

Promoting Rural Development Through Rural Roads & Transport

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The Cycle of Poverty

- Rural transport can be thought of as a system in equilibrium with many interacting components
- For much of the developing world the system is one of a number of interacting 'vicious circles' holding people in poverty



The Rural Transport System & Poverty

1. The visible manifestation of poverty:

High personal effort, low long distance trip making, low goods movement, poor use of services, limited market interaction

2. The transport constraints:

Long walking distances, limited modal choice, high transport costs, poor service frequency, unsafe transport

3. The difficulties with the transport system:

Low service density, cartels and weak competition, inadequate infrastructure

4. Underlying factors causing the problem:

Low density of demand, weak tax base, poor infrastructure funding, weak institutional structure



The Components

- Village level mobility and IMTs
- Village social infrastructure
- Rural transport services
- Rural roads and other transport infrastructure
- Rural road finance and maintenance



Transport & MDGs

The MDGs:

- Eradicate Extreme Poverty
- Achieve Universal Primary Education
- Promote Gender Equality and Empowerment of Women
- Reduce Child Mortality
- Improve Maternal Health
- Combat HIV/AIDS, Malaria and other Diseases
- Ensure Environmental Sustainability
- Develop a Global Partnership for Development

WHAT IS THE ROLE OF RURAL TRANSPORT ?



MKUKUTA & Transport

MKUKUTA is Tanzania's Poverty Reduction Strategy

It is organised around three clusters:

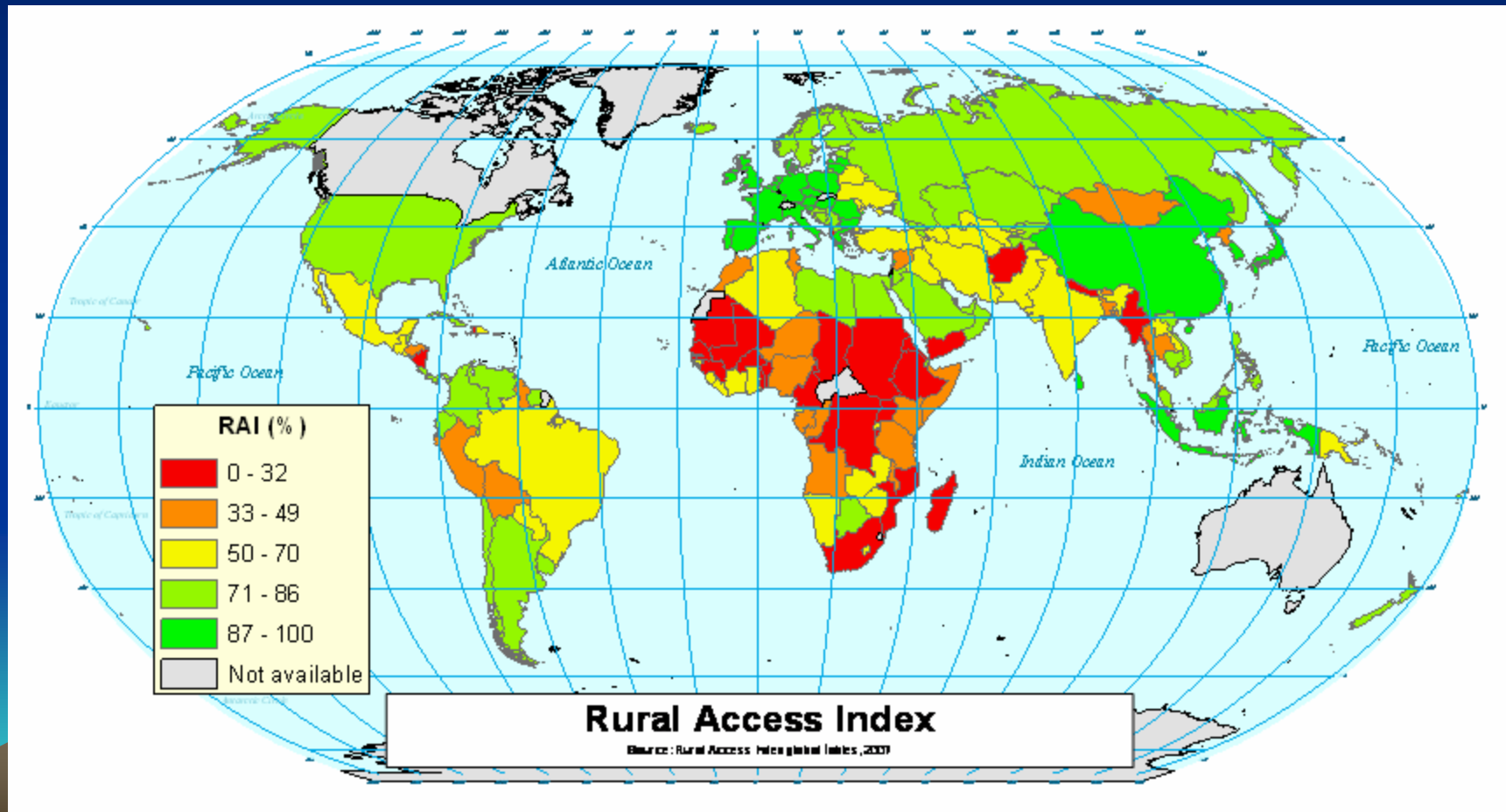
- Growth & Reduction of Income & Poverty
- Improvements in Quality of Life and Social Well-Being
- Governance and Accountability

But it is weak in providing guidance on appropriate transport interventions ! Out of 107 indicators there are just 3 that relate to transport and these just relate to rural accessibility.



