

SEMINAR: SUSTAINABLE ACCESS AND LOCAL RESOURCE SOLUTIONS

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TITLE: Developing a Knowledge Sharing Forum (CNCTP) and Knowledge Networking for the benefit of the Cambodia Rural Road Sector.

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ABSTRACT

Poor knowledge access, dissemination and mainstreaming have been identified as major constraints to development of the rural road sector in Cambodia. The paper describes the sector challenges and local knowledge development and sharing initiatives that are improving access to research and information for engineers and managers in the rural transport sector.

The Cambodia National Community of Transport Practitioners (**CNCTP**) is a recently formed national forum for stakeholders to provide and gain access to important knowledge and documentation to improve the performance of the rural road transport sector.

KEY WORDS: Rural, Transport, Road, Knowledge, Cambodia



1 BACKGROUND

Cambodia 'lost' about 75% of its road network through the years of conflict associated with the Khmer Rouge regime and regional conflicts. The professional, educated and educational cadres were also decimated by the mass genocide perpetrated by the Khmer Rouge.

In consequence of this history and the particular circumstances of Cambodia, the Rural Transport sector faces a number of substantial challenges that require to be tackled in an appropriate and effective way.



2 THE TRANSPORT INFRASTRUCTURE CHALLENGES

The aim of the Royal Government is to reduce poverty and improve health for the whole nation and more especially for the majority who live in rural areas. To achieve this poverty reduction target and bring development and prosperity to the people, the 3rd mandate Royal Government has adopted a new policy called "the Rectangular Strategy". This is an interlinking series of 4 point strategies concerning governance, environment and growth. Of these, the 2nd and the 3rd Growth Rectangles focus on physical infrastructure development and employment creation.

The Royal Government will continue to accord high priority to the rehabilitation and reconstruction of physical infrastructure especially roads and bridges, which are considered to be strategic measures for supporting economic development and poverty alleviation. Due to this importance, the Cambodian transport networks have been developing rapidly from the post-conflict residual network and extending both national and rural roads under development projects or programmes of the key development partners, NGOs and International Organisations.

There are a number of challenges that those involved with **Transport Infrastructure Management** need to tackle in the pursuit of an effective and efficient road network to serve the economic and social needs of the Cambodian nation.

Consideration of these challenges reveals that there is a substantial need to develop appropriate knowledge through research and practice in the Cambodian circumstances, and to ensure that this knowledge is readily available to decision makers and practitioners in an effective way, and finally that policies, strategies, specifications, procedures and practices incorporate this knowledge.

The principal sector challenges are discussed in the following text.

In parallel with rehabilitation and reconstruction, **Maintenance** is another growing obligation and must not be neglected¹. Maintenance has understandably been a lower priority in the initial post-conflict surge of infrastructure rehabilitation. However, the growing and valuable road network assets require improved and appropriate maintenance if the considerable investments are not to prematurely deteriorate and be wasted.

Funding - The national road maintenance budgets are seriously deficient when compared with the requirements. Therefore not all roads, but only some prioritised and selected roads and bridges will receive any significant maintenance interventions in the near future. Maintenance funds should be used effectively in response to the needs of the road users and local communities, and for the purpose of preserving the transport asset and accessibility in the best way with the limited funds available. This will require particular Transport Infrastructure Management skills.

Road Surfacing is another important issue to be addressed. Rural roads in Cambodia are typically surfaced with laterite or gravel, if surfaced at all. These **gravel** roads, while lending themselves easily to Labour Based Appropriate Technology (LBAT) techniques, have been shown by recent studies^{2 3} to be very costly in terms of maintenance, or whole life costs. These types of road are a low (initial) cost but high maintenance; beyond the capacity of the government or communities to maintain on a sustainable basis.

