Managing road infrastructure:
Promoting the use of selected approaches and tools

Presentation prepared for the Annual General Assembly of the SSATP, held in Bamako, Mali
14 to 18 November 2005
Prepared by Ig Schutte
Purpose of presentation

To update participants on the content, findings and recommendations so far of this study – this may impact on the work program for 2006.
Structure of presentation

- TOR and study context
- “Overview document”
- “Issues document”
- Questionnaire
- Where are we now?
- Way forward
TOR and study context

• **Overall objective:**
  – To promote the use of selected approaches and tools in the region that can assist in managing road infrastructure

• **Study context:**
  – This study is one of the activities aimed at addressing the “demand for support” (see next slide)
Thematic areas in 2005 Work Program (WP) of SSATP program

- Road Management and Financing (RMF)
  - Initiative 1: Road Network Management (Inst & fins arrmnts)
- Transport Services
  - Initiative 2: Road Fund Enhancement
- Transport and Regional Integration
  - Initiative 3: Road Agency Improvements
  - Initiative 4: Capacity building and training

Overarching Initiative 1: Transport Strategy Development

Overarching Initiative 2:
Establishment of Transport Sector Performance Indicators (linked to Millennium Development Goals (MDGs))

Implementation of activities addressing demands for support: (E.g.) Preparation of Road Management Tools Guide

Study context
Specific objectives (based on initial discussions and “Inception Report”):

- To prepare an “overview document” for the SSATP-supported approaches and tools, as well as five “new” approaches and tools
  - Target audience: Users of approaches/tools
- To prepare a stand-alone “issues document”, focusing on aspects such as constraints for better uptake and ways to exploit the market
  - Target audience: World Bank
Structure of paper

- TOR and study context
- “Overview document”
- “Issues document”
- Questionnaire
- Where are we now?
- Way forward
“Overview document”: Contents

- Chapter 1: Introduction
  - Purpose of document and target audience
  - Scope of the document
  - Description of key concepts
  - Structure of the document
- Chapter 2: Overview of road management systems
- Chapters 3 to 16: Overview of 14 approaches and tools
- Chapter 17: Comparative analysis of approaches and tools
- Chapter 18: Contact details (web sites)
- Chapter 19: References
- Appendix A: Key success factors for road management systems
- Appendix B: Example of best practice: DROMAS

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“Overview document”: Chapter 1: Introduction

• **Purpose of document:**
  – To give overview of selected approaches and tools, in order to promote their use

• **Target audience:**
  – Politicians and high-level decision makers, as well as 1st time technical readers

• **Scope of the document:**
  – I.t.o. type of road: whole spectrum from *social* roads to *main* (economic) roads (see next slide)
  – I.t.o. approaches/tools: 9 SSATP-supported approaches/tools plus 5 “new” approaches/tools

• **Description of key concepts:**
  – “Approach” vs “tool”: see slide
For each of the approaches and tools, the following aspects are discussed:

- **Background and problem statement**
- **Purpose and description**
- **Expected results**
- **Linkage to road management system**
- **Limitations**
- **Data requirements**
- **Customizing to local needs**
- **Examples of recent applications**
- **Cost**
“Overview document” (cont): Chapter 17: Approaches and tools considered

SSATP supported approaches and tools

- Highway Development and Management (HDM-4) model.
- Roads Economic Decision (RED) model.
- Road User Charges (RUC) model.
- Rapid Rural Road Appraisal (RRRA).
- Performance Assessment Model (PAM).
- Standard Overall Ultralite Road Care Estimate (SOURCE).
- Basic Access Approach (BAA).
- Participatory Rural Appraisal (PRA) technique.
- Integrated Rural Accessibility Planning (IRAP).
“Overview document” (cont): Chapter 17: Approaches and tools considered (cont)

“New” approaches and tools

- Logical Framework Analysis (LFA)
- New Approach to Transport Appraisal (NATA)
- Decisions on a FINITE set of alternatives (DEFINITE)
- Balanced Score Card (BCA) method
Chapter 17: Road Management System defined

• **“Narrow” sense:** “… any system that is used to store and process road and/or bridge inventory, condition, traffic and related data, for highway planning and programming” (from recent World Bank report).

• **“Broad” sense:** As defined above plus relevant approaches and tools.
Example 1.1: Investment in the road network must be economically justified.

Example 2.1: Poor communities must be involved in initiatives affecting their lives.

Example 1.2: Identifying, quantifying and comparing benefits and costs.

Example 2.2: Participatory Rural Appraisal (PRA) technique.

Example 1.3: RED model.