Rural Access Index (RAI)

% Rural population within 2 km of all season roads



How Does Transport Affect Development ?

Through the following channels:

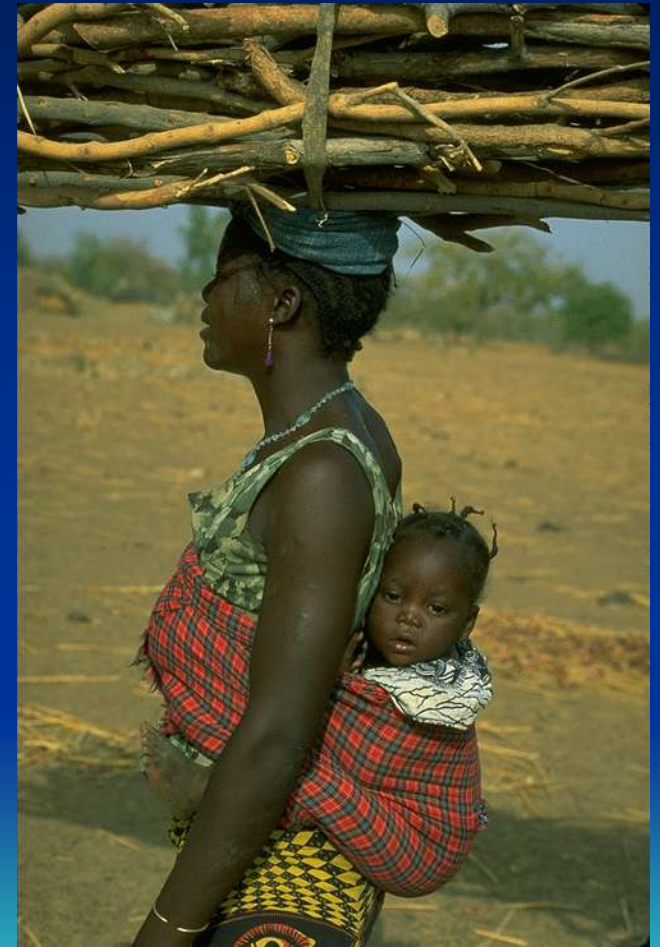
- Availability and quality of infrastructure
- Price and availability of transport services
- Nature, quality and availability of social facilities such as schools, clinics, hospitals, markets, water supply
- The local economic resource base – fertile land, health and education of the population
- Availability of capital to invest
- Competitive transport and agricultural marketing structure
- Accessible Urban and International markets

ROADS ALONE ARE NOT ENOUGH !



Village Transport

- Within village transport activities: collecting water, firewood, going to farm consumes huge labour time and effort



