Linking Farmers to Markets – Experience from Malawi

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Presentation Outline

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Location of Malawi

Introduction

- Malawi is a land linked country located in Southern Africa with a population of about 17 million people spread over an area of 118,484 square kilometers
- It is an agro-based economy with approx. 85% of the population living in rural areas that thrives on rain fed agriculture as the main economic activity.
- Limited access to markets continues to be a major constraint for farmers to realise their full potential
- Many agricultural areas remain inaccessible or are difficult to access due to poor road conditions especially during the rainy season

Introduction cont…

- Agriculture remains mainstay of the economy and accounts for 30% of GDP.
- The Agriculture sector is the main contributor to the national and household food security and nutrition. The sector comprises of the smallholder (contributing more than 70 percent of agricultural GDP) and the estate sub-sectors.
- The smallholder farmers mostly grow food crops (including maize, rice, sorghum, bananas, cassava, sweet potatoes, Irish potatoes, and legumes), and some cash crops such as tea, tobacco, sugarcane and coffee
- Provision of safe and reliable transport infrastructure contributes to economic and social benefits resulting in improved accessibility to markets, employment and enhanced investments

Introduction cont…

- The 2004 Road Reclassification Study carried out by the Malawi Roads Authority (RA), identified a network of close to 25,000 km of public roads in Malawi, of which 80 percent (20,000 Km) were unpaved.
- The network of district roads is generally poorly developed and, in some instances, impassable during the rains.
- The current state of district roads is attributed to a combination of factors, including unclear institutional responsibilities for roads management and insufficient and ad-hoc funding for rehabilitation and maintenance
- Currently RA implements an annual programme of rehabilitation and maintenance on selected district roads financed through the fuel levy.

Implementation of Agriculture Sector Wide Approach Support Project (ASWAP SP)

- Under the Comprehensive Africa Agriculture Development Programme (CAADP) process, Government of Malawi (GoM) developed and adopted the ASWAp (2010-2016)
- A Multi Donor Trust Fund (MDTF) administered by the WB with financing from EU, Irish Aid, Flanders, USAID and Norway was established in 2013 to support ASWAP program.
- The primary objectives of the MDTF were improving effectiveness of investments aimed at food security and sustainable agricultural growth and strengthening the natural resource base
- ASWAP SP I was implemented from 2012 to 2016 where selected roads in 10 districts were rehabilitated
- The ASWAp SP II is a follow up to the ASWAp SP I Project which was implemented between 2018 – 2021 now extended to June 2023

Implementation of ASWAP SP I

- ASWAP SP I was Implemented in 10 selected districts of Malawi from 2012 to 2016
- Two interventions were implemented under Road Component
  - Rehabilitation of rural roads through spot improvements
  - Upgrading to Low Volume using Cold mix Asphalt surfacing
- Project Development Objective - Improved market access through the rehabilitated and upgraded feeder roads.

Implementation of ASWAP SP I cont.

- **Achievement of the Project Development Objectives (PDO)**
- There was a significant change in motorized and non-motorized traffic volumes on the rehabilitated roads. A total of 469km of selected rural roads were improved including three bridges and other drainage structures
- Project beneficiaries - a total of 3 million people benefited from the project through their participation in road works and other agricultural programs of which 42% were women.
- Trainings were conducted in Principles of Low Volume Seal, Construction materials, Drainage Systems Design, Gabion Design and Installation

Implementation of ASWAP SP II

- ASWAP SP II was a follow up to ASWAP SP I program and was implemented from 2018 to 2021 (extended to June 2023) in complementarity with the Rural Roads Improvement Program (RRImp) funded by EU through the National Authorizing Office in the Ministry of Finance.
- The project was implemented through District Councils who were the Clients as a way of building capacity to the Councils.
- Road selection and prioritization was based on agricultural productivity (actual and potential), economic aspects and connectivity
- The total project cost was US$55 million with US$30.64million allocated to the Roads Component. Allocation for Road Component included US$ 3.27 million for Implementation Support to District Councils.

Implementation of ASWAP SP II

Project Development Objective (PDO):

To improve productivity and market access of selected commodities for small holder farmers in targeted districts of Malawi.

