Seminar to Update the Uganda Government, National Roads Authority and other stakeholders on the outputs of the Africa Community Access Programme

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Report summary

A large proportion of the Uganda road network is unpaved. With growing traffic levels there is need to consider sustainable low cost sealing technology. AFCAP management was invited by the Uganda Government to share AFCAP research findings on design standards for pavements and surfacings for low volume sealed roads. This was achieved through a one-day meeting held in Kampala on 19th March 2014 and hosted by the Ministry of Works and Transport. The objective of the seminar was to share key findings of AFCAP research with road sector agencies and other stakeholders in Uganda.

Acknowledgements

We would like to acknowledge the contribution of Dr Sion Haworth, Technical Assistant to the Uganda MOWT, and Lydia Babinaga, Manager of Crown Agents Uganda, to the successful organisation of the seminar

This project was funded by the Africa Community Access Programme (AFCAP) which promotes safe and sustainable access to markets, healthcare, education, employment and social and political networks for rural communities in Africa.

Launched in June 2008 and managed by Crown Agents, the six year-long, UK government (DFID) funded project, supports research and knowledge sharing between participating countries to enhance the uptake of low cost, proven solutions for rural access that maximise the use of local resources.

The programme is currently active in Ethiopia, Kenya, Ghana, Malawi, Mozambique, Tanzania, Zambia, South Africa, Democratic Republic of Congo and South Sudan and is developing relationships with a number of other countries and regional organisations across Africa.

This material has been funded by UKaid from the Department for International Development, however the views expressed do not necessarily reflect the department's or the managing agent's official policies.

For further information visit https://www.afcap.org

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List of Abbreviations

AFCAP	Africa Community Access Programme
DFID	Department for International Development
LVR	Low Volume Road
LVSR	Low Volume Sealed Road
MOWT	Ministry of Works and Transport
UNRA	Uganda National Roads Authority

It should be noted that the BSI Symbol and UKAS Accreditation mark signify that Crown Agents operate a documented Quality Management System registered with the British Standards Institution to the international quality standard BS EN ISO 9001:2008. The provision of consultancy services in revenue enhancement and expenditure and debt management including: customs, taxation and trade, human institutional and organisational development, engineering, procurement management advice and reform, health logistics and procurement services. The management of third party quality assurance and inspection services related to the supply of manufactured and processed products. International freight forwarding services utilising in house sub-contract warehousing. Verification of service as follows: Air Import – Clearance UK airport; Exports – Airport of departure; Sea Imports – Clearance UK port; Sea Exports – Port of loading.

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1. Background

The Africa Community Access Programme (AFCAP) is a DFID (UK) funded research initiative for the rural transport sector in Africa. The programme is based around a portfolio of research, demonstration, advisory and training projects, which identify and support the uptake of low cost, proven solutions for rural access that maximise the use of local resources. The outputs from these projects are feeding directly into regional and national rural transport policies and strategies for poverty reduction. AFCAP (Phase 1) started in June 2008 and will close in June 2014.

Seven countries in Africa are participating in AFCAP1 under formal agreements made between the government and Crown Agents. These are Mozambique, Ethiopia, Malawi, Tanzania, Kenya, South Sudan and DRC. Additional countries are benefiting through transport services research projects and training events, and participation in regional projects, particularly in SADC. AFCAP1 is expected to be closely followed by AFCAP2, a new six year research programme covering a larger number of countries.

The management of AFCAP and AFCAP researchers have a responsibility to disseminate the findings of AFCAP research as widely as possible in Africa. AFCAP therefore accepted an invitation from the Uganda Government to share AFCAP research findings through a dissemination seminar in Kampala. A large proportion of the Uganda road network is unpaved and with the growing traffic levels, there is need to consider sustainable low cost methods for constructing sealed roads. Currently regravelling is the main treatment option for earth roads, but with gravel sources being depleted, the government wants to consider other options that are technically robust and economically viable. AFCAP has been instrumental in supporting the implementation of such technologies in other countries in Africa.