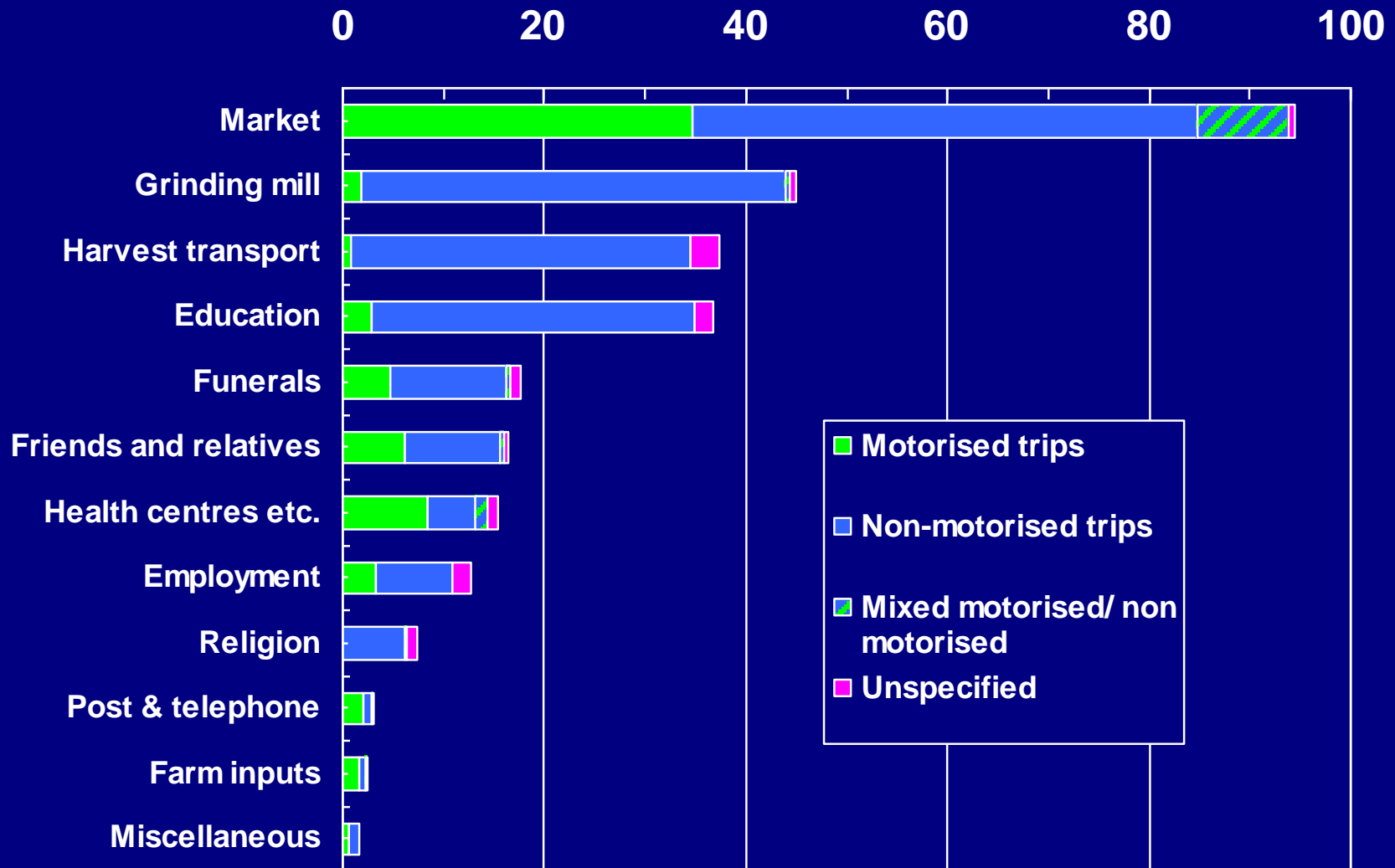
Intermediate Means of Transport (IMTs)

Intervention success depends on sufficient uptake, viable repair & maintenance + cash income to support use.