- The key outcomes include:
  - Increased volume of production of selected agricultural commodities;
  - Number of agricultural marketing centers connected by rehabilitated roads;
  - Farmers reached with agricultural assets / services of which 50% are female farmers

Implementation of ASWAP SP II cont..

- Beneficiaries of the project include
  - smallholder farmers and local communities who benefitted from improved agricultural interventions and jobs created through road rehabilitation
  - road users from improved road infrastructure
- Support under the road component was provided in form of two main areas of interventions:
  - Improvement of the 1200km of unpaved rural roads through labor-intensive rehabilitation and upgrading works using Low Volume Sealing Concept in 12 selected districts
  - Implementation support to District Councils to facilitate proper monitoring of works

Implementation of ASWAP SP II cont..

- A total of 926km were rehabilitated through labour based method and 76km were upgraded using Low Volume Seal concept including small bridges and culverts
- Total Cost for the rehabilitation works including drainage structures is USD 22,827,843.97. Cost per km for upgrading works is USD 215,658.70
- A total of 94 out of the planned 100 market centres were connected
- District Council staff were trained in Project Management, Procurement and Road Prioritization

Locations of Project Districts for ASWAP SP II

Impact Study Report Findings

- The Impact Study Report for the project has highlighted the following impacts:
  - Improved accessibility of the roads
  - Availability of motorised transport services to and from market centres
  - Reduction in travel time to and from the main markets especially for farmers
  - Improved livelihoods for those that worked on the road projects

ASWAP SP II Project Outcomes

- Rehabilitation – 926km of rural roads were rehabilitated using labour intensive method.
- Upgrading – 76.2 km of rural roads were upgraded to bitumen standard using LVS concept
- Market Centres – 94 market Centres were connected out of the targeted 100
- Beneficiaries – Over 15,000 people were employed during road rehabilitation out of which 43% were women.
- Training – District Council staff were trained in Procurement, Project management, Financial Management and Road Prioritization

Challenges

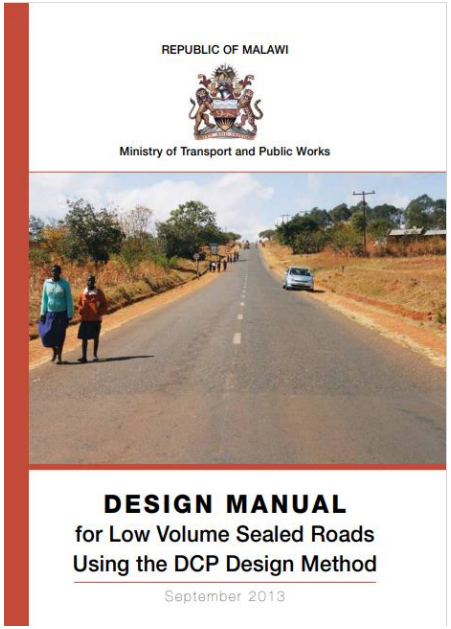
- Lack of capacity – Some local contractors lacked capacity to handle more than two rehabilitation contracts
- Covid 19 Pandemic affected implementation of the works
- Budget limitations
  - spot gravelling done on some of the rehabilitated roads
  - 6 to 8 km upgrading done per road
  - selective lining of side drains

Low Volume Seal Concept

- **Background**
- Most unpaved roads in Malawi carry relatively low volumes of traffic i.e. less than 200 vehicles per day
- Some of these roads with such low traffic were surfaced with thin bituminous surfacing and performed beyond expectation and lasted over 20 years
- However, the construction was done without any approved manuals for geometric or pavement design of geometry or pavement.

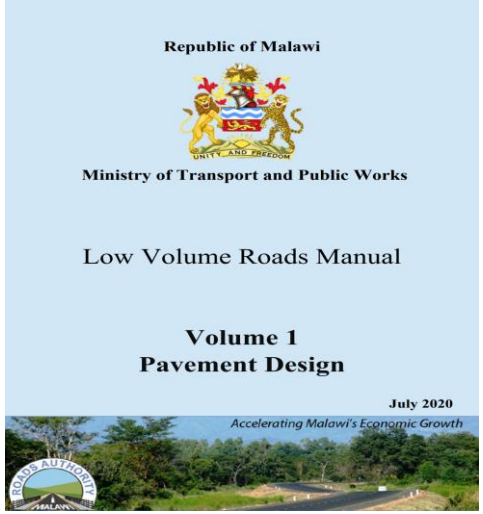
Low Volume Seal Concept cont..