Example 2.3: Not applicable (PRA is technique/approach rather than tool).
Chapter 17: Features of social and economic roads

<table>
<thead>
<tr>
<th>Farm</th>
<th>Household/Sub-village</th>
<th>Village</th>
<th>Market Center</th>
<th>District Headquarters</th>
<th>Regional Headquarters</th>
<th>Capital/Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical Transport Infrastructure</td>
<td>Path</td>
<td>Path/Track</td>
<td>Track/ Earth Road</td>
<td>Earth Road/ Gravel Road</td>
<td>1-2 lane Gravel / SD* Road</td>
<td>2 lane AC** Road</td>
</tr>
<tr>
<td>Typical Traffic</td>
<td>Porterage</td>
<td>NMT 0-5VPD</td>
<td>NMT 5-50VPD</td>
<td>NMT 20-200VPD</td>
<td>&gt;100VPD</td>
<td>&gt;1500VPD</td>
</tr>
<tr>
<td>Typical Distance</td>
<td>1-5 km</td>
<td>1-10 km</td>
<td>5-20 km</td>
<td>10-50 km</td>
<td>20-100 km</td>
<td>50-200 km</td>
</tr>
</tbody>
</table>

- Type of Network: Rural Transport Infrastructure
  - **: Surface
  - ***: Asphalt Concrete
  - ****: Part of either RTI or the Provincial Network

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Chapter 17: Summary of approaches and tools

See next slide for example
<table>
<thead>
<tr>
<th>Tool</th>
<th>Short description</th>
<th>Developed by</th>
<th>When:</th>
</tr>
</thead>
<tbody>
<tr>
<td>RMS</td>
<td>Any system that is used to store and process road and/or bridge inventory, condition, traffic and related data, for highway planning and programming. Associated with the RMS are appropriate business processes to use the RMS to execute the business needs of the highway agency.</td>
<td>Various road agencies, also commercially available</td>
<td>Not applicable</td>
</tr>
<tr>
<td>RRRA (Rapid Rural Road Appraisal)</td>
<td>By providing information on the extent and condition of the non-main road network, using low-cost methods utilising state-of-the-art IT. Information on the entire road network under the jurisdiction of the authority, enabling it to properly manage it.</td>
<td>World Bank</td>
<td>??</td>
</tr>
<tr>
<td>SOURCE (Standard Overall Ultralite Road Care Estimate)</td>
<td>By producing an overall indicator of the physical performance of the road network. Information on the physical performance of the road network and changes in the level of service resulting from recent interventions.</td>
<td>RMI (Road Maintenance Initiative) (World Bank)</td>
<td>1998</td>
</tr>
<tr>
<td>HDM-4 (Highway Development and Management Model)</td>
<td>By determining the funding level for defined network standard, and by determining the resulting network standard for a given funding level. The road authority will be able to plan for sufficient funding, alternatively, to indicate the consequences of insufficient funding.</td>
<td>Initiated by the World Bank</td>
<td>1968</td>
</tr>
</tbody>
</table>
“Overview document” (cont): Chapter 17: Comparative assessment of approaches and tools

See next slide for example
<table>
<thead>
<tr>
<th>Tool</th>
<th>Management objective</th>
<th>Resulting need to be addressed</th>
<th>How does the tool address this need?</th>
<th>Intended outcome of use of this tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDM-4 model: Strategy level</td>
<td>The trade-off between network standard and funding level must be managed in a justifiable manner</td>
<td>The funding implication of a given network standard must be known; alternatively, the resulting network standard for a given funding level must be determined</td>
<td>By determining the funding level for defined network standard, and by determining the resulting network standard for a given funding level</td>
<td>The road authority will be able to plan for sufficient funding, alternatively, to indicate the consequences of insufficient funding</td>
</tr>
<tr>
<td>HDM-4 model: Programme level</td>
<td>Correct investment decisions must be made when additional funding becomes available</td>
<td>The optimal combination of sections of the road network must be identified for periodic maintenance and improvement</td>
<td>By identifying the “correct” combination of sections of the road network to be maintained and improved</td>
<td>Investment in the road network that is economically justified and that will reduce total transport cost</td>
</tr>
<tr>
<td>HDM-4 model: Project level</td>
<td>Investment in the road network at the project level must be economically justified</td>
<td>Benefits and costs over the economic life of the project, resulting from the investment, must be calculated</td>
<td>By ensuring that discounted benefits exceed (or at least are equal to) discounted costs over the economic life of the project</td>
<td>Total transport cost will be minimised as the investment option that minimises total transport cost will be indicated</td>
</tr>
<tr>
<td>RED model</td>
<td>Investment in the road network at the project level must be economically justified</td>
<td>Benefits and costs over the economic life of the project, resulting from the investment, must be calculated in cases where relevant data are not available at the same level of detail as in the case of HDM-4</td>
<td>By ensuring that discounted benefits exceed (or at least are equal to) discounted costs over the economic life of the project</td>
<td>Total transport cost will be minimised as the investment option that minimises total transport cost will be indicated</td>
</tr>
</tbody>
</table>
Chapter 17: Linkage of approaches and tools to road management

