

## **OVERVIEW OF AFRICA AND SUSTAINABLE PRACTICE STATUS OF T<sup>2</sup> CENTRES AND PARTICIPATION IN PIARC**

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### **ABSTRACT**

Africa has always been left behind with respect to technological development and when it is the issue of sustainable practice it is even more critical. Sustainable practice with respect to road transport development in Africa is still far fetched. An overview of the best and sustainable practice remains to be a challenge for the future of road transport. But sustainable transport within the framework of overall sustainable development is a clear target for all. The situation is even clearer when the unpaved roads within Southern African Development Community (SADC) are about 70% of the total network, posing another challenge to development.

The process of openly gaining and freely sharing experiences, solutions, technologies, and innovation has come to be understood as technology transfer. Technology transfer is not simply information dissemination and passively waiting for its use. Technology Transfer or T<sup>2</sup> in the context of roads is a more active term that describes both a mission and innovation to improve the roads. In Africa Technology Transfer Centres have been established to facilitate sharing of experiences and best practices. The first centre to be established was in South Africa by the South Africa Department of Transport in 1995 followed by the Tanzania T<sup>2</sup> centre in 1997. Others to follow suit are Zimbabwe in 2000, CSIR and Kwa Zulu Natal both from South Africa and established in 2000, and Malawi in 2001. Namibia and Zambia will be established in 2003 as well as Botswana which is yet to be operational. The first six are known to be working while the others have received equipment and will be operational soon.

This paper discusses the overview of the Africa's road transport and links it to the Technology Transfer Centre project under PIARC. The paper further discusses the effectiveness of the centre with respect to the future and as springboards for other African T<sup>2</sup> Centres.

The status of the Tanzania Technology Transfer Centre and its participation in PIARC will be discussed and reported. The most profound contribution to the establishment of the Malawi and Zimbabwe T<sup>2</sup> centres will be highlighted. Achievements made so far will be explained and recommendations on how to improve further the use of the centre. The linkages with other Centres will be emphasized and recommended.

Finally the paper will highlight the need for other African countries to be encouraged to be active on technology transfer issues through establishment of Technology Transfer Centres.

## **KEY WORDS**

SUSTAINABLE DEVELOPMENT, TRANSPORT POLICY, PRACTICE, T2 CENTRE, TECHNOLOGY TRANSFER, AFRICA

Sustainability in Transport Policy – Decision Making and Implementation

## **1. INTRODUCTION**

Unpaved roads carrying low volume of traffic comprise approximately 70% of the total road network of the Southern Africa Development Community (SADC) region<sup>1</sup>. These roads connect the productive agricultural areas to the primary road network and they also play a vital social and economical role in the development of rural areas where the majority of the populations live.

Many villages of rural Africa do not have road access and the major mode of rural transport is on foot. It can probably be unrealistic to assume that roads (all weather) will be built to link all those rural villages in a foreseeable future. Good roads play a vital role in the development and hence countries and donor aid agencies invest considerable resources in them. In Southern Africa most secondary roads are earth or gravel. Similarly in Tanzania about 90% of the total road network is earth or gravel. The construction of bitumen surfaced roads is perceived as expensive but they do play an important role in providing all weather access to linking health centres, schools, markets, and other communities, all essential to the improvement of the rural livelihood.

Most rural road transport infrastructure in developing countries and countries in transition consists of two types:

- (a) adapted roads where Local Government is usually responsible for maintenance
- (b) other roads, tracks, paths and foot bridges informally owned by the communities

However, most of the Primary road networks in the same countries are also adopted from the colonial masters and the Central government is responsible for their management and maintenance.

## **2. POLICY AS A TOOL FOR CHANGE ON AFRICA'S ROADS**

Lack of clear policy on roads transport development in most African Countries contributes to the poor condition of roads. Policy usually provides a framework within which decisions can be taken about all aspects of road network management. Many Government policies would provide a "statement of intent" about how they intend to manage, operate and develop the sector<sup>2</sup>.

Policy can be a powerful vehicle to facilitate a change. But policy is complex because of the need to coordinate between many sectors, organizations and bodies if sustainable

implementation is to be obtained. Policy formulation is a process, which needs to be well articulated and structured. A properly structured approach to policy formulation and particularly in Africa is therefore necessary to overcome the above shortfall.