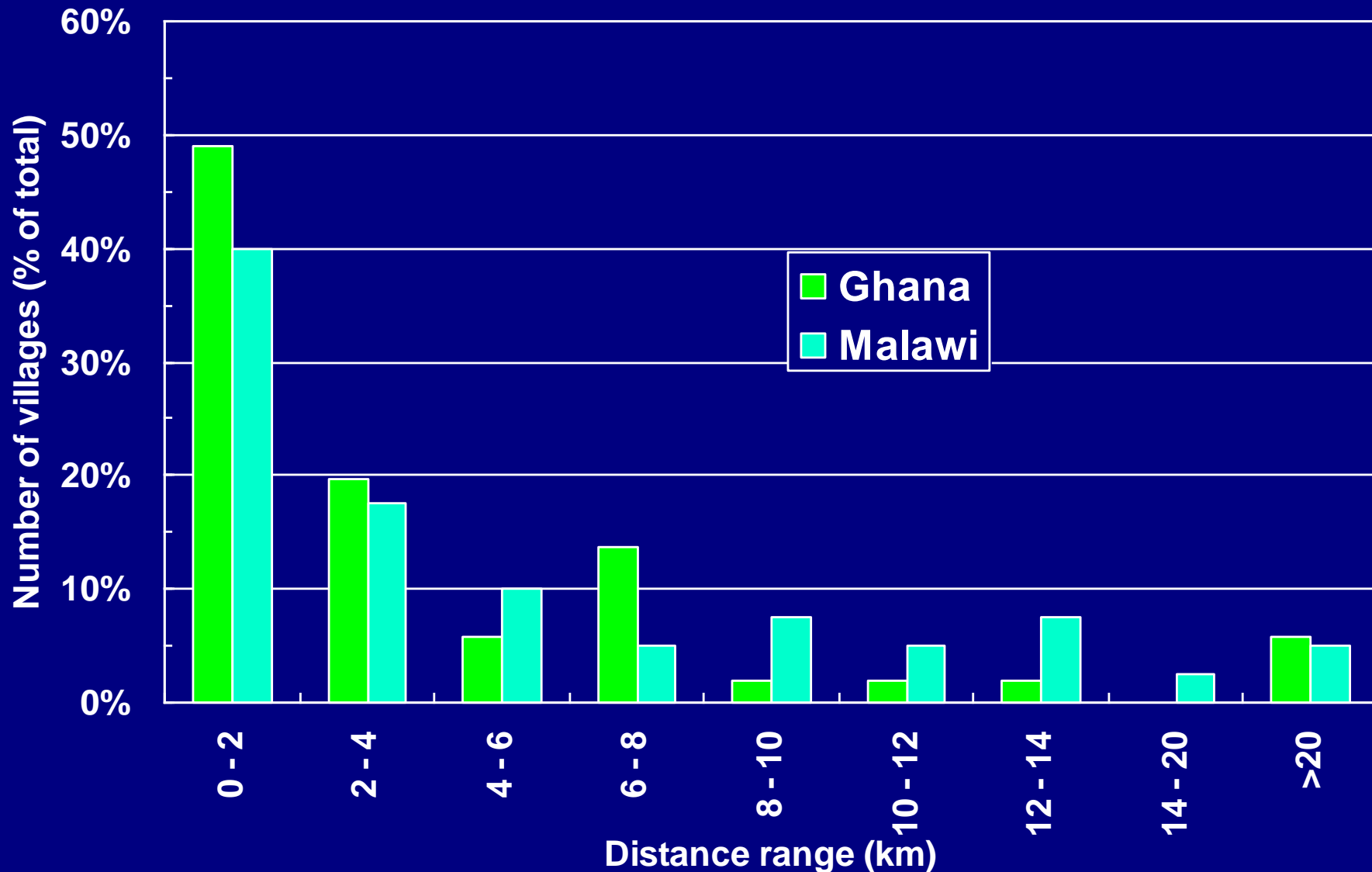


Out-of-Village Travel Patterns by Trip Purpose and Mode in Ghana

Average number of trips per household per year



Distance (km) of Pickup Point for Motorised Transport from Village Centre in Ghana and Malawi



Cartels: Pickup trucks queuing for loads in Mali –
Transport Tariffs in Africa range up to six times those
in Asia – high prices confirmed by many studies.



Infrastructure Issues

- What is the impact of road investment ?
- Can the poor benefit ?
- What standards do we adopt (track improvements, earth, gravel, bitumen, width) with limited resources ?
- What choice of technology do we use ? Labour intensive, labour based, capital intensive ?
- What should be the institutional structure for looking after roads ?
- How do we finance maintenance ?



What is the Problem with Rural Infrastructure ?

- There is no market to supply and maintain infrastructure. - So governments become involved and there is no feedback mechanism to identify appropriate standards
- Rural infrastructure performance is invariably poor
- There are confusions over responsibilities
- Different authorities are involved and planning is inconsistent
- Financial and management resources are scarce and inadequate
- Too often infrequent, over designed, investment is accompanied by totally inadequate maintenance

Russia has its problems too!



Temporarily Impassable Road in Tanzania



A Typical Rural Track in Africa



Planning Infrastructure

- In the World about 1 bn people do not have all season road access. Perhaps 300 m may have no motorized access at all.
- The evidence of impact is strong but often conflicting. – Do roads promote development or does development promote roads ?
- The very poor maybe the least likely to benefit.



Road Investment and Development

- Is road investment a catalyst for development ?
OR
- Does road investment just permit development?
- An economic framework: The magnitude of response will depend on
 - a) the cost change involved
 - b) the elasticity of demand
(i.e. % increase in demand over % reduction in transport costs)

Benefits From Road Investment

Changes in transport costs occur because of :

- Lower road roughness
- Shorter trip distance
- Faster speeds
- Reduced chance of impassability
- Reduced traffickability problems
- Change in mode (e.g. headload to truck)



Elasticity of Demand 1.

A High response (for a given change in transport costs):

- **Underused resources of land, water and labour**
- **Proximity to major markets**
- **Educated and innovative population**
- **A flexible competitive economy**
- **Access to credit**
- **Good extension services**



Elasticity of Demand 2.

A Low response (for a given change in transport costs):

- Low agricultural capacity
- Limited natural resources
- Uneducated /physically weak population
- Uncompetitive markets
- Poor extension services
- Poor access to credit



