



WORLD BANK GROUP



META
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Roads for Water



ROADS FOR WATER IN MOZAMBIQUE:

OPPORTUNITIES AND REALITIES

Roads in Mozambique

32,700 kilometer of roads

- 5000 km class 1
- 5000 km class 2
- 12,700 km class 3
- 10,000 unclassified (incl urban)

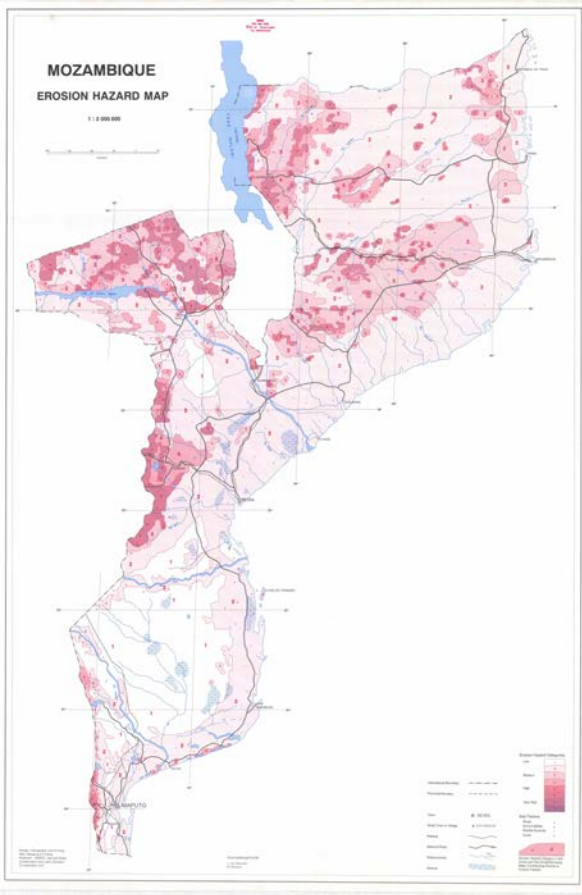
Only 24% of population within 2 km of all weather road

80% non-paved

Challenge of funding maintenance

Only (max) 56% of rural roads in good condition

Compounded by lack of appropriate building material (Red Sands)



Erosion

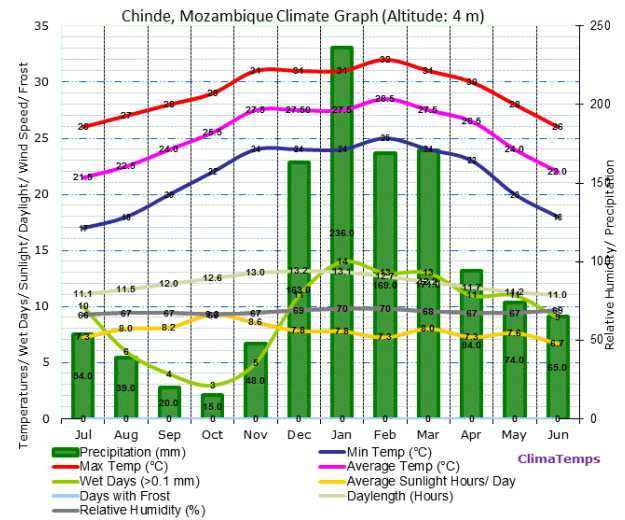
CHALLENGES



Floods

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Droughts

Climate change: Mozambique

36th most vulnerable country

142th in preparedness (out of 178 countries)

Temperature increase in past decades and expected to continue (1-4 degrees)

More flood peaks (25%)

More rain in heavy rainfall events (10%)

Less rain in central and south (-3.1%)

Rain onset delayed

Expected reduction in yields: maize (-25%); cassave (-2%), sorghum (-17%)

Roads for water in Mozambique: opportunities

1. Dealing with droughts:

- Converting/ using borrow pits
- Connect trenches to farm land
- Drifts as sand dams
- Water bars to control sedimentation and damage
- Other water harvesting and water spreading measures

2. Dealing with floods

- Better management of floods
 - Controlled overflows
- Management of flood plains
 - Active versus non active flood plains
 - Bed sills of crossdrainage structures
- Using floods for productive use
 - Roads as flood spreading weir