When policy is developed in a formalized and structured way, it can provide a framework within which effective and sustainable reform can develop. A policy driven consultative approach to reform can generate ownership and commitment among stakeholders. Agreement of policy principles is easier than getting embroiled in discussing the details of legislation. The process requires commitment from the highest levels of the Government and needs a champion to pursue it. Development of a road sector Green Paper in Zimbabwe provides a typical good example of policy formulation process. The process started in 1996 and until March 1998 when a Steering Committee was set up and held its first workshop to draft a National Policy Statement. Here in Tanzania the development of a road sector Green Paper was just initiated through RMI but has not succeeded in getting off the ground. This is a measure of the commitment that is required to pursue the road sector policy development.

### **3. PROMOTING SUSTAINABLE SOLUTIONS FOR THE RURAL ROADS IN THE SADC REGION**

Unpaved roads demand constant maintenance to arrest damage caused by both heavy traffic and the environment<sup>3</sup>. With traffic volume of more than 300 vpd, regravelling is needed after only one year or a maximum of two years service, thus an unsustainable demand is put on scarce financial, manpower and natural resources. However provision of a thin bituminous seals could mitigate the problem, but it is often difficult to justify this type of upgrading solely on economic criteria principally because of the relatively low volumes of traffic and the associated negligible user benefits generated. But as said above, it is also very expensive to maintain as gravel standard once the traffic volume is higher than say 250-300 vpd. Also it reflects the inappropriately high design and construction standards often applied to these types of road, particularly those standards originating from developed countries where the social, economic and environmental conditions are very different to those in developing countries.

### **4. IMPROVING ACCESS TO KNOWLEDGE AND RESEARCH**

A Technology Transfer (T<sup>2</sup>) Centre or a TTC is a focal point for interchange of information and for encouraging best practices. In other words it is a system or mechanism used to bring to practitioners the techniques and devices others create or practice. It focuses on bridging the gap that sometimes exists between research and practice. A T<sup>2</sup>Centre can only come to exist when a group of practitioners and users of the technique or their leaders recognize that needs exist that are not being met, and make commitment to address such needs<sup>4</sup>. In Africa, PIARC and the US Federal Highways Administration are actively supporting to establish T<sup>2</sup>Centre, in the road transportation sector. A questionnaire sent to several T<sup>2</sup>Centre from Tanzania T<sup>2</sup>Centre to find out how they are performing and to establish historical data about T<sup>2</sup>Centres,

have been collected and analysed by the author of this paper. The findings have revealed important information as detailed below. The most important thing to know is that all T<sup>2</sup>Centres have a Vision and a Mission to accomplish.

a) The Tanzania T<sup>2</sup>Centre has the following Vision and Mission

“To be renowned nationally and internationally as the paramount resource in developing and transferring innovative and appropriate technologies, proven solutions and reliable services to successfully resolve the challenges facing the transportation sector in Tanzania<sup>5</sup>”. While the Mission, on the other has been stipulated “as to foster safe, efficient and environmentally sustainable transportation systems in Tanzania by improving skills and knowledge of transportation providers and users through training, technical assistance and technology transfer.” The main objectives of the centre are to:

- ❖ diversify and deliver quality customer services
- ❖ develop customer oriented needs-driven programs
- ❖ promote effective utilization of technology transfer centre services
- ❖ enhance technology transfer and networking
- ❖ obtain sustainable and predictable funding

While the functions of the Tanzania T<sup>2</sup>Centre are to:

- conduct training and technical assistance programs
- provide information on new and existing appropriate technologies
- maintain a mailing list of stakeholders
- serve as a clearing house for transportation information and
- publish quarterly newsletters
- carry out applied research and development activities
- promote and coordinate TRAC programs
- promote and coordinate community transportation programs in Tanzania
- perform an annual self evaluation of the programs

b) The Malawi Technology Transfer Centre has the following Vision to accomplish that is to make the transportation safe and efficient throughout Malawi<sup>6</sup>. Its Mission is yet to be worked out. The same applies to its objectives and functions. Malawi T<sup>2</sup>Centre is still at its early stages of establishment although it has been in operation since June 2001.

c) The CSIR T<sup>2</sup>Centre of South Africa has its Vision as follows: - “To transfer knowledge and create value<sup>7</sup>.” The Mission of the centre has been spelled out as: - “to identify innovations and to deliver appropriate technologies and solutions locally and regionally”. The main objective on the other hand have been to:

- ❖ identify the needs of the transportation sector, and to facilitate the provisions and disseminations of technology, policy and procedures as well as technical expertise and skills to the wider transportation community in South and Southern Africa

The functions of CSIR have been given to be:

- clearing house for information
- capacity building
- research implementation and special projects
- FHWA Transpotek to cooperatively undertake technology sharing and research projects
- act as ASANRA regional T<sup>2</sup>Centre
- undertake training for the transportation sector.

d) The Kwa Zulu Natal T<sup>2</sup>Centre has a Vision of “prosperity through Mobility by becoming a leading centre for the development and transfer of relevant transportation technologies for the development of transport sector in province of Kwa Zulu Natal<sup>8</sup>”. The Mission of the centre is to seek and package innovative solutions through research and to empower departmental officials through training. The main objectives of the centre are to:

- ❖ improve the effectiveness and efficiency of the department by sourcing and packaging relevant research for local condition
- ❖ implement and coordinate research aimed at solving transportation problems affecting the department and province
- ❖ ensure a well trained workforce by assessing training needs, developing relevant training materials and facilitating the training
- ❖ providing material testing facilities and services for the purpose of quality assurance, research and training
- ❖ encourage national and international linkages and partnership in order to reduce duplication of services, and share training costs and expertise.
- ❖ Contribute to the growth of the national pool of technical personnel by developing and supporting programs that enhance interest in mathematics and science schools
- ❖ provide a One Stop Shop for transportation resources by setting up and operating a technical resource centre in collaboration and association with the main department resource centre.

e) The Zimbabwe T<sup>2</sup>Centre has no Vision but has its Mission as: “to serve as a focal point for effective dissemination of information and Technologies in order to improve the quality of the road network<sup>9</sup>”. The main objectives are:

- ❖ to systematically and effectively facilitate the creation and dissemination of appropriate technology practices.

The functions of the centre have been spelled out to be a publisher of quarterly newsletter, conducting and arranging seminars and training.

f) other T<sup>2</sup>Centres which replied to our questionnaire were the Cuba Technology Transfer Centre established in 1986 and one of the oldest T<sup>2</sup>Centres and the Mongolia T<sup>2</sup>Centre established in 2002. Both these Centres gave very useful information on their vision and mission as well as objectives and functions. Uniquely the Cuba T<sup>2</sup>Centre is attached to a National Design Enterprise for

Transport Works who runs the centre for the Ministry of Construction of Cuba. On the other hand the Mongolia T<sup>2</sup>Centre is attached to three institutions, the Department of Traffic Police, the Department of Transport and the University Science and Technology of Mongolia.

## **5. TECHNOLOGY TRANSFER AND ITS CONTRIBUTION TO THE ROAD TRANSPORT SECTOR**

As it has been noted from above, the process of sharing experience, solutions, technologies and innovations is very clear. This underscores the importance of the Technology Transfer Centres. Many centres, including those which have existed for a number of years, have become more than just an information dissemination centre. A Technology Transfer is a process by which existing knowledge, facilities, or capabilities are utilized to fulfil public and/or private needs<sup>10</sup>. Technology Transfer contributes to creation of a condition for sustainable development. Technology Transfer creates an environment that promotes the exchange of innovations in transportation that stimulates local economic growth and trade. It provides and links to international technology arena.

There are about eleven T<sup>2</sup>Centres established and operational in Africa. Five of these are supported by PIARC and they include the one under the South Africa Department of Transport, and the Tanzania T<sup>2</sup>Centre. Others include Madagascar T<sup>2</sup>Centre and Chad T<sup>2</sup>Centre while the last one is the Burkina Faso T<sup>2</sup>Centre. The Federal Highways Administration supports the rest. These include Malawi T<sup>2</sup>Centre, Zimbabwe T<sup>2</sup>Centre, Kwa Zulu Natal T<sup>2</sup>Centre, Namibia T<sup>2</sup>Centre, Zambia T<sup>2</sup>Centre, CSIR T<sup>2</sup>Centre and the one in Botswana T<sup>2</sup>Centre. The T<sup>2</sup>Centre in Tanzania, which was established in 1997, was the second one after that of the National Road Agency of South Africa and has benefited from both FHWA and PIARC. The centre has grown steadily and performed very well. It hosted the First Road Transportation Technology Transfer Conference in Africa in May 2001 under the Theme: "Technology Transfer in Road transportation in Africa". The centre has undertaken a number of courses, seminars and workshops on the road technology and road transport in general. It has on the mailing list about 1296 people and institutions. In terms of dissemination of publications it has a lending library with about 1500 titles, 80 CD-ROM and about 200 video cassettes while the number of customers requesting information from the Centre has grown to about 300.