2. Seminar Objective

The objective of the seminar was to share key findings of AFCAP research on low volume sealed roads technology with road sector agencies and other stakeholders in Uganda. This was achieved through a one-day meeting held in Kampala on 19th March 2014 and hosted by the Ministry of Works and Transport.

3. Attendance

The seminar was attended by 50 practitioners, 16 percent of who were women, representing central and local government, the private sector, civil society organisations and development partners in Uganda. The list of participants is included in Annex A of this report.

4. Seminar Programme

The seminar programme is included in Annex B. The seminar was opened by Eng Robert Rwanga, Acting Commissioner for Roads and Bridges in the MOWT. The opening address was followed by introductory remarks made by Eng Benjamin Olobo, Technical Services Manager of the Uganda National Roads Authority (UNRA), on behalf of the UNRA Executive Director. The text of the MOWT and UNRA presentations are included in Annex C and Annex D respectively. The technical presentations can be found on the AFCAP web site www.afcap.org.

5. Summary of Discussions

The key issues arising from the technical presentations and during the seminar discussion periods were summarised by the facilitator. Agreement was reached on these issues during the final session prior to closure of the meeting. The key issues arising were:

1. Rural roads and rural transport services must provide for the needs of all road users: community needs are part of the "road environment".

2. The cross cutting issues pertaining to HIV, environment, occupational health and safety, elderly and disabled, and gender, i.e. the way a programme will impact on men and women, must be taken into consideration in the provision of rural roads and transport services.

3. Practitioners should improve the "marketing" of the Low Volume Sealed Roads design concept by not using negative terms such as "marginal materials" and "reduced standards"; the LVSR concept can be promoted through life cycle costing comparisons with conventional design approaches.

4. Significant improvements can be made to naturally occurring road construction materials through simple and innovative measures (e.g. blending different sand and clay).

5. More research is needed to define the limits of performance of naturally occurring materials; some materials perform much better in service than is predicted by conventional specifications.

6. Every country should have experimental road sections in their different climatic and geophysical zones; there experimental sections should be routinely monitored under a structured research programme.

7. The critical requirements for establishing transport research centres are:
    - Sustainable funding from the government
    - Diversity of research skills and staff retention in the research centre
    - Technical credibility of the research outputs (for example through publishing research papers in international journals.

8. District finances in Uganda (and other countries) are not adequate for the implementation of even LVSR design standards. Therefore there is a need for:
    - More research on cost effective solutions
    - More equitable allocation of resources across the road network.

9. The DCP design approach allows engineers to optimise the design of the road along its length thus contributing to reduced costs.

10. Cold Mix Asphalt is a labour-friendly option for the construction of a high quality seal on low volume roads.

11. Greater understanding is needed on the impact of climate change on rural accessibility; measures need to be developed to strengthen the resilience of communities.

12. The second phase of AFCAP will commence in mid-2014 with a duration of 6 years. It will include a sister programme in south Asia called ASCAP (Asia Community Access Programme). It is expected that twelve counties will be chosen as core participating countries in AFCAP 2. For Uganda to be considered as one of these 12 countries it will need to show a strong commitment to research and knowledge management for the rural transport sector.

Annex A: Attendance List

NAME	SEX	POSITION	ORGANISATION	EMAIL
CENTRAL GOVERNMENT				
Eng. Robert Rwanga	M	Ag Engineer in Charge	Ministry of Works and Transport	rwangarobert@gmail.com
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Annex B: Seminar Programme