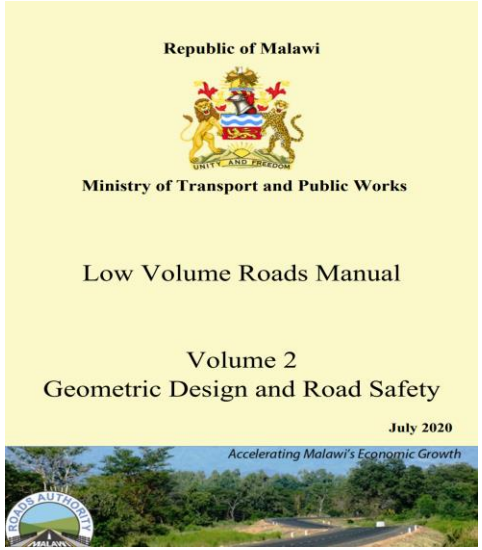
- In 2013, the Roads Authority of Malawi through assistance from the UK Govt under the Africa Community Access Partnership (AfCAP) developed a Design Manual for Low Volume Sealed roads using DCP design method
- The manual was among the first to be produced in Africa and was developed following a back analysis study and formulation of specifications for low volume roads also funded under the same programme
- The ASWAp-SP was used as a first formal pilot for the design manual.



Low Volume Seal Concept (Conti….)

- **Low Volume Definitions**
- 2013 LV Manual
  - “those roads that carry both less than 300 vehicles per day (vpd) and about 1 MESA”
- 2020 LV Manuals
  - For Pavement design: “those that have a base year average traffic (ADT) of up to 300 motorized, 4 wheeled vehicles including about 20 – 25 % commercial vehicles and a related traffic loading of up to 1 MESA over a design life of typically 10-15 years”
  - For Geometric design: “traffic at mid-life is required and this would exceed 300 motor vehicles per day”





Low Volume Seal Concept (Conti….)

- **Characteristics of Low Volume Roads**
  - Constructed from naturally occurring non-standards moisture sensitive materials
  - Pavement deterioration dictated by environmental factors particularly moisture with traffic loading having a lesser influence and drainage being of paramount importance
  - Alignment not fully engineered
  - Road Safety for urban and peri urban areas
  - Variable travelling speed not exceed 60 – 80 km per hour

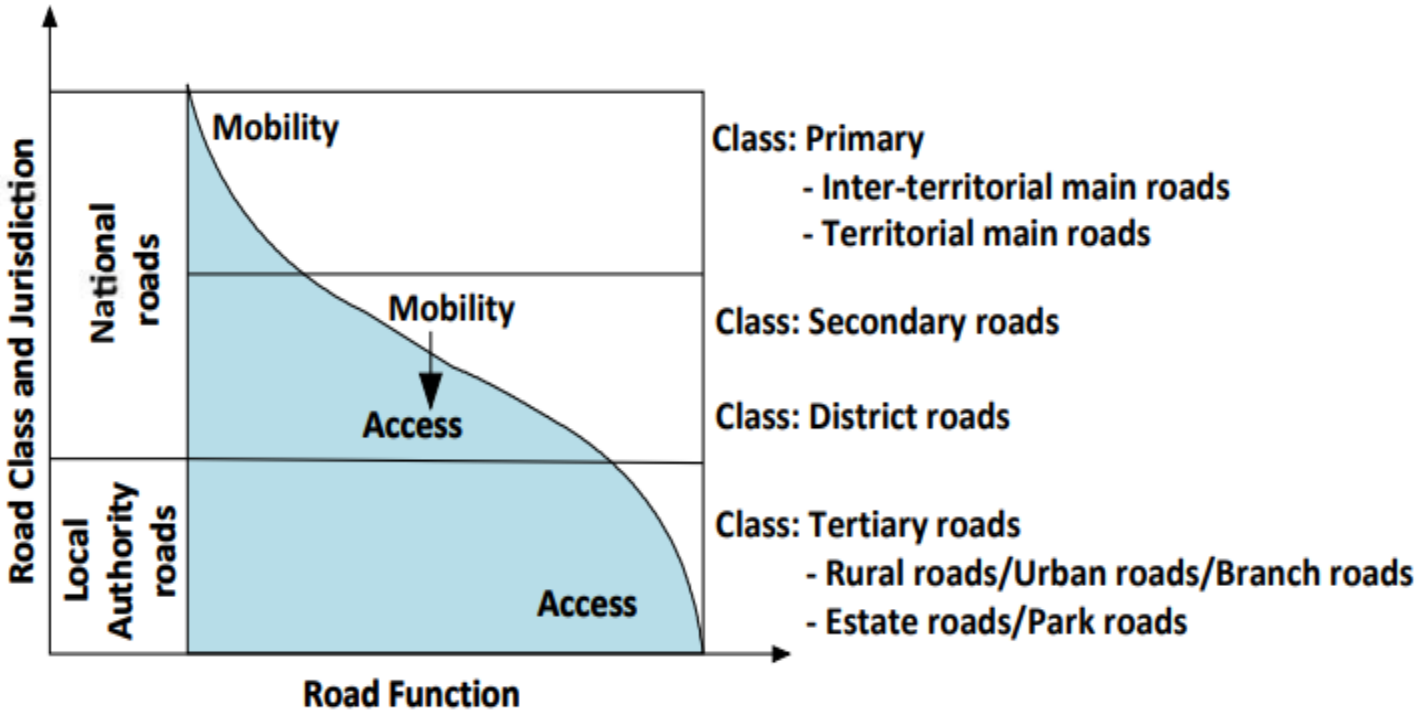
Low Volume Seal Concept (Conti….)