This was done by linking approaches and tools to the 7 KRAs (Key Result Areas) of road agencies
Chapter 17: KRAs of road agencies

- Monitoring and evaluation (knowing what's going on)
- Network standard at a strategy level
- Asset preservation (keep (look after) what you have)
- Needs assessment (focusing on the role of road network in poverty alleviation)
- Appraisal and ranking of investment options
- Funding of road network
- Organizational functioning of the road agency
“Overview document” (cont): Chapter 17: Linkage of approaches and tools to road management

See next slides for example
### Linkage of tools to road management

<table>
<thead>
<tr>
<th>Road agency KRA (= aspects in terms of which agency will be judged)</th>
<th>Principle/management objective</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Overall) objective</td>
<td>(Specific) objective</td>
<td></td>
</tr>
<tr>
<td>Approach tools</td>
<td>Tools</td>
<td></td>
</tr>
<tr>
<td>Network standard at a strategy level</td>
<td>Appropriate standards must be set - the trade-off between network standard / funding requirement must be managed in a justifiable manner</td>
<td>HDM-4 (Strategy level)</td>
</tr>
<tr>
<td>Monitoring and evaluation (knowing what's going on)</td>
<td>The performance of the road network must be monitored, and evaluated against set performance criteria</td>
<td>RMS</td>
</tr>
<tr>
<td>Evidence is needed of positive changes that took place since the inception of the RMI (given lack of reliable data)</td>
<td>RRRA</td>
<td></td>
</tr>
<tr>
<td>Network standard at a strategy level</td>
<td>The concept of a &quot;sustainable livelihood&quot; must be understood in the context of broader development debates</td>
<td>SLA</td>
</tr>
<tr>
<td>Asset preservation (keep (look after) what you have)</td>
<td>The existing road network must be optimally maintained in order to maximise net benefits to society</td>
<td>HDM-4</td>
</tr>
<tr>
<td>Needs assessment (focusing on the role of road network in poverty alleviation)</td>
<td>The role of rural transport infrastructure (especially social roads) as a critical element of poverty alleviation initiatives must be recognised</td>
<td>PAM</td>
</tr>
<tr>
<td>Needs assessment (focusing on the role of road network in poverty alleviation)</td>
<td>The analysis, presentation and management of interventions at all levels (project, programme and strategy) must be based on appropriate techniques</td>
<td>LFA</td>
</tr>
<tr>
<td>Needs assessment (focusing on the role of road network in poverty alleviation)</td>
<td>The &quot;right&quot; balance between investment in the main road network and in basic access interventions must be sought in order to maximise poverty reduction initiatives</td>
<td>BAA</td>
</tr>
<tr>
<td>Needs assessment (focusing on the role of road network in poverty alleviation)</td>
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<td>Needs assessment (focusing on the role of road network in poverty alleviation)</td>
<td>The accessibility needs of rural households in terms of basic social and economic services must be addressed, as &quot;roads are not enough&quot;</td>
<td>IRAP</td>
</tr>
<tr>
<td>Needs assessment (focusing on the role of road network in poverty alleviation)</td>
<td>(Poor) communities must be involved in initiatives affecting their lives</td>
<td>PRA</td>
</tr>
<tr>
<td>Appraisal and ranking of investment options</td>
<td>Investment in the road network must be economically justified</td>
<td>HDM-4 (Programme level)</td>
</tr>
<tr>
<td>Appraisal and ranking of investment options</td>
<td>Investment at the partial network level must be economically justified</td>
<td>RED model</td>
</tr>
<tr>
<td>All project impacts must be considered in project appraisal and ranking</td>
<td>Project appraisal must occur in terms of a logical framework</td>
<td>NATA</td>
</tr>
<tr>
<td>Appraisal and ranking of investment options</td>
<td>&quot;Project worth&quot; must be expressed as a single numerical figure, based on all impacts</td>
<td>DEFINITE</td>
</tr>
<tr>
<td>Funding of road network</td>
<td>Road users and beneficiaries must bear the full cost incidental to operating, maintaining and improving the road network</td>
<td>RUC</td>
</tr>
<tr>
<td>Organisational functioning of the road agency</td>
<td>The authority responsible for managing the road network must be functioning optimally</td>
<td>BSC</td>
</tr>
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<td>Road agency KRA (= aspects in terms of which agency will be judged)</td>
<td>Principle/management objective</td>
<td>Item</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
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<td>------</td>
</tr>
<tr>
<td>Monitoring and evaluation (knowing what’s going on)</td>
<td>The performance of the road network must be monitored, and evaluated against set performance criteria</td>
<td>&quot;Overall objective&quot; as applied to the formal network.</td>
</tr>
<tr>
<td></td>
<td>&quot;Overall objective&quot; as applied to the non-main road network.</td>
<td>Evidence is needed of positive changes that took place since the inception of the RMI (given lack of reliable data).</td>
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<td>Network standard at a strategy level</td>
<td>Appropriate standards must be set - the trade-off between network standard / funding requirement must be managed in a justifiable manner.</td>
<td>HDM-4 (Strategy level)</td>
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<td>Asset preservation (keep (look after) what you have)</td>
<td>The existing road network must be optimally maintained in order to maximise net benefits to society.</td>
<td>HDM-4</td>
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The analysis, LFA  