Time	Subject	Presenter
09:00	Introduction by Facilitator	Eng Rob Geddes (AFCAP Technical Services Manager)
09:00 - 09:10	Welcome Address	Eng Robert Rwanga (Acting Commissioner Roads and Bridges, MOWT)
09:10 - 09:30	Developments in LVSRs in Uganda	Executive Director UNRA
09:30 - 09:50	Overview of AFCAP	Eng Nkululeko Leta (AFCAP Technical Manager)
09:50 - 10:15	Innovations in the design of Low Volume Sealed Roads including findings of AFCAP research on laterites and sand	Eng Mike Pinard (AFCAP Consultant)
10:15 - 10:25	Discussion	
10:25 - 10:50	Transport Services for Rural Communities in Africa	Nite Tanzarn (AFCAP Consultant and Steering Group Member)
10:50 - 11:00	Discussion	
11:00 - 11:20	Tea/Coffee	
11:20 - 11:50	Key Outcomes of Research on Low Volume Sealed Roads in Ethiopia	Eng Alemayehu Ayele (Director of Research Ethiopia Roads Authority)
11:50 - 12:10	Discussion	
12:10 - 12:40	Key Outcomes of Research on Low Volume Sealed Roads in Mozambique	Eng Kenneth Mukura (AFCAP Consultant – TRL)
12:40 - 13:00	Discussion	
13:00 - 13:40	Lunch	
13:40 - 13:55	Impact of Climate Change on Rural Accessibility	Eng Robert Kagaba Kakiiza (PhD Student University of Birmingham)
13:55 - 14:00	Discussion	
14:00 - 14:20	The DCP Design Method	Eng Mike Pinard
14:20 - 14:30	Discussion	
14:30 - 15:00	Cold Mix Asphalt, DCP design and other innovations from Kenya Roads 2000	Eng Esther Amimo (Materials and Research Department, Ministry of Roads, Kenya)
15:00 - 15:20	Discussion	
15:20 - 16:00	Summary, Resolutions and Way Forward	Eng Rob Geddes (AFCAP Technical Services Manager)
16:00	Close of Meeting	MOWT

Annex C: Opening Remarks of Eng. Robert Rwanga, Acting Commissioner, Roads and Bridges, Ministry of Works and Transport

Ladies and Gentlemen, you are all very welcome to today's workshop on the experiences of low cost seals on low traffic volume roads in Africa. Today's attendees are drawn from across the spectrum of interests in the subject matter. The Ministry of Works and Transport is well represented here this morning, as is the Uganda National Roads Authority, from whom we shall hear shortly. Also participating are representatives of road design and supervision consultants, and a large number of contracts who are showing interest in this engineering innovation. We also have representatives of development partners, as well as academics and civil society.

We are very grateful to AFCAP for facilitating this workshop, and putting together the programme of speakers. There is a wealth of experience on hand today from which we will able to learn. I also hope that our Ugandan participants will be able to contribute constructively to the discussions, as this is a very important initiative which the Ministry wants to take forward.

Indeed, the Ministry is already investigating technologies for low volume roads, and I would just like to highlight some of these.

a) Under the Ministry, the Mount. Elgon Labour-Based Training Centre (MELTC) developed Specifications and Training Modules for Low Cost Seals of roads using labour-based technology in 2011.

b) A review of LCS technology options on Low Volume Roads (LVR) in Uganda was conducted by the Ministry in January 2013 to inform the policy and strategy for adoption of Low Cost Seal options. The study observed, among others, that there were a number of important links in the pathway from research to implementation which were critical to the attainment of sustainable Low Cost Seal implementation that still need to be addressed including the production of a Manual on Materials and Pavement Design for low volume sealed roads.

c) MELTC with support from CrossRoads Programme is carrying out practical field training of small scale labour-based contractors in surfacing of Low Volume Roads using Low Cost Seal options.

d) CrossRoads Programme is also implementing a number of research projects aimed at improving performance of unsealed roads using Enzymes/Polymers, rice husks, volcanic ash, termite saliva and Vetiver Grass Technology for protection of road embankments.

I think that these developments highlight the Ministry's commitment to taking low volume seals to a serious level of implementation in the near future. Already we are development a programme with the European Union for low volume seals in Northern Uganda specifically designed to both reduce maintenance costs, and to improve access for farmers to get produce to markets.

As a result I would like to see this Workshop as the key starting point for the next steps required in our implementation programme. I hope that the results of trials elsewhere in Africa can be applied in Uganda, and I look forward to hearing of the experiences elsewhere.

With these words, I declare this workshop open, and urge you all to actively participate in this important subject.

Annex D: Remarks of Eng. Ben Kimeze Ssebbuga, Acting Executive Director, Uganda National Roads Authority

Dear Participants, may I also welcome you to this important workshop. I would also like to thank our parent Ministry for hosting the workshop, and thank AFCAP for all the facilitation including the very impressive range of speakers, many of whom have come from outside Uganda to be with us today. You are all most welcome.