Good quality gravel (Laterite) deposits in Cambodia are limited in extent and location, and are becoming scarce. Gravel used as a road surface also creates health problems (dust), and is environmentally destructive in its extraction for usage as a “wasting surface”. The laterite that is available generally contains too much clay and not enough durable gravel particles. The material can initially produce a reasonable road surface, but with a combination of heavy traffic and tropical weather (hot, dry conditions or monsoon rains) the laterite becomes powdery and is blown away, or turns to an easily damaged sticky mud.

Natural gravel and crushed stone aggregates are generally hauled long distances, some times up to 100km and more for rural road construction. The heavy vehicles used to transport construction materials to site damage the roads on which they travel. With limited maintenance budgets and inefficient maintenance methods and policies, the road network deteriorates further.

When haulage distances are long, the benefit of the project to local communities as well as national level is reduced. A large portion of the project funds are directed towards haulage of the materials required for construction, rather than towards the intended beneficiaries of the community. A single haulage contractor will in effect assimilate the bulk of the project funds to cover fuel consumption, spare parts and depreciation of trucks, overheads and profit.

In reality, the large numbers of gravel roads rehabilitated in recent years are reverting to earth standard through lack of maintenance. This raises the question of whether these roads should be gravelled in the first place, or whether the limited available funds should be used for more selective spot improvement of priority roads to a higher standard, low maintenance surfaces, together with simple low cost maintenance of the remainder of the priority earth road network.

Appreciating these foregoing problems, MRD appreciates the need to review **policies and strategies** and adopt approaches that move away from reliance on gravel/laterite surfacing

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- 1 Road Maintenance Review, SEACAP 2, CAMBODIA Transport Mainstreaming Partnership Phase 1, Intech-TRL, 2005
 - 2 Rural Road Investment, Maintenance and Sustainability, A Case Study on the Experience in the Cambodian Province of Battambang, , Johnston, D. and Salter, D., May 2001.
 - 3 Rural Road Gravel Assessment Programme (RRGAP), Vietnam, SEACAP 4, Module 4 Final Report, Intech Associates -TRL, July 2005.

towards longer lasting and more cost effective solutions with less maintenance burden, so that roads can be maintained with the involvement of local communities.

A national programme of selectively upgrading gravel/laterite roads is required.



Figure 1 – A donor funded project gravel road within 2 years of maintenance cessation
(photographed in the dry season! – impassable to motor cars)

Providing longer lasting paving options would require higher initial investment cost if compared to gravel. However if whole life cycle costs are to be considered, providing more durable surfacing with less maintenance requirements would show higher economic returns and better residual asset values. Moreover, if road paving options are designed to maximise appropriate use of local resources (local knowledge, skills, labour, materials, local contractors, local tools and equipment) greater benefits can be expected and project funds would be dispersed to a greater number of community beneficiaries, and foreign exchange use would be minimised.

Greater use of in-situ **materials** and materials close to the road construction site can be achieved by improving strength and performance characteristics (modifying physical characteristics by screening or remixing with other imported material, or stabilisation with cement, lime or bitumen emulsion). This will reduce haulage costs and break the cycle of haulage damage to existing roads.

Under the South-East Asia Community Access Programme (SEACAP) funded principally by DFID, **research** on Low Cost Surfacing is being implemented by Intech-TRL. To date, 10 different trial sections have been constructed at Puok Market in Siem Reap Province seeking suitable alternative solutions to replace laterite surfaced roads. It was realised that laterite roads are becoming more and more expensive due to the factors described previously. It is appreciated that the scarcity of good quality of laterite will lead to the need to haul ever longer distances, which will increase the haulage cost and therefore increase not only construction costs, but also maintenance funding requirements. Even though the long term monitoring of these alternative pavements has not yet been completed, the initial research results have already had significant and positive impact on other road development

projects which have adopted these paving options. The experience and knowledge gained on alternative surfaces has helped MRD substantially to move away from reliance on gravel/laterite surfacing, which is problematic and unsustainable for many situations in Cambodia. Gravel use was a necessary immediate, rapid-impact response in the post-conflict situation. However, MRD is now beginning to adopt more sustainable paving options in its rural road programmes, based on the Puok trials and other experiences.