The "right" balance between investment in the main road network and in basic access interventions must be sought in order to maximise poverty reduction initiatives. BAA  

The concept of a "sustainable livelihood" must be understood in the context of broader development debates. SLA  

The accessibility needs of rural households in terms of basic social and economic services must be addressed, as "roads are not enough". IRAP  

(Poor) communities must be involved in initiatives affecting their lives. PRA
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<td>(Specific) objective</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Social roads</td>
<td>Economic roads</td>
</tr>
<tr>
<td>Appraisal and ranking of investment options</td>
<td>Investment in the road network must be <em>economically justified</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Investment at the <em>partial network level</em> must be economically justified.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Investment at the <em>project level</em> must be economically justified.</td>
<td></td>
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Key factors were identified in recent World Bank report: “Success factors for Road Management Systems (East Asia Pacific Transport Unit)”

See next slide
Processes, people, technology and funding

- Funding
- Processes
- People
- Technology
- Funding

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Key success factors for RMS

- **Processes:** The road management system must have an active role in the road agency
- **People:** The road management system must be fully institutionalized and supported
- **Information technology:** The IT components must be appropriate
- **Data collection:** Data collection must be appropriate and sustainable.
“Overview document”: Appendix B: Example of best practice

DROMAS
Structure of paper

– TOR and study context
– “Overview document”
– “Issues document”
– Questionnaire
– Where are we now?
– Way forward
“Issues document”

• Target audience: World Bank (initially)
• Contents: Aspects such as:
  – Details of survey:
    • Questionnaire used
    • Organizations interviewed
  – Results obtained:
    • Examples of best practice
    • Utilization of tools
    • Constraints in the use of tools
    • Options for fast-tracking use of tools
  – Recommendations (based on results obtained)
Structure of paper

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Questionnaire

Objectives:

• The identification of examples of best practice in respect of road management systems;
• The extent to which available tools for facilitating road management are currently being used;
• Constraints (e.g. human resources, financial and technical constraints) in cases where this does not happen;
• The identification of strategies and an action plan to fast-track the use of available tools
### Questionnaire (cont)

**Contents:**

- Table 1: General information (e.g. country, agency name)
- Table 2: RMS: Information on subsystems used in your organization
- Table 3: RMS: Constraints/challenges regarding implementation and use, and suggested solutions
- Table 4: Approaches and tools: Information on approaches and tools used in your organisation
- Table 5: Approaches and tools: Constraints / challenges regarding implementation and use, and suggested solutions
Questionnaire (cont): Details

- 14 countries
- 23 road agencies
Structure of paper

- TOR and study context
- “Overview document”
- “Issues document”
- Questionnaire
- Where are we now?
- Way forward
Where are we now?

- **“Overview document”:**
  - Draft report has been completed, and comments received
  - Comments are being incorporated in Draft “User Guide”
  - Will then be re-submitted for internal peer review

- **“Issues document”:**
  - Awaiting final responses to questionnaire

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Structure of paper

- TOR and study context
- “Overview document”
- “Issues document”
- Questionnaire
- Where are we now?
- Way forward
Way forward: Conclusions

- **Inclusion of more approaches and tools**: The need has been identified to expand the study to also include other/more approaches and tools.

- **Certain patterns are already emerging**: Although the response rate has been low (+- 33%), certain patterns are already emerging.
Way forward: Conclusions (cont)

• **Low usage of RMS**: Generally, there is a low use of RMS (in a narrow sense)

• **Approaches and tools mostly not known in the region**: “Approaches and tools” listed in the questionnaire is mostly not known (and therefore not used), even by “industry leaders”
Way forward: Recommendations

• Importance of training: Training constitutes a critical component of promoting the use of approaches and tools
Way forward: Recommendations (cont)

Some suggestions by respondents:

- **Importance of user group**: “A mini-forum for the region must be organized”

- **Virtual interest group**: This could be supplemented by a virtual discussion group