My Authority, the Uganda National Roads Authority, known as UNRA, is responsible for the development and maintenance of over 20,000 km of roads. Of these less than 4,000 km are paved, which is less than 20 percent of the network. Most of the remaining 16,000 km are gravel roads, although some are earth. If you consider that between 12 and about 25 mm of the gravel thickness is lost from gravel roads annually under environmental and traffic actions then I calculate that about 1to 2 million cubic metres or between 2 and 4 million tonnes of gravel needs to be replaced annually to maintain the status quo.

In addition to the gravel loss, unsealed roads deteriorate significantly more rapidly than sealed roads and require constant maintenance, which is both costly and leads to unsafe traffic conditions on busy roads where the traffic interacts with graders and labour

Add to that the fact we are running out of cheap sources of gravel in Uganda, then you can see why we are so interested in the potential of low volume seal roads.

Of even greater significance, however, is the fact that unsealed roads become impassable during periods of high rainfall, and this is something that Uganda is experiencing with greater frequency and intensity. When roads becomes impassable, this can have a profound effect on the communities involved with loss of jobs, deterioration of crops and products that cannot be delivered and problems with access to schools and medical facilities.

The economic, social and environmental benefits of sealing many of our unsealed roads is very obvious. It is not possible or even suggested that all unsealed roads be sealed. However, there are many thousands of kilometres of rural access, and urban that could be justifiably upgraded on the basis of these benefits.

Sealing of roads can have direct economic, social and environmental benefits, providing solutions to some of the problems I have identified. These include, among other benefits, improved access and safety of road users, environmental sustainability, reduced road maintenance costs and sustainable creation of employment through small contractor maintenance contracts.

In order to improve the economic benefits of upgrading unsealed roads, the construction, maintenance and rehabilitation costs of the proposed pavement structure must be minimised.

Conventional pavement designs are generally directed at high level of service, minimal maintenance structures requiring numerous layers of selected materials. Significant reductions in pavement cost for low volume roads can be effected by reducing the number of pavement layers and/or thicknesses, by using local materials and by using lower cost, more appropriate surfacing options. Implementation of such measures, however, does not necessarily mean an increased risk of failure. They do require a greater degree of pavement engineering knowledge, experience and judgement and the careful application of fundamental pavement and material behaviour principles. Costly operations (e.g. stabilization and the use of chip seals) can be substituted with less expensive alternatives, such as improved drainage and higher degrees of compaction.

UNRA has already constructed a section of the Matuga – Semuto – Kapeeka road using innovative technologies in 2009 and performance monitoring is on-going. Further, UNRA carried out a field trial on use of Landlock technology in 2010. We also commissioned a study in 2013 to investigate the use of new innovative technology / proprietary stabilizing agents (chemical and enzymes) to treat locally available materials for applications on selected low volume roads.

The visual appearance of the road can have significant implications in the eyes of politicians, who like to be seen to be providing high quality pavements and not apparently low-cost solutions. This can be particularly important with seals such as Otta and sand seals, where although the final product is often indistinguishable by the untrained eye from asphalt, has a "settling-in period" during which the surface looks like a gravel road. The perceived increased risk of failure can also have serious political connotations. Politicians will not accept a structure that is considered likely to fail prematurely or require maintenance (e.g. the second application of a sand seal) shortly after construction.

Our primary reason for wanting to move more into low volume seal technology is to reduce maintenance costs on unpaved roads. Like most African countries our maintenance budget is way below our needs. Inevitably the low traffic roads tend to be at the bottom of the priorities, and costs of fully maintaining these roads are very high. The maintenance costs of sealed roads are much lower and should allow our limited maintenance budget to be used more effectively.

So you will see that UNRA has a big interest in low volume seals, and that is why a large number of my engineers are attending today. We all want to learn from experiences elsewhere, and I hope we will be able to use this technology on an increasing scale in Uganda.

Thank you for your attention.

Annex E: Technical Presentations

The technical presentations can be found on the AFCAP web site www.afcap.org or at http://r4d.dfid.gov.uk/Output/195849/Default.aspx

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