There are many Proven Rural Road Surface Options using:

- Stone
- Bitumen
- Concrete
- Brick



They can have better Whole Life Cost & Local Resource Use attributes than gravel.

Intech Associates

TRL

Figure 2

Review of previous experiences in Cambodia has shown that many paved and unpaved roads were deteriorating faster than expected. This has caused the government unnecessary additional expenditure, and lost benefits, often resulting in the re-investment of their limited and scarce funds in reconstructing the same road section several times.

There are many factors relating to this rapid chronic cycle of deterioration, such as natural causes like excessive rain and floods, technical capacity and capability, management, maintenance and many others. But there is one predominant factor; that of **Overloading**, which needs to be considered and brought under control⁴. Overloading is probably the single major factor causing most damage to the Cambodian roads and bridges. We often see overloading related articles in newspapers and the media, where bridges and roads are reported collapsed or damaged by heavily overloaded trucks. It is undoubtedly overloading which has caused damage to paved and unpaved roads and which costs US\$ millions to the

4 Proceedings of National Workshop on Road Planning, Pavement Design & Overloading Prevention, 11 – 12 November 2004, ITC – Phnom Penh – Cambodia, Intech-TRL and ILO for MPWT and MRD.

economy and society.

Overloading on many routes is a serious problem in Cambodia. If the loading situation is not carefully assessed, then road investments can be destroyed prematurely. Since loading control is currently ineffective, the transport operators maximise their vehicle loads to reduce the number of trips necessary and maximise profit within the capacity of their vehicles. Pavement damage is increasing significantly as wheel loading increases above about 8 tonnes per (4 tyre) axle and tyre pressures are increased to raise vehicle payload. Thus the deterioration of the road network escalates exponentially with vehicle loading. The transport operator benefits and the nation pays for the damage. With little funding available even for road maintenance, the resulting road rehabilitation burden is certainly unaffordable. Communities are hence left without all-weather satisfactory access, a vital component of the poverty reduction effort. The effects of only temporary provision of access to isolated communities through a construction/rehabilitation project, then subsequent access denial for lack of maintenance can also have serious social and economic implications for these communities.



Figure 3 – Truck bodies extended in Cambodia to carry at least 20m³ of construction materials on 3 axles.



Figure 4 – Overloaded truck damages bridge on a secondary road.

A Cambodian **Road Law** is currently being re-drafted. Reviews by stakeholders are contributing suggestions to ensure that there is insufficient recognition of the current axle loading situation and consequences for road pavement and bridge damage. Furthermore, there needs to be provision for rational monitoring and control for tackling this problem.

Road Safety – Unfortunately Cambodia has the worst road accident fatality rate in the ASEAN Region when related to vehicles using the road network (currently 21.5 fatalities per 10,000 registered vehicles)⁵. The road safety situation in Cambodia is inevitably likely to be adversely affected by the rapidly increasing vehicle fleet of the country, with which there is likely to come a much higher risk of road accidents. However, such an increase in deaths and injuries should not be accepted as the inevitable price for increased mobility. Indeed, it can be regarded as one of the responsibilities of government to help to maintain as safe a road environment as possible for its population of road users.

Over the past six years, not only have recorded accidents increased overall but the severity of injury of accident victims appears to have been increasing at an even greater rate.

5 Working Paper 3 - Improving Road Safety, (Component 9), SEACAP 2, Cambodia Transport Mainstreaming Partnership, Intech-TRL, June 2005.

Fatalities increased by 32.7 per cent in 2003, and a massive 46.8 per cent in 2004 alone, a trend that is obviously causing great concern. The incidence of people seriously injured in crashes is also likely to be increasing sharply but there are indications of a high level of under-reporting of such accidents.