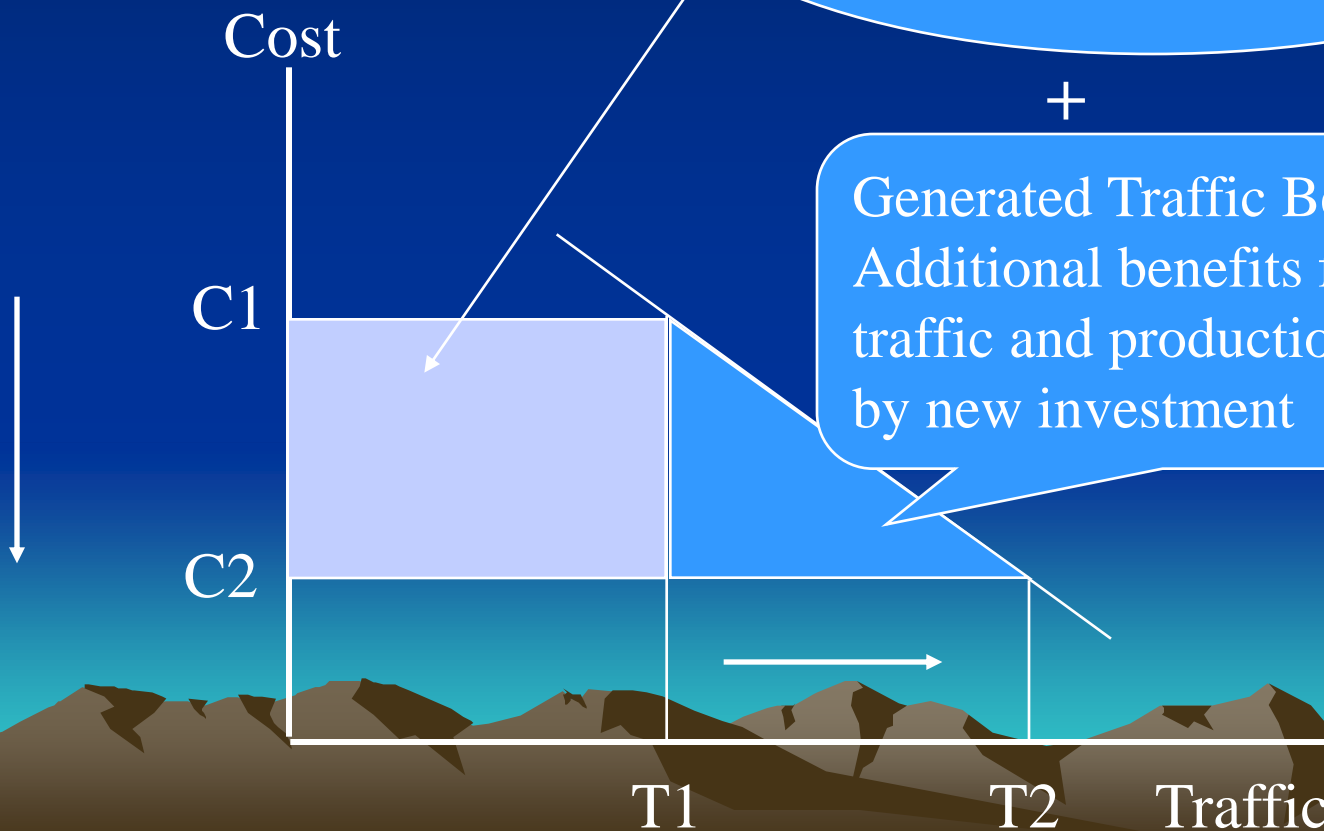
The Consumers' Surplus Approach

Total Benefits =

Normal Traffic Benefits :
Transport Cost Savings to existing traffic and normal traffic growth

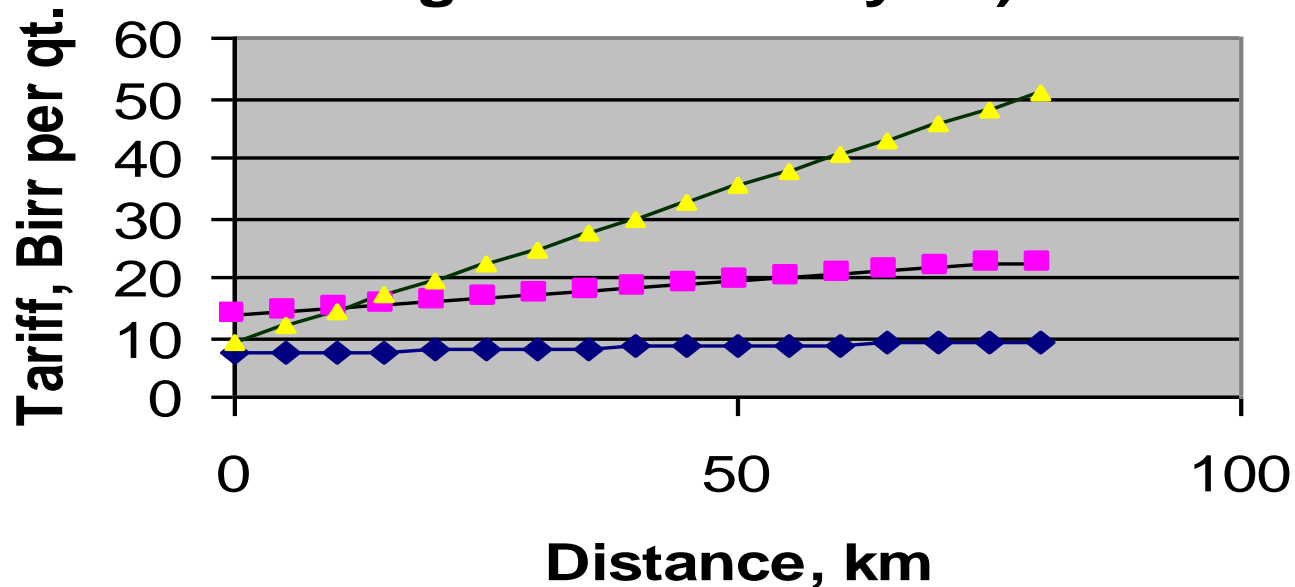
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Generated Traffic Benefits :
Additional benefits from new traffic and production induced by new investment



