

Climate Adaptation: Risk Management and Resilience Optimisation for Vulnerable Road Access in Africa

AfCAP Project GEN2014C

Briefing Note No 6: Climate Resilience: Handbook and Guidelines trialling
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Context

Africa is experiencing changes to the Continent's climate, causing widespread damage to road infrastructure and associated assets. As a consequence, governments are facing a growing backlog of damage to infrastructure assets caused by the effects of a changing climate and are often unable to deal with those because of financial and/or technical constraints.

Rural accessibility is being compromised in a number of countries for increasing proportions of the year, creating both direct and indirect adverse effects on livelihoods and associated socio-economic development.

AfCAP commissioned a three-year project in 2016 to identify, characterise and demonstrate appropriate engineering and non-engineering adaptation procedures that can be implemented to strengthen long-term resilience of rural access. At the same time, the project also focuses on capacity building and knowledge exchange by meaningfully engaging with relevant road and transport Ministries, Departments and Agencies/Authorities in a knowledge dissemination and capacity building programme.

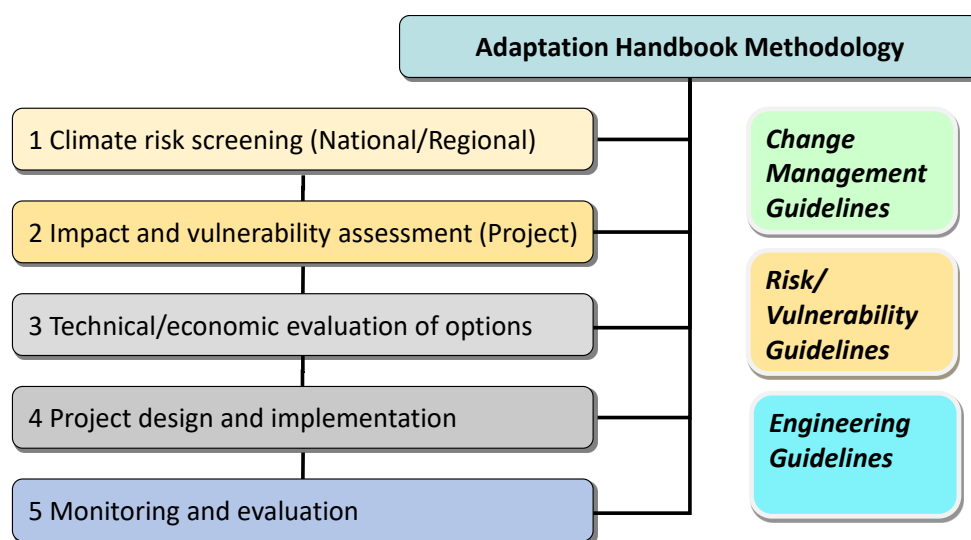
Draft Handbook and Guidelines

A draft Handbook has been prepared to provide guidance on how to address climate adaptation methodologically. This Handbook offers direction on how to deal with a wide array of climatic, geomorphologic and hydrological circumstances, based on experiences gained in Ethiopia, Ghana and Mozambique. These three countries represent nearly the full range of climatic systems in Africa. Mozambique is subject to flooding and extreme events, including tropical cyclones. Both Mozambique and Ghana are on the receiving end of water flowing out of major international river basins, and most of their economic activity and population are concentrated along the coast and in low-lying estuaries and deltas, while Ethiopia has both mountainous and fairly flat areas subjected to a wide diversity of climate effects including floods and droughts.

The Handbook has been produced to provide relevant information on engineering and non-engineering adaptive procedures for new and existing rural road access, along with instructions on an appropriate methodology to address climate threats and asset vulnerability and to increase resilience for the foreseeable future. Although produced for low volume access roads, the principles also apply to high volume roads, although there will be differing priorities and design parameters.

While the Handbook sets out the overall approach, typified by the five stages outlined in the figure below, it is supported by the following three technical Guidelines providing details on both non-engineering and engineering adaptation approaches:

- *Change Management Guidelines*, focusing on the embedment of climate change in policies, strategies and plans, as well as in decision support systems such as the Road Asset Management System;
- *Climate Threats and Vulnerability Assessment Guidelines*, focusing on national as well as project level risk and vulnerability assessments , and
- *Engineering Adaptation Guidelines*, guiding the users through the engineering options available to render rural access roads more climate resilient in order to support and inform decision making and prioritisation when adapting existing and new road infrastructure to the impacts of climate variability and change..



Trialling of the Climate Adaptation Handbook and Guidelines

The Handbook as well as the Guidelines are being trialled in Ethiopia, Ghana and Mozambique by using previously identified climate adaptation demonstration sections for both hands-on training and validation. The roads selected in the three countries for trialling the Handbook procedures are:

ETHIOPIA: The Tullo Bollo to Kela Road, located south of Addis Ababa. The dominant problems identified were:

1. Shear failure due to excessive subgrade moisture
2. Erosion of wearing course and side-drains on grades
3. Slope instability
4. Erosion of embankments near structures
5. Collapse of structures



<p>GHANA: The Tampion to Tidjo Road, located north of Tamale. The dominant problems identified were:</p> <ol style="list-style-type: none"> 1. Erosion of side drains and road surface 2. Impassability due to poor materials and local ponding of water 3. Poor road condition due to unsuitable wearing course gravel 4. Flooding of the road where no drainage or insufficient structures exist 5. Erosion around existing drainage structures 	
<p>MOZAMBIQUE: The Mohambe to Maqueze road, located in the Gaza Province. The dominant problems identified were:</p> <ol style="list-style-type: none"> 1. Erosion and undercutting of concrete fords 2. Damage to road surfaces 3. Damage to culverts and erosion protection 4. Ineffective drainage of road surfaces 	

While successful training workshops have already been held in Chibuto, Mozambique (September 2017) and Addis Ababa, Ethiopia (December 2017) on Stages 2 to 4 of the proposed adaptation methodology (as per the figure above), the final workshop will be held in February 2018 in Tamale, Ghana.

The Workshops serve the following two main purposes:

- i. For the AfCAP Project Team to induct engineers on the proposed climate adaptation methodology as outlined in the Handbook and associated Guidelines; and
- ii. For the workshop delegates to identify potential shortcomings of, and recommendations for improvements to the methodology (and supporting documentation) so that the Handbook and Guidelines will eventually add significant value to not only the three countries that participated in the workshops, but also to all sub-Saharan African countries.

The format of the Workshop was as follows:

- i. **Day 1:** Overview of the Handbook and associated Guidelines, predominantly focussing on Stages 2 to 4 of the Adaptation Methodology as described in the *Climate Adaptation Handbook*, these being:
 - a. Stage 2: Impact and vulnerability assessment at project level
 - b. Stage 3: Technical and economic evaluation of options
 - c. Stage 4: Project design and implementation

The purpose for only focussing on Stages 2 to 4 was to provide sufficient guidance to the Workshop delegates to enable them to apply the concepts in practice on Day 2 of the Workshop.

- ii. **Day 2:** Hands-on training of the Workshop delegates on identifying potential climate-related threats and vulnerable assets, and potential adaptation measures on the identified demonstration sections.

The feedback obtained from the workshop delegates will be used to upgrade the Handbook and Guidelines, which will subsequently be used in train-the-trainer programmes that will be initiated in the three countries.

Disclaimer:

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