Figure 5 – Road accidents are increasing alarmingly

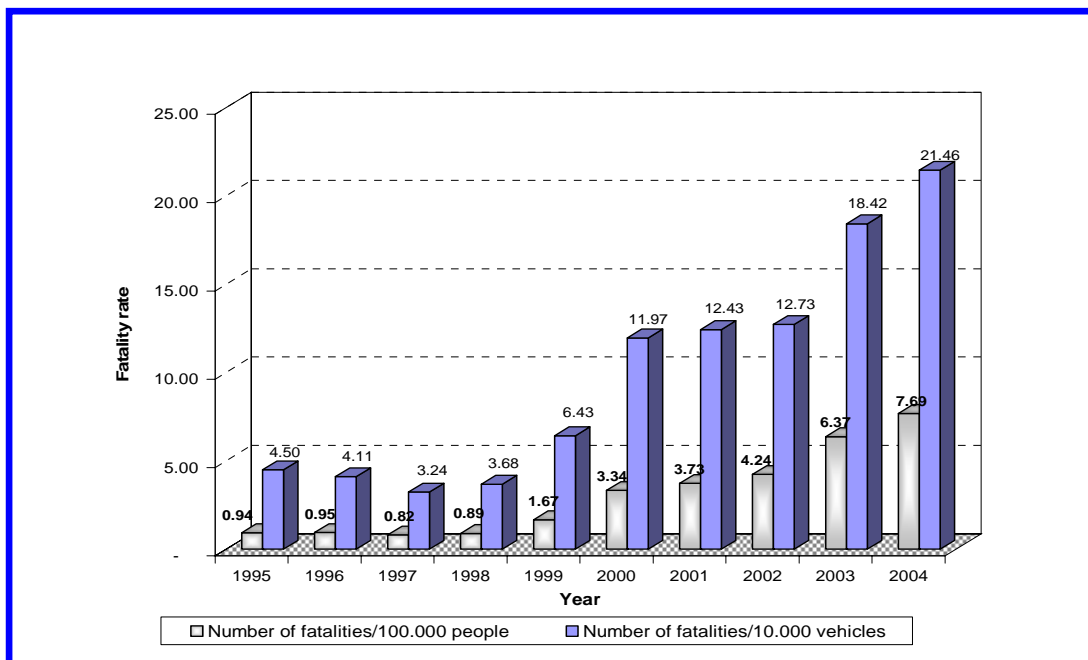


Figure 6 – Trends in traffic fatality rates, 1995 to 2004 (source: MPWT)

There are serious deficiencies in the **Human Resources** capacity and organisational arrangements in the road sector according to a recent SEACAP 2 report ⁶. Initiatives are required to improve knowledge and performance through appropriate training and mentoring activities.

Last but not least, one of the first activities in the investment cycle, is the aspect of infrastructure **Planning**. Cambodia has developed good experience with systems such as the Integrated Rural Accessibility Planning (IRAP) developed by the ILO Upstream and NRDP projects. It is proposed to develop the current IRAP tool into an integrated planning and management system for rural transport infrastructure in Cambodia. The system will be further developed based on the successful current system. Such an approach will require only modest resources and will be achieved with the involvement of the stakeholders, trialled, and then mainstreamed for the benefit of the rural communities throughout Cambodia.