Table 2-1: Road classification system

Basic Function	Class No.	Level of Service	Road Class	Road Definition
Mobility	1	*Very high:* Provides the highest level of service at the greatest speed for the longest uninterrupted distance, with minimal degree of access control. To be designed to the highest standards.	International Arterial	Roads that link international centres. Connection between the national road system and those of neighbouring countries.
	2		National Arterial	Roads that link cities, towns and centres of economic importance with each other and with major border posts or link to international roads.
	3	*High:* Provides a less highly developed level of service at relatively high speed for shorter distances by collecting traffic from main centers of population and connecting them with pri-mary national roads.	Secondary-Arterial	Roads that link major towns to each other or link to the international road network.
			Secondary-collector	Roads that link towns, villages, agricultural, commercial, recreational or major tourist areas to each other or link to the national road network.
Access	4	*Moderate: P*rovides a moderate level of service at moderate speed	District	Roads that link district centres, villages, local centres of population and developed areas with each other or link to higher order roads of the road network.
	5	*Moderate-Low: P*rovides a relatively low level of service at moderate-low speed	Community	Roads that provide access to land adjacent to the collector network, or to villages or link to tertiary or higher order roads of the road network.
	6	N/A	Cycleway / Walkway	Paths or tracks that link communities or settlements with each other.

Low Volume Seal Concept (Conti….)

Relationship between road class and road function



Malawi Road Network

Road Class	Paved		Unpaved		Total	
	km	% Share	km	% share	km	% share
Main	2,774	59	583	5	3,357	22
Secondary	835	18	2,290	21	3,125	20
Tertiary	210	4	3,911	36	4,121	27
District	50	1	3,450	32	3,500	23
Urban	842	18	509	5	1,351	9
Total Network	**4,711**	**30%**	**10,740**	**70%**	**15,451**	**100**