3. Dealing with erosion

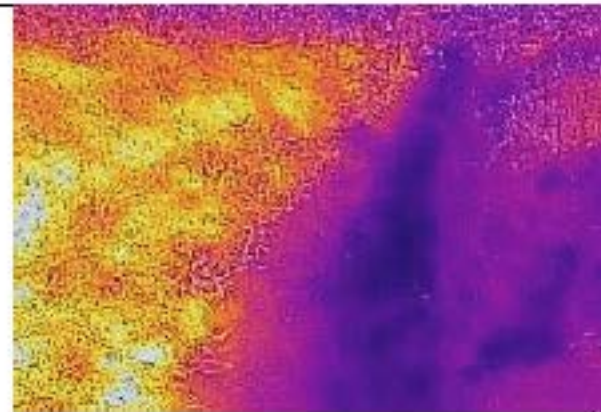
1. DEALING WITH DROUGHTS



1 a. Converting borrow pits



1 b. Connecting trenches to land



1c. Using series of (concrete) water bars on (soft) feeder roads to take water to the land

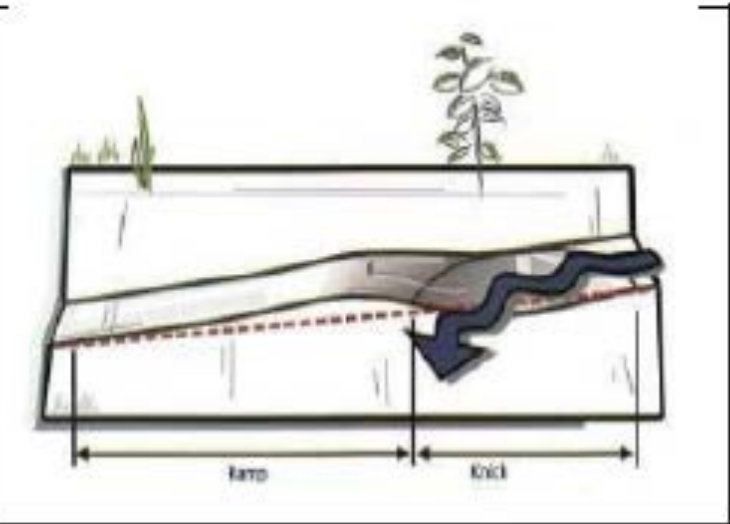
Reliable cross drain for low standard roads

Used to drain roads having grades between 3 and 15%

Function: collect surface runoff from the roadway and/or road ditch and direct the flow across and away from the roadway

Can feed local road waterharvesting and incentive local maintenance





1 d. Road drifts and crossings for water storage





1 e. Other harvesting water from road

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2. DEALING WITH FLOODS





2a. Roads for flood management

Example from Orissa, India



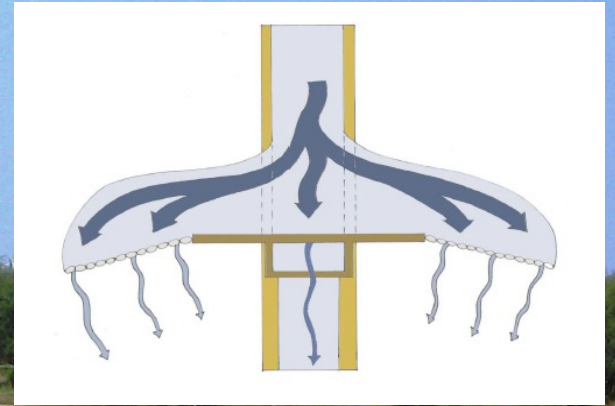


2b. Roads managing flood plains



2c. Harvesting flood water for productive use





Many things can be done
along each road

A decorative horizontal bar consisting of a red segment on the left and a blue segment on the right, positioned below the text.