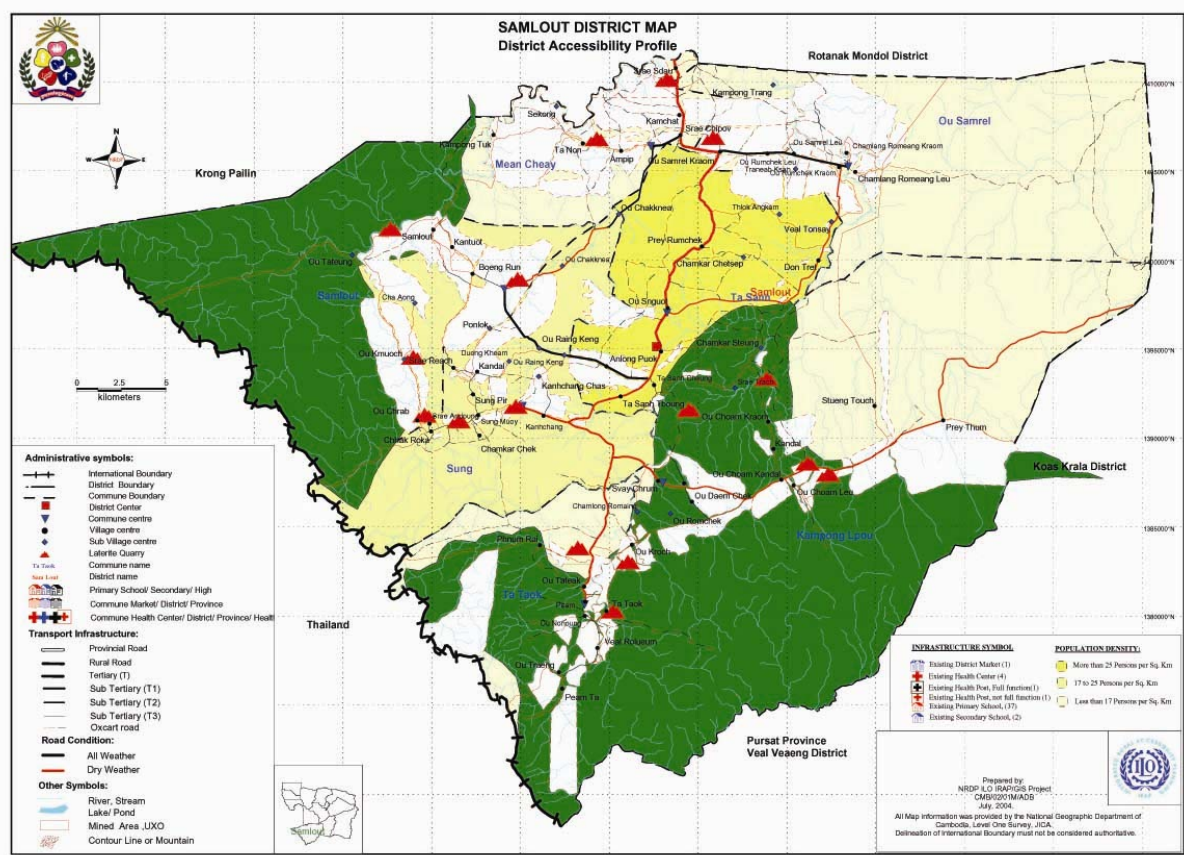


Figure 7 – Example of Transport Infrastructure Inventory (TII) Mapping developed through Integrated Rural Accessibility Planning (IRAP)

With the background of these substantial challenges, but also opportunities, the key sector practitioners and stakeholders have an interest to access the available knowledge appropriate to the Cambodian circumstances. A mechanism was required that would facilitate this access and application of knowledge to achieve a more effective **Transport Infrastructure Management** approach in the future.

6 Working Paper 1, Human Resources Development Strategy, (Component 8), SEACAP 2, CAMBODIA Transport Mainstreaming Partnership, Intech-TRL, May 2005

3 FORMATION OF THE CNCTP

In Cambodia, as in other developing countries, MRD and development partners are aware that it is not sufficient merely to carry out **Appropriate Research** relevant to the local conditions in Cambodia to bring about beneficial changes in sector practice. In the past considerable relevant research has been carried out in Cambodia and other countries with similar conditions, but it has often not been taken beyond documentation and sporadic application.