Source: Roads Authority, Annual Report, 2020

DCP Design – Flow diagram

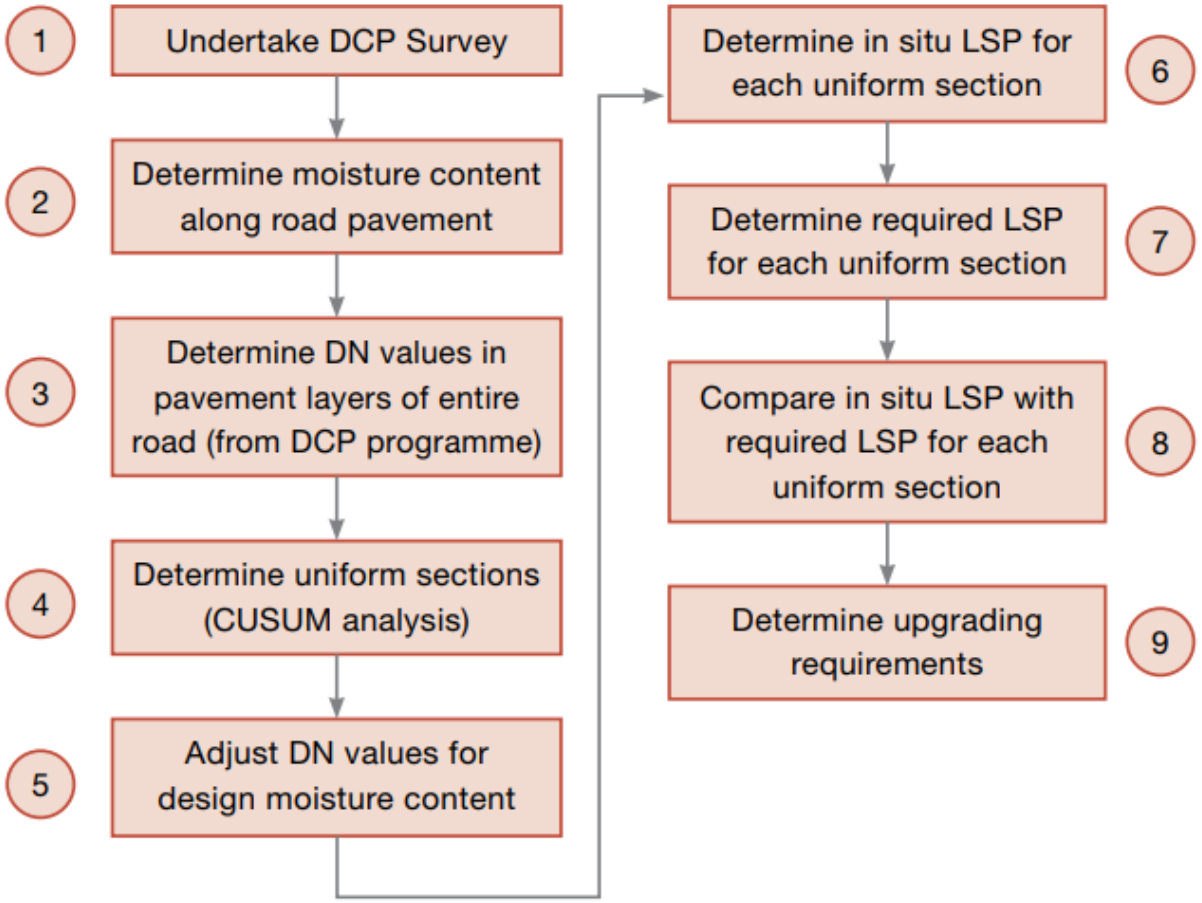


Table 1: Design Traffic Loading for Project Roads (ASWAp SP II)

Road Number	District	Name of Road	Length (km)	Estimated Traffic Loading (MESA)	Design Traffic Class (MESA)
1	Lilongwe	Mitundu – Kambanizithe (T366)	8.6	0.24	LE 0.3 (0.10–0.30)
2	Mchinji	Ludzi T/Off to Ludzi Trading Centre (D171)	6.45	0.67	LE 0.7 (0.30–0.70)
3	Ntchisi	Ng'ombe to Nyalavu (T340)	7	0.23	LE 0.3 (0.10–0.30)
4	Kasungu	Mphomwa to Kamtuwale (T324)	6	0.28	LE 0.3 (0.10–0.30)
5	Mzimba	Ehehleni – Chipata – Jenda Trading Centre (D63)	5.3	0.05	LE 0.1 (0.03–0.10)
6	Chitipa	Kapoka – Chendo (S100)	6	0.46	LE 0.7 (0.30–0.70)
7	Dedza	Dedza – Kasumbu (T374)	6	0.24	LE 0.3 (0.10–0.30)
8	Ntcheu	Chinyamula – Mphepozinayi (S134)	5.75	0.14	LE 0.3 (0.10–0.30)
9	Zomba	Mpotola School – Namadidi Market Road (S139)	6.7	0.5	LE 0.7 (0.30–0.70)
10	Phalombe	Phalombe – Mpata – Nkhulambe (T414)	5	0.03	LE 0.1 (0.03–0.10)
11	Mulanje	Savama – Mathambi (T422)	6.3	0.27	LE 0.3 (0.10–0.30)
12	Thyolo	Chiperoni – Khonjeni Railway Station (T420)	5.5	0.44	LE 0.7 (0.30–0.70)
			74.6		

