with low cost drainage structures (such as fords)
- Costs can vary greatly depending mainly on terrain: from, say, \$5000/km to \$100,000/km
- Motorized basic access, however, is often not affordable for rural populations in poor countries. In those cases, provision of basic access could mean improvement of the access for non-motorized means of transport

# The Basic Access Approach



**Roads need to be designed to the correct service level related to traffic and then gradually adjusted with growing traffic**

# Planning and Selection of Rural Transport Infrastructure Interventions

- The Planning Process
  - Must be top-down and bottom-up iteratively
  - But must be centered on the “owner” of the infrastructure
  - Most of all, it must be participative and transparent
  - Selection of stakeholders for the participatory process is crucial
  - Economic selection criteria must be simple and transparent to allow for participation
  - In the planning process other than just economic criteria might need to be considered
- Tools for the Planning Process
  - Screening and ranking procedures
  - Maps

# Planning and Selection of Rural Transport Infrastructure Interventions (2)

- Selection consists of two steps
  - Screening
    - E.g. selection of project area based on poverty criteria, or by eliminating low priority links
  - Ranking
    - Recommended ranking method for basic access roads is based on a cost effectiveness approach:

$$\text{Cost – effectiveness indicator of link} = \frac{\text{Cost of upgrading of link to basic access standard}}{\text{Population served by link}}$$



# Planning and Selection of Rural Transport Infrastructure Interventions (3)

- Why cost-effectiveness (and not cost-benefit analysis)?
  - At traffic levels  $< 50$  vpd the traditional economic tools (e.g. HDM) don't work
  - Producer surplus method often leads to unrealistic results
  - Emphasis is increasingly on social benefits of roads which are difficult to quantify
  - Method has been traditionally applied for other rural infrastructure (wells, health centers) but not for roads

# Examples

- Andhra Pradesh Rural Roads Project
  - Three districts selected based on poverty criteria (screening)
  - Screening based on redundancy criteria (only one all-season link per village) with the help of District Transport Master Plans: core network of 9000 km
  - Ranking based on cost-effectiveness (700 links): 3000 km selected for upgrading to basic access standard
  - Out of which 1000 km were selected for upgrading to bituminized standard (with the help of a simple spreadsheet cost-benefit analysis: threshold about 150 vpd)

# Examples (cont.)

- Vietnam Rural Transport Project
  - Here the above described cost-effectiveness approach was enhanced by giving a poor person a higher “weight” than a non-poor (requires reliable and detailed poverty data)
- Bhutan Roads Project
  - Here the cost-effectiveness approach was enhanced with a cost-benefit analysis on a selected link, which included social benefits (such as educational and health benefits)

# Examples (cont.)

- Madagascar Rural Transport Project
  - Screening was applied to select about 8,500 km out of 21,000 of provincial roads based on connectivity, agricultural and demographic criteria
  - The 8,500 km were ranked (in about 150 links) based on least-cost upgrading to basic access standard (based on preliminary engineering designs) per population served
  - Actual selection of the first-year intervention program was made at provincial workshops with all major stakeholders participating
  - Exercise is planned to be repeated annually and should lead eventually to a province based regional planning process using all kinds of spatial data using GIS

Thank you