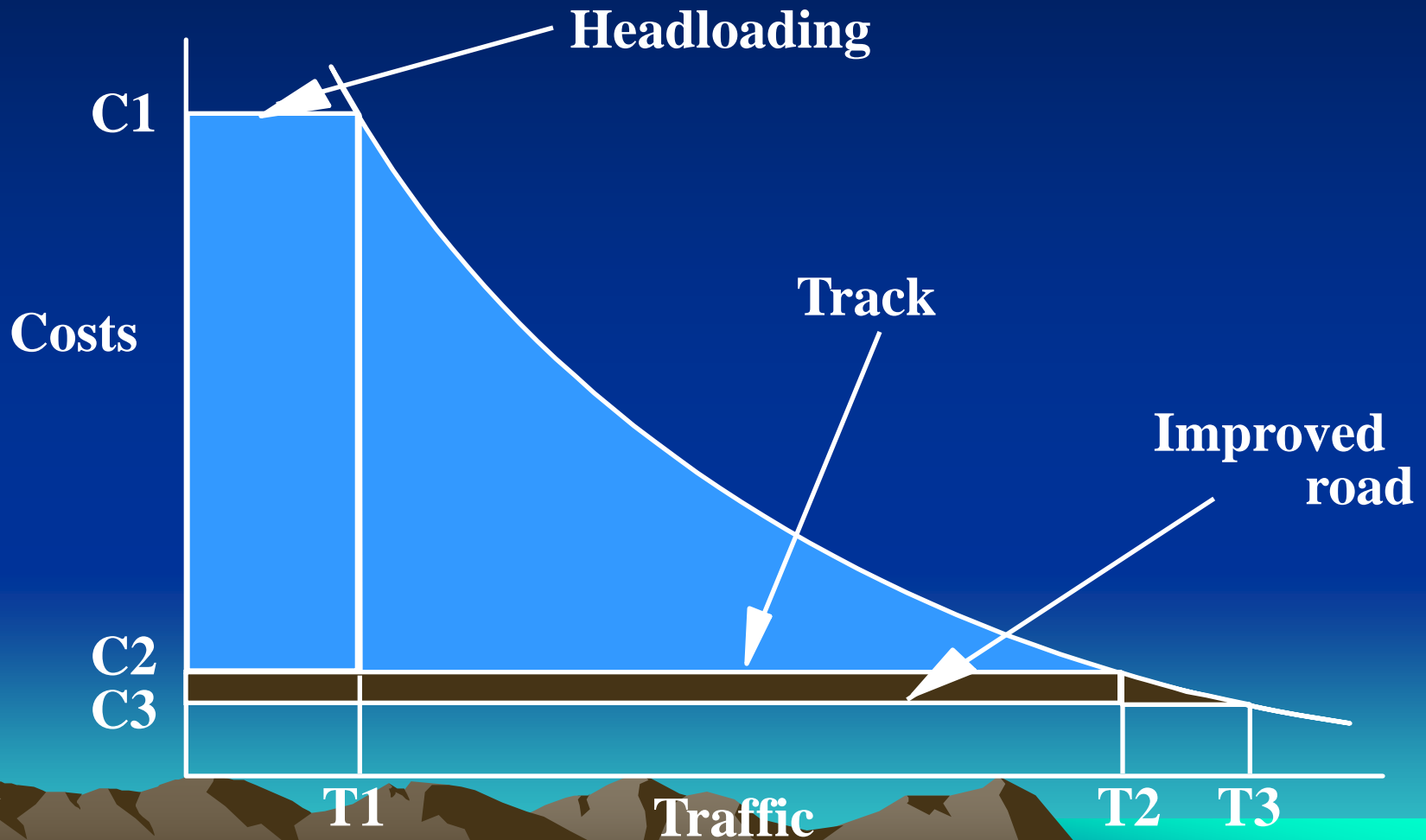
Ethiopian Statistical Analysis

Transport Tariffs (Derived from Regression Analysis)