There are also key aspects to mainstreaming which must be catered for. These include:-

- Establishment of an effective **Steering Mechanism** to initiate priority research and to review the completed research and knowledge as it is implemented or becomes available, allow comment and contributions from the key stakeholders, and a route to incorporation of recommendations in the revised standards. A steering function needs to be established with the various stakeholders in Cambodia, which is tailored to the specific local circumstances of the country.
- **Knowledge Sharing** needs to be enhanced by **Practical Demonstrations of Good Practice**, as 'seeing' is certainly a catalyst for 'believing'. These initiatives also provide the opportunity for practitioners and experts to discuss the various issues and practicalities with the parties involved. For example, the trial pavements construction at Puok Market in Siem Reap province constructed under projects managed by Intech Associates, TRL and the ILO Upstream Project with DFID and SIDA funding, provide practical demonstration of alternative rural road surfacing techniques.
- **Dissemination** of knowledge needs to be organised in a structured way. The knowledge should be accessible to all users. It should also be available in usable formats; both in English and Khmer language. Knowledge needs to be available in "hard" format; documents and other publications, and should be downloadable electronically from the internet.
- **Mainstreaming** of the knowledge requires a programme of training courses, workshops and seminars, use of the media, ITC, EIC, GMSARN technical and professional network and seminar programme, and professional journal and publications.

It was realised that these essential functions could be greatly enhanced through the establishment of a Cambodia National Community of Transport Practitioners (CNCTP). This would involve all sector stakeholders. A framework of the CNCTP functions has been developed (Figures 8 and 9).

A number of officials and practitioners working in the sector have previously supported international initiatives such as the IFRTD (International Forum for Rural Transport Development), IFG (International Focus Group on Rural Road Engineering), and PIARC (World Road Association). However it was clear that a local forum was required that was initiated by and organised for Cambodian sector stakeholders, was aimed at the generation and exchange of knowledge specifically relevant to the rural transport sector in Cambodia.

With the support of the SEACAP 2 – Cambodia Transport Mainstreaming Programme project, various initial meetings and exchanges were organised and in 2004 and 2005.

The official launch workshop for the Cambodia National Community of Transport Practitioners (CNCTP) was held at the Sunway Hotel, Phnom Penh, Cambodia on 31 May 2005, supported by the DFID funded SEACAP programme and the ILO IRAP component of the NRDP, funded by ADB and Royal Government of Cambodia.

Figure 8
CONTRIBUTING TO AND GAINING FROM RESEARCH AND TRANSPORT KNOWLEDGE
CAMBODIA NATIONAL COMMUNITY of TRANSPORT PRACTITIONERS - SHEET 1
CONCEPT

Roads & Waterways
(Not Rail or Air Transport)