The Tanzania T<sup>2</sup>Centre has coordinated a Contractor Development Mission, which has been very successful. It has also coordinated the Tanzania Construction Industry Capacity Building Project, which is at various stages, and it involves all public and private stakeholders' institution. Among other achievements is overseeing the Transport and Civil Engineering (TRAC) program developed by AASHTO aiming at inspiring and encouraging Secondary School Students to aspire for transportation studies at the University, or Civil Engineering or Applied Sciences and Technology as their carrier. The program also aims at bridging the gap in technical workforce development. This program is being implemented in only four countries in the World, which includes USA, Puerto Rico, South Africa and Tanzania.

Another achievement in terms of customer services has been the assistance in getting information for the Tanzania Road Agency (TANROADS). In absence of Highway Beautification Act, responsible for road reserve management in Tanzania, the T<sup>2</sup>Centre was requested to facilitate collection of information from other T<sup>2</sup>Centres in Africa and other countries, which enabled the Agency to start developing its own system for road reserve management. Also the Tanzania Road Fund Board requested facilitation of information collection with respect to Asset Management, which was provided. Similarly facilitation of information on Contract Maintenance based on performance, which is being put into practice by TANROADS, and was found to be uniquely developed and used in other T<sup>2</sup>Centres worldwide. Hence on the achievement the centre has done quite substantial work with respect to establishing contacts.

Furthermore the Tanzania T<sup>2</sup>Centre was a springboard for Zimbabwe and Malawi T<sup>2</sup>Centres. The Zimbabwe T<sup>2</sup>Centre was established in year 2000 and has made a good number of achievements. The Centre has conducted about four courses and has borrowed over 400 publications, videos and CD-ROMs. The number of customers requesting information from the centre is more than 300. The Malawi T<sup>2</sup>Centre has made similar achievements since its establishment in June 2001. It has conducted about four training courses and has many publications for dissemination. It has about ten customers requesting for information and is fully established getting ready to fulfil other activities. As can be seen the Tanzanian T<sup>2</sup>Centre has made an impact on the formation of other T<sup>2</sup>Centres in Africa. It has further being identified as a Reference Shelf for the Africa Region by PIARC.

## **6. CONCLUSION AND RECOMMENDATIONS**

The Technology Transfer Centres are good tools for technological exchange of best practices, and thus the best methodology to share expertise among the African Countries. There is need to establish regional centres which would play the role of coordination. One could be located in west Africa while another covers the and east, central and south Africa.

They can effectively be used to prepare and undertake training nationally and regionally. There is need to exchange even staff particularly on how to manage and run the TRAC Programs. This will enhance knowledge and encourage the young scholars to consider opportunities available for them in their carrier development.

For sustainable development, the T<sup>2</sup>Centres can be useful in disseminating the best practices and thus transfer expertise nationally and regionally across the Africa region.

In promoting the TRAC program which, as I said before, is being implemented in only four countries in the world, and is now functional in both Tanzania and with National Road Agency of South Africa, Tanzania may need to assist the Sub-Saharan African countries to administer the TRAC program.

We have seen that most T<sup>2</sup>Centres are administered by Management Committees. There could be some lessons to be learned on the problems encountered in terms of

bureaucratic procedure so that the best practice can be established for administering the Centres. On the other hand there is need to find out the best practice of administering the T<sup>2</sup>Centre whether it is by Management Committees or by a legal instrument that will make the Centres either semi autonomous or completely independent and act as an authority. This requires further research to ascertain what needs to be done. It is therefore recommended that a study be carried out to identify how best the T<sup>2</sup>Centres can be administered.

Nearly all the Centres, which replied to our questionnaire said YES to the question on sustainability except the Tanzania T<sup>2</sup>Centre and Malawi. Both the T<sup>2</sup>Centre in Tanzania and that of Malawi subjected their not being sustainable to the lack of adequate funds for its operations and lack of legal instrument for the establishment. May be there is need to undertake further research into the which is the best practice in terms of administering these Centres. The funding seems to be an issue. It also recommended that the funding be looked into if we want the Centres to perform and become sustainable.

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