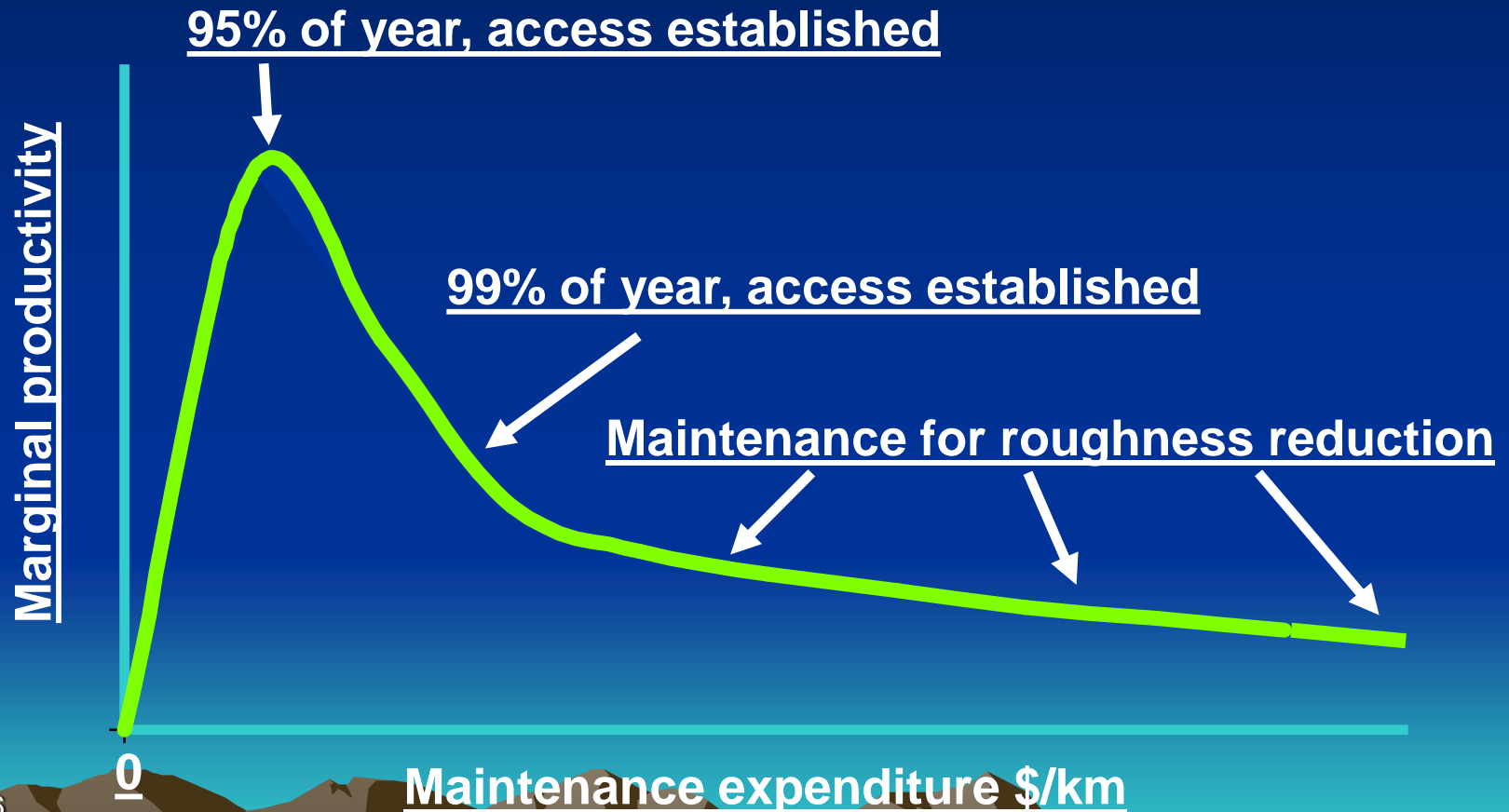


—◆— main road —■— rough road —▲— animal transport

Illustration of Benefits from Building a Track or an Improved Road



The Marginal Productivity of Investment & Maintenance Expenditure

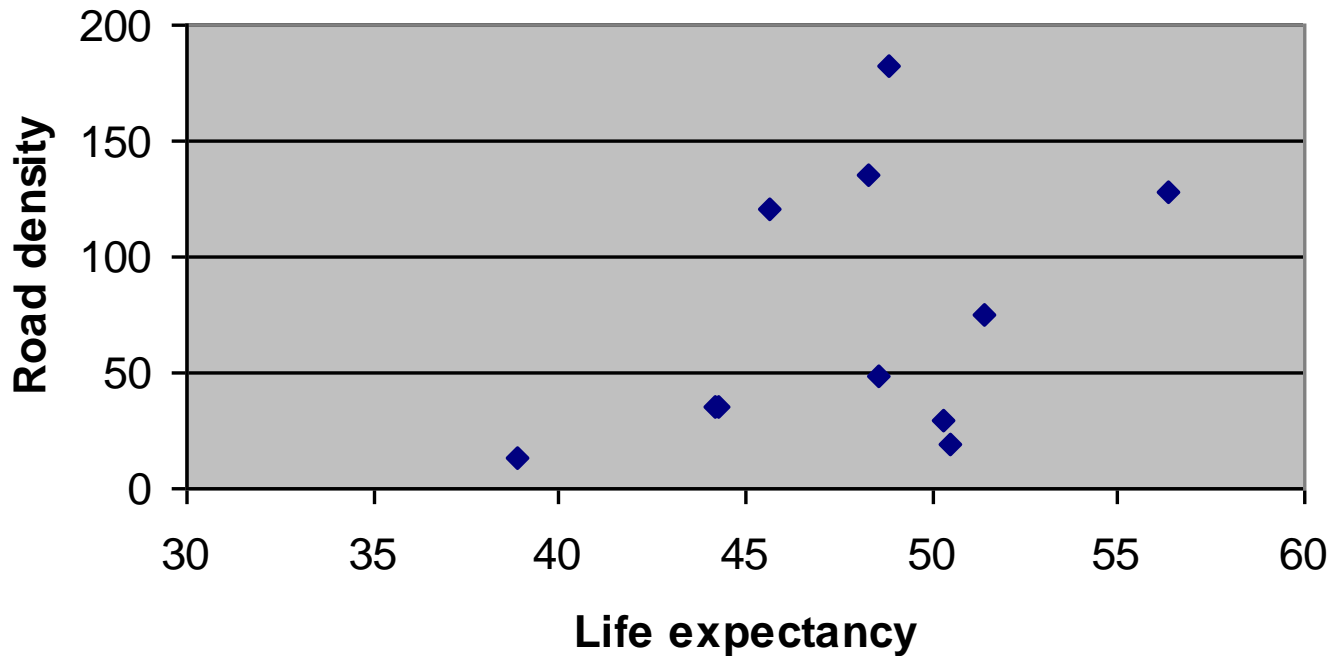


The Social Impact of Rural Transport

- Rural transport development has the potential for improving the livelihoods of the rural poor with improvements to the following:
 - Education
 - Health
 - Access to basic facilities
 - Empowerment
 - Access to markets and towns

Does Road Accessibility affect Health?

SNNP Region life expectancy and road density



Different Types of Benefit

- Normal traffic benefits
= traffic \times change in transport costs
- Economic Development benefits
 - A function of (change in transport costs)²
- Social benefits
 - A function of population \times change in transport costs

Road Impact in Ethiopia

An econometric study by Stefan Dercon of Oxford University , carried out in 1989 and 1994 of six villages (354 households) in south and central Ethiopia found that the presence or absence of a road was a major factor in reducing poverty .

On average food consumption rose by 8% per year in this time, poverty declined in all but one village but just over 50% of the change was attributed to road infrastructure and location.



Impact Studies: The Evidence 2.

New Macro Studies give promising results:

Shenggen Fan and others (at the International Food Policy Research Institute), have found through an analysis of regional data the following:

- China : 6.37 Yuan return for 1 Yuan invested in rural roads. (For Major roads ratio: 1.45Y :1Y)
- Vietnam: 3.01 Dong agric production for 1 dong invested in rural roads; \$63,000 invested would bring 132 people out of poverty
- India. Per Rupee spent impact of reducing poverty was higher for rural roads than for R&D, irrigation, education, rural development

The analysis is calculated on 'change in road length' rather than actual expenditure. (Most rural road expenditure is on existing roads involving little or no change in length.)