DCP – DN Design Catalogue

Traffic Class E80 x 10^6	LE 0.01 0.003 - 0.010	LE 0.03 0.010 - 0.030	LE 0.1 0.030 - 0.100	LE 0.3 0.100 - 0.300	LE 0.7 0.300 - 0.700	LE 1.0 0.700 - 1.0
0- 150 mm Base ≥ 98% Mod. AASHTO	DN ≤ 8	DN ≤ 5.9	DN ≤ 4	DN ≤ 3.2	DN ≤ 2.6	DN ≤ 2.5
150-300 mm Subbase ≥ 95% Mod. AASHTO	DN ≤ 19	DN ≤ 14	DN ≤ 9	DN ≤ 6	DN ≤ 4.6	DN ≤ 4.0
300-450 mm subgrade ≥ 95% Mod. AASHTO	DN ≤ 33	DN ≤ 25	DN ≤ 19	DN ≤ 12	DN ≤ 8	DN ≤ 6
450-600 mm In situ material	DN ≤ 40	DN ≤ 33	DN ≤ 25	DN ≤ 19	DN ≤ 14	DN ≤ 13
600-800 mm In situ material	DN ≤ 50	DN ≤ 40	DN ≤ 39	DN ≤ 25	DN ≤ 24	DN ≤ 23
DSN 800 (blows)	≥ 39	≥ 52	≥ 73	≥ 100	≥ 128	≥ 143

Pavement structure – ASWAP II

- The adopted pavement structure for all the roads was 150mm base, 150mm sub base
- The surfacing type was Double Chip Seal

DOUBLE SURFACE DRESSING

1 Prime
2 Binder
3 Large Stone
4 Binder
5 Small Stone

Technical Audit Findings

A post construction technical audit was carried out on the project and the following successes were highlighted:

- District Councils gained practical experience in terms of management of road contracts
- Paving of road sections of the rural roads has uplifted communities. Accessibility of the roads has improved and the roads are now passable in all weather conditions.
- Reduction in vehicle operating costs due to improved road conditions

Technical Audit Findings cont.

The following shortcomings were also identified during the audit

- Design did not provide minimum crown height (h_{min}) to ensure adequate drainage
- Design introduced a ‘hybrid’ specification that included elements of the DCP – DN pavement design and conventional (CBR) design
- The recommended Double Chip Seal surfacing required high contractor expertise which was found lacking in the local contractors

Way forward for low volume design approach

- “Fit for Purpose” - The Malawi Roads Authority considers the low volume approach as the best approach in terms of upgrading rural roads to bitumen standard as it ensures that with the same financial resources more roads will be constructed since the cost per km for low volume approach roads is only a third of the conventional approach.
- Low Volume Road Design and Construction Trainings

The RA to conduct training in order to improve the delivery of the approach in future projects of such nature

Way forward for low volume design approach

- Long Term Pavement Performance. RA will continue to monitor the constructed roads using low volume design approach in order to establish appropriate, cost-effective standards and specifications for Low Volume Roads using performance-based data collected from existing trial/demonstration road sections.

ASWAp I Pictures

- Showing before and after conditions of some roads

Kalenge Bridge-Misuku (Chitipa)

Before

After

Parachute Battalion-Lifuwu (Salima)

Before

After

Ntcheu – Kasinje Road (Ntcheu)

Before

After

Mwanza – Kunenekude (Mwanza)

Before

After

ASWAp II Pictures

- Showing before and after conditions of some roads

Thyolo – Khonjeni Road

Before

After

Sayama – Mathambi Road in Mulanje

Before

After

Phalombe – Fortlister Road

Before

After

Mpasadzi Bridge in Kasungu

Before

After

- Thank you