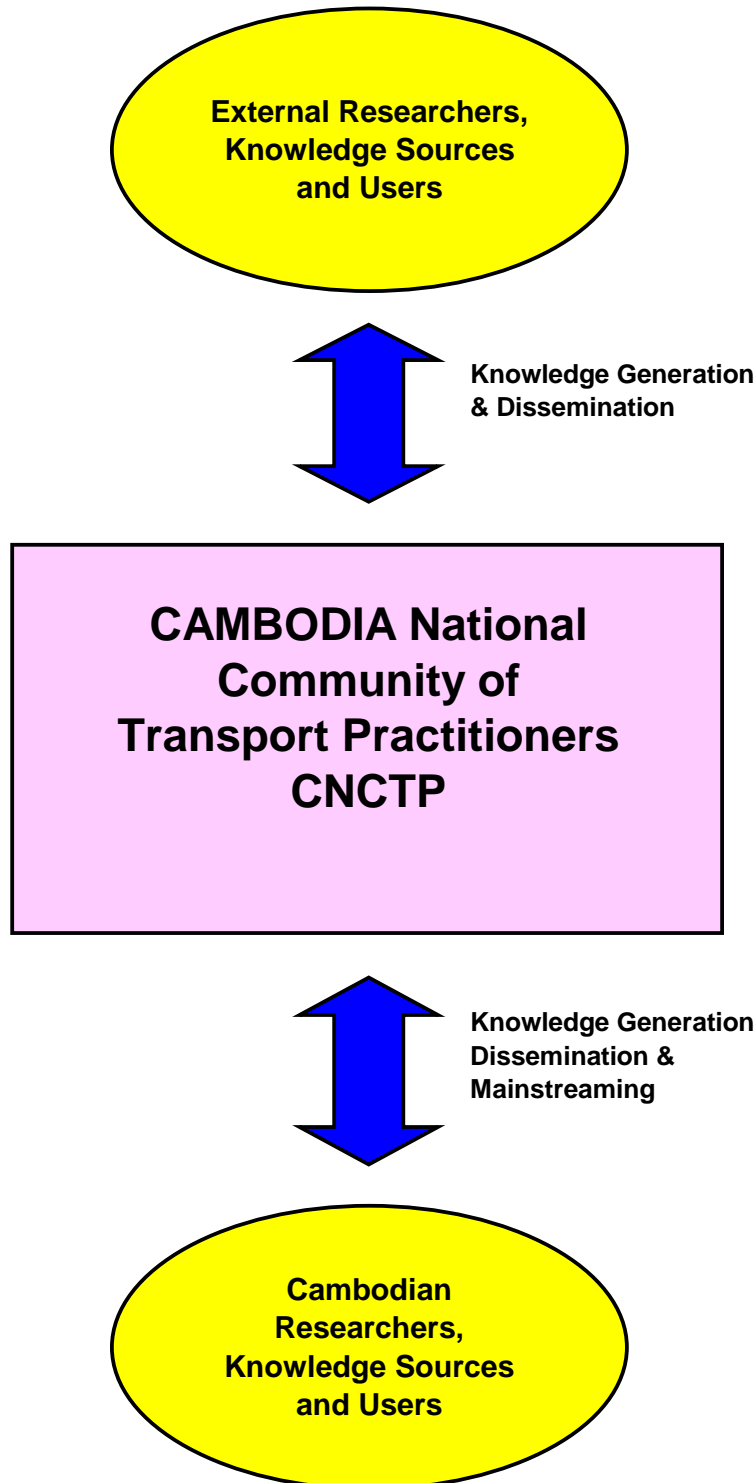
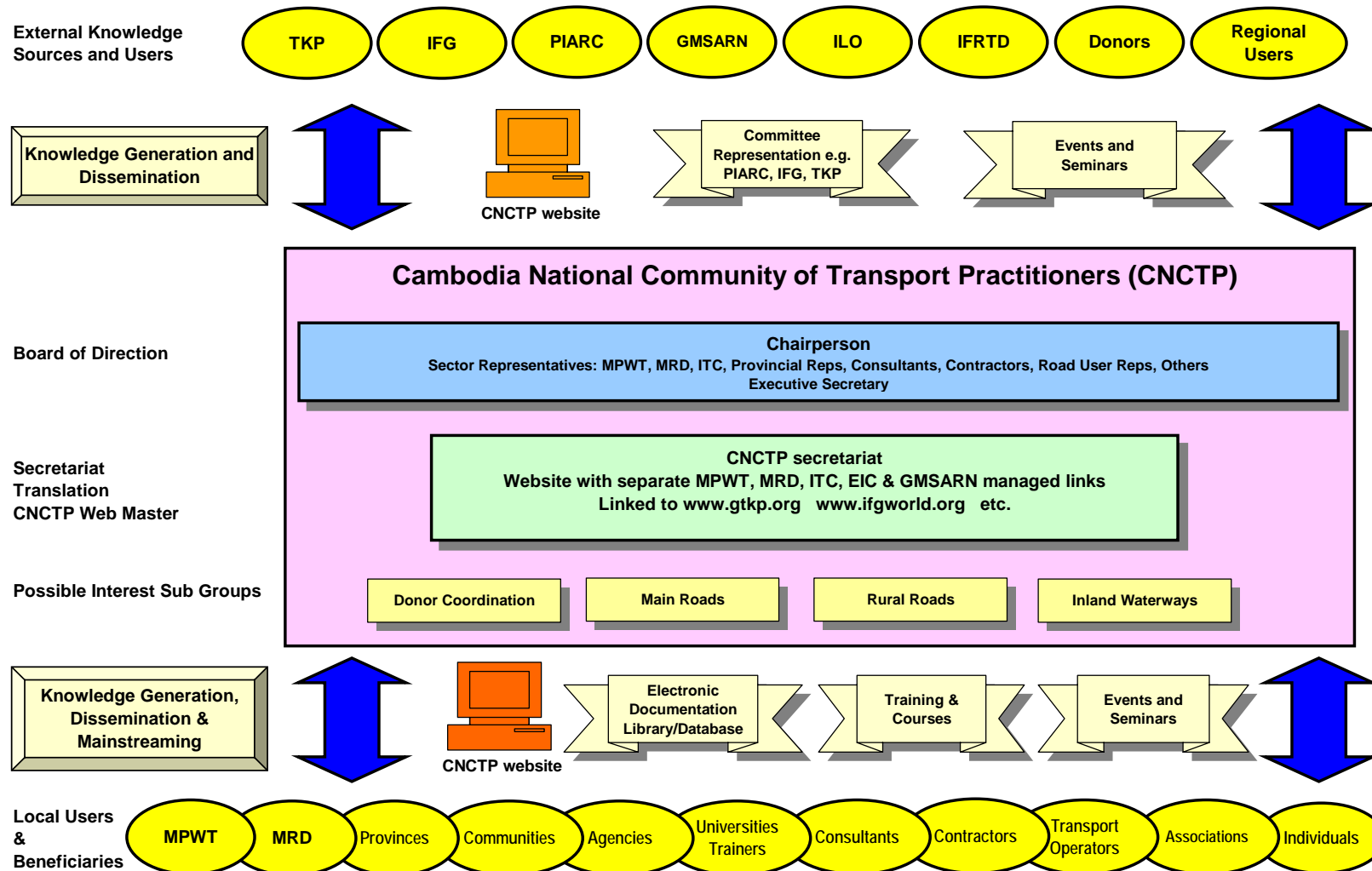