Chowne - Mabalane



Transect = 62 Km



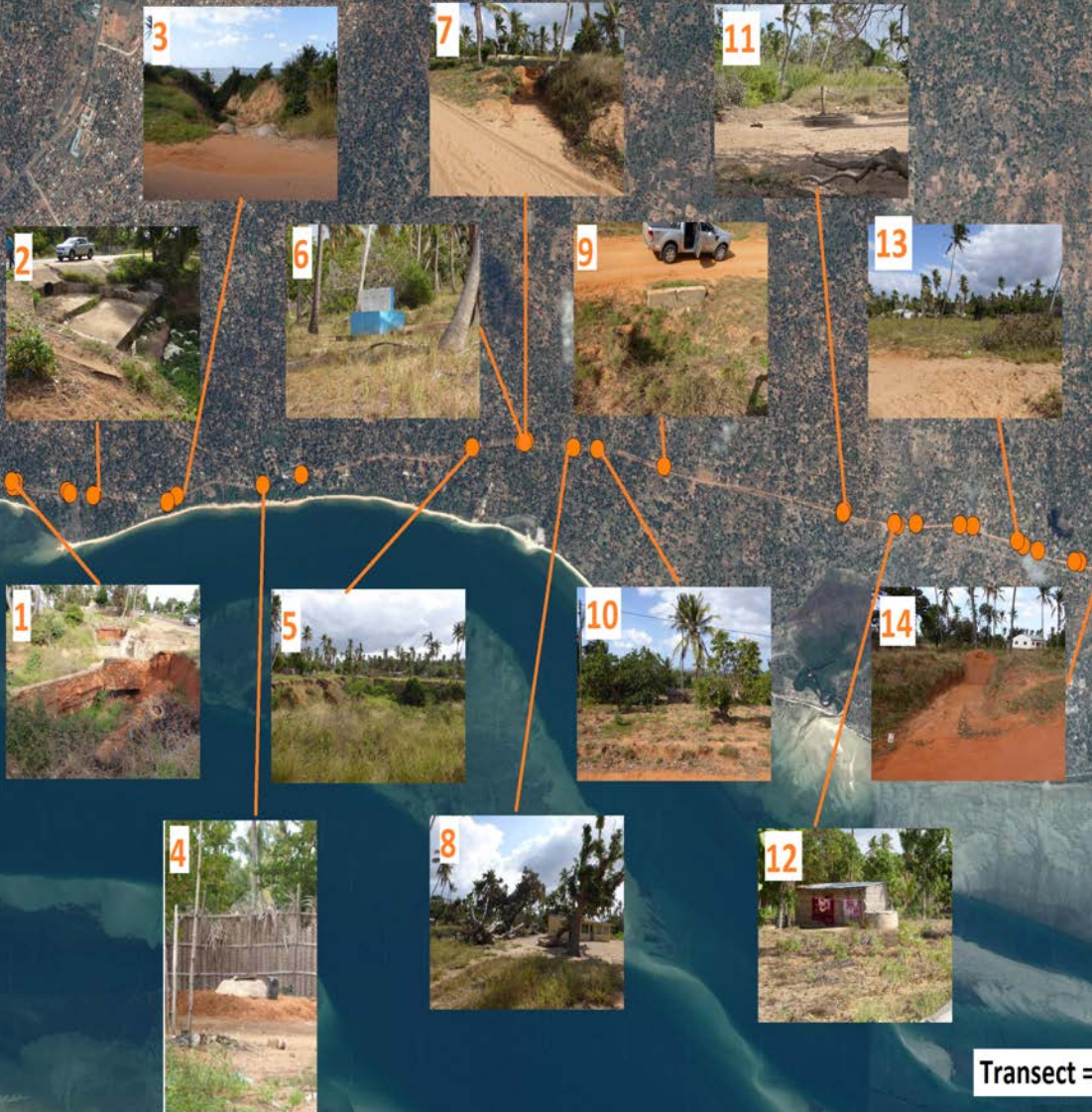
Legend

- 1 Road damage
- 2 Road washed away
- 3 Floodplains
- 4 Deep borrow pits
- 5 Water logging between road and railway
- 6 Filled borrow pit
- 7 Culvert pond
- 8 Culvert at lower level
- 9 Shallow borrow pit

Maxixe - Chiquoke

Legend

- 1 Culvert eroded
- 2 Culvert with gently drainage
- 3 Culvert creating gullies
- 4 Water storage
- 5 Borrow pits
- 6 Public water taps
- 7 Long trenches
- 8 Damage of ciclone
- 9 Silted Culverts
- 10 Flood plains
- 11 Water well recharge
- 12 Water harvesting
- 13 Flood plains
- 14 Short Tranches



Transect = 10 Km

What next



What is most promising?

How to take it forward?

How to use existing opportunities to make quick starts?

How to cooperate?