But is reverse causality at work ?

A study of 33 villages in the Ashanti Region of Ghana 1.

- Inaccessible villages
 - more dependent on agriculture
 - more labour input into farming
 - more sheep goats and poultry
 - more cocoa grown and sold per farmer
 - greater use of fertiliser, insecticide, extension and tractor hire
 - greater proportion of plantain sold



A study of 33 villages in the Ashanti Region of Ghana 2.

- Accessible villages
 - more dependent on non-farming jobs
 - more trip making
 - more success in loan finance
 - greater proportion of cassava sold
- No difference
 - Cocoa sales per hectare
 - maize yields or proportion of maize sold



POTENTIAL IMPROVEMENT IN FARM GATE PRICES

Percentage increase in farm-gate price of maize with improved access

	Length of access to be upgraded	
	5 km	20 km
Upgrade from earth to gravel road	0.08	0.29
Upgrade from path to earth road	11.4	70.6


What are the Lessons of Research ?

- Basic Motor Vehicle Access appears to be the most cost-effective key to Rural Development
- After basic vehicle access is achieved the next priority is to ensure that access is maintained throughout the year.
- For a given traffic level Roughness Reduction is a secondary consideration.

Standards should be related to traffic volume



Particular Resource and Finance Problems for Rural Infrastructure

- Rural areas are poor and may have a very low tax base
 - Traffic volumes are low hence maintenance costs per vehicle km are high
 - If Road Funds are the key source of finance cross-subsidies from main and urban road traffic will inevitably be involved
 - Population densities may be low hence infrastructure costs per person will be high
 - Low population densities will also be a major constraint in using community labour to maintain roads
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Peru Rural Roads Project –Benefits of Integrated Planning -The Impact and Availability of Infrastructure Services

