Rural Access Power Points:
10-minute briefing

Low Cost Structures

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The Context

Many rural roads are normally passable for maybe 95% of their length but may then turn into an impassable quagmire for the remaining 5% where they are crossed by watercourses or at low points in the alignment during wet weather.

Drainage and water crossing structures form a major part of the construction cost of a road which, depending on the topography, may account for up to 40% of the total cost. Once a road has been constructed the passability and maintenance cost are closely linked to the quality of the cross drainage provision for the road.

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The Challenge

Conventional rural road provision usually costs > US$100,000/km in construction costs

Basic Access and Spot Improvement strategies using Local-resource-based approaches could provide all-weather access to many rural communities for about US$10,000/km

Using a combination of:

- **In situ soils to form an Engineered Natural Surface**
- **Improved surfaces for limited problem sections**
- **Provision of simple structures; such as culverts, drifts and small bridges for water course crossings**

As illustrated in the following slide ……..

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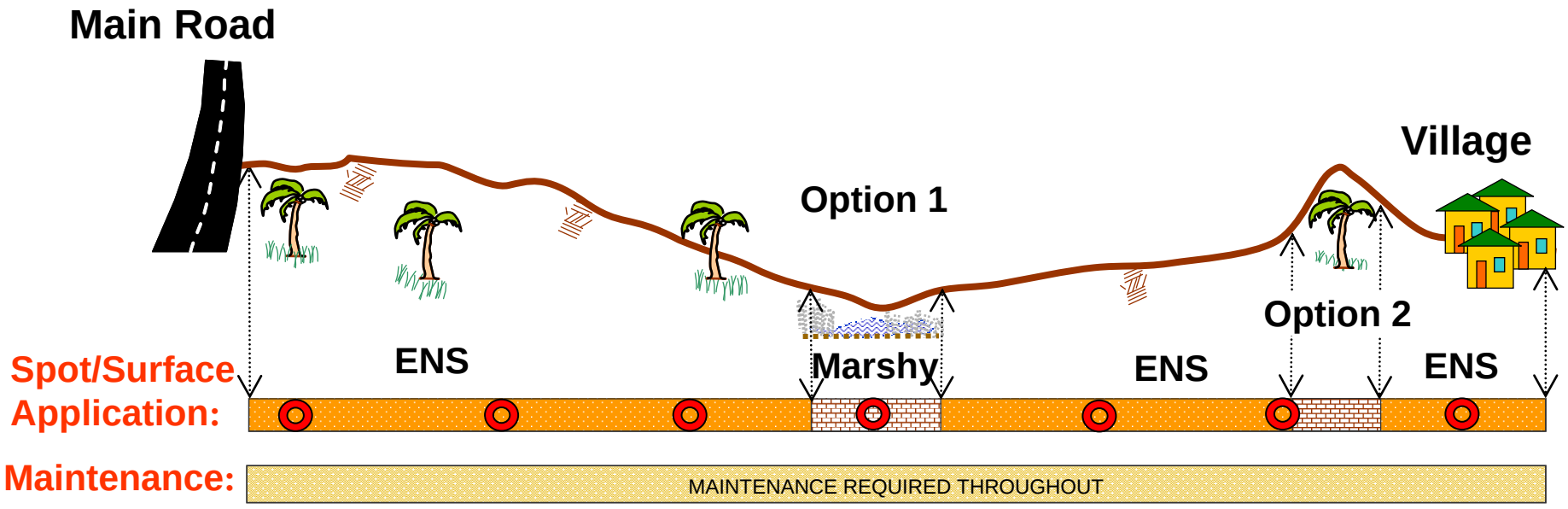
Spot improvement strategy

Example application over a typical rural route



Low Cost Structure or culvert

Surface Options

Engineered Natural Surface (ENS) (Earth Road)

Maintenance

Why use Local-Resource-Based methods?

- **The existing internationally accepted guidelines for small structures are based on the 'traditional' use of reinforced concrete**
- **Not enough consideration given to the use of local-resource-based structures works:**
  - **Local labour (skilled and unskilled)**
  - **Local materials**
  - **Local enterprises**
  - **Local communities and social structures**

Therefore a Low Cost Structures Guideline has been developed with international cooperation

It provides guidance on planning, selection, design, construction & maintenance of Low Cost Structures using stone, brick, timber, as well as concrete.

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Why use Local-Resource-Based methods?

The resource base is very different in developing countries:

- **Labour wage rates typically <US£10/day (instead of >US$100/day in developed countries)**
- **Credit scarce and expensive >20%p.a. (instead of <10%p.a. and usually available in developed countries)**
- **Some local materials do not meet normal international guidelines, however can provide affordable solutions**
- **Local carpentry, masonry skills and local community and enterprise resources usually not mobilized sufficiently in rural road works**

Considering the above, we cannot directly transfer technology from developed countries into a limited resource environment.