Figure 9 - CAMBODIA NATIONAL COMMUNITY of TRANSPORT PRACTITIONERS - SHEET 2

Roads & Waterways
(Not Rail or Air Transport)

STRUCTURE & LINKAGES



4 CNCTP AIMS

CNCTP is a transport sector stakeholders' knowledge forum committed to the provision of sustainable transport access for the rural poor. CNCTP seeks to foster collaborative efforts amongst members, donors and other organisations that encourage management and dissemination of transport knowledge so as to participate in improving transport policies and decision-making.

The objectives of the launch workshop were to officially initiate the CNCTP, brief participants on some of the current key initiatives in the road transport sector, finalise and endorse the **Memorandum of Understanding** and CNCTP **Constitution** documentation, confirm appointment of officers and achieve stakeholder commitment.

These objectives were met and the CNCTP is now an operational forum.

Currently the CNCTP website is under construction and will be populated with key documents for downloading free of charge, as well as news on developments in the Transport Sector in Cambodia:-

www.cnctp.info

CNCTP actively supports events such as the recent Cambodia Transport Infrastructure Management (TIM) Workshop and this PIARC – Royal Government of Cambodia seminar on **SUSTAINABLE ACCESS AND LOCAL RESOURCE SOLUTIONS**.

FOOTNOTE

The photograph below is of the Ankorian viaduct built over 800 years ago using laterite stone blocks without the benefit of modern cements, and which is still in service today on the main National Route No 6 for international heavy traffic (albeit catering for single lane operation). The CNCTP aims to promote the continued spirit of innovation, appropriate use of local resources for sustainable transport solutions and poverty reduction.