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There is widespread evidence of inappropriate structures design

The developing world has abundant examples of BAD PRACTICE in structures provision for rural roads

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Stone: an under-utilised resource

Masonry skills available in many communities

Can be used mortared or un-mortared

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Fired Clay Brick: an under-utilised resource

Especially in areas with lack of hard stone resources

Small scale kilns using agricultural waste can produce engineering quality bricks

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Timber: an under-utilised renewable resource

Low carbon footprint if managed sustainably

Carpentry skills available in many communities

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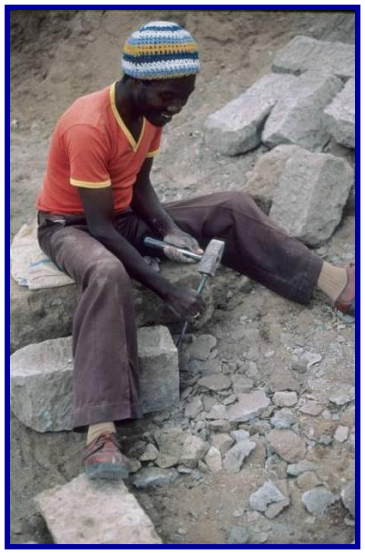
People: an under-utilised resource

Often ready to be involved in creating and maintaining their own access

Local people, enterprises and communities can be helped with knowledge and support



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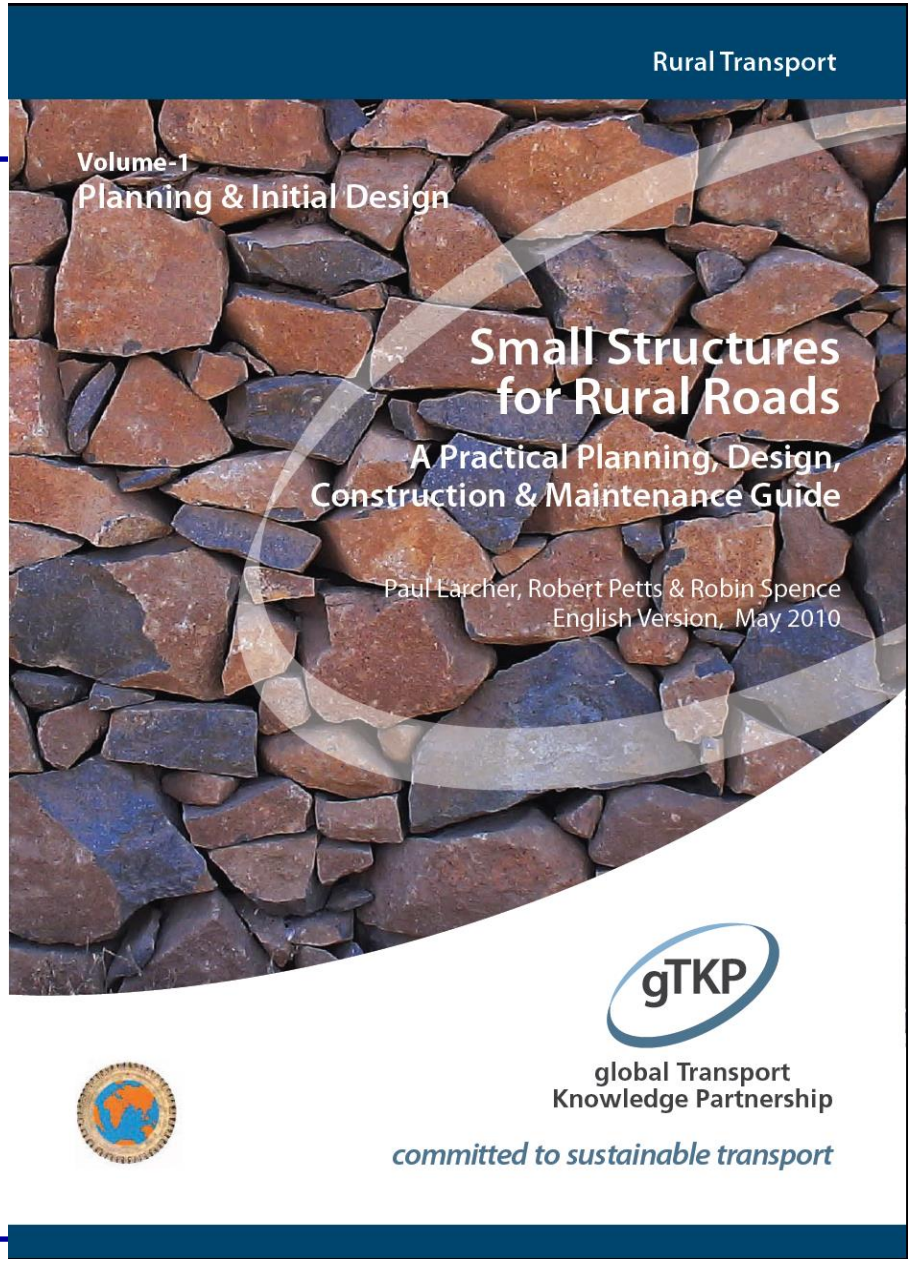
Further Information

Some of these issues are addressed in the Small Structures for Rural Roads Guide

Further information may be obtained from the e-mail address below



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