

It encompasses agronomic, vegetative, structural and management aspects to minimise land degradation within the road catchment and its environment using participatory methods. The purpose of the technology was to improve on the managent of water from the (J.G. Njuki)

Road runoff management - Nyeri (Kenya)

MRP - soil conservation pilot project

DESCRIPTION

management of runoff water on the road and its environment to reduce land degradation

It encompasses agronomic, vegetative, structural and management aspects to minimise land degradation within the road catchment and its environment using participatory methods. The purpose of the technology was to improve on the managent of water from the road so that it does not cause degradation. Establishment and maintenance of the technology was done by the local community bordering the roads.

LOCATION



Location: Central, Kenya

No. of Technology sites analysed:

Geo-reference of selected sites • 36.9483, -0.4051

Spread of the Technology: evenly spread over an area (approx. < 0.1 km2 (10 ha))

In a permanently protected area?:

Date of implementation: less than 10 years ago (recently)

Type of introduction

- through land users' innovation
 - as part of a traditional system (> 50 years) during experiments/ research
- through projects/ external interventions



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CLASSIFICATION OF THE TECHNOLOGY

Main purpose

- improve production
- reduce, prevent, restore land degradation
 - conserve ecosystem protect a watershed/ downstream areas – in combination with
- other Technologies
- preserve/ improve biodiversity
- reduce risk of disasters
- adapt to climate change/ extremes and its impacts
- mitigate climate change and its impacts
- create beneficial economic impact
- create beneficial social impact

Purpose related to land degradation

- prevent land degradation
- reduce land degradation
- restore/ rehabilitate severely degraded land adapt to land degradation not applicable

SLM group

• water diversion and drainage

Land use


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CroplandAnnual croppingNumber of growing seasons per year: 2

Settlements, infrastructure - Traffic: roads, railways

## Water supply

rainfed
mixed rainfed-irrigated
full irrigation

### Degradation addressed

![](_page_1_Picture_27.jpeg)

**soil erosion by water** - Wt: loss of topsoil/ surface erosion, Wg: gully erosion/ gullying, Wo: offsite degradation effects

**chemical soil deterioration** - Cn: fertility decline and reduced organic matter content (not caused by erosion)

#### SLM measures

![](_page_1_Picture_31.jpeg)

structural measures - S4: Level ditches, pits

## TECHNICAL DRAWING

**Technical specifications** 

Technical knowledge required for field staff / advisors: moderate

Main technical functions: control of dispersed runoff: impede / retard, control of concentrated runoff: retain / trap, control of concentrated runoff: impede / retard, control of concentrated runoff: drain / divert

Secondary technical functions: reduction of slope length, increase in organic matter, increase of infiltration

Grass species: napier grass

Slope (which determines the spacing indicated above): 0.00%

Construction material (stone): for scour checks in the waterway

Construction material (wood): small posts for scour checks

Construction material (other): grass, brush wood, live vegetative material

Lateral gradient along the structure: 8%

Vegetation is used for stabilisation of structures.

Change of land use type: exclusion of land under waterway

## ESTABLISHMENT AND MAINTENANCE: ACTIVITIES, INPUTS AND COSTS

#### Calculation of inputs and costs

#### • Costs are calculated:

- Currency used for cost calculation: Kenyan Shilling
- Exchange rate (to USD): 1 USD = 33.0 Kenyan Shilling •
- Average wage cost of hired labour per day: 0.96 •

#### Establishment activities

- 1. planting napier grass cuttings (Timing/ frequency: after first rains)
- 2. establish scour checks (Timing/ frequency: on set of rains)
- 3. excavation (Timing/ frequency: dry spell)
- 4. planting grass for stabilisation (Timing/ frequency: on set of rains)

#### Maintenance activities

- 1. contour ridging (Timing/ frequency: dry season / beginning of season)
- 2. weeding (Timing/ frequency: dry spell /once per season)
- 3. desilting channel (Timing/ frequency: dry season/each cropping season)
- 4. gapping the grass (Timing/ frequency: wet season/each cropping season)
- 5. slashing grass in channel (Timing/ frequency: wet season/each cropping season)

## NATURAL ENVIRONMENT

#### Average annual rainfall

![](_page_2_Figure_30.jpeg)

Agro-climatic zone

humid 1 sub-humid 1 semi-arid arid

Specifications on climate Thermal climate class: tropics

![](_page_2_Figure_34.jpeg)

![](_page_2_Figure_35.jpeg)

#### Most important factors affecting the costs

The general ground slope determines the cost of the structures and the distance of the safe discharge point from the road

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| Groundwater table<br>on surface<br>< 5 m<br>5-50 m<br>> 50 m                                                                                                            | Availability of surface water<br>excess<br>good<br>medium<br>poor/ none                                                 | Water quality (untreated)<br>good drinking water<br>poor drinking water<br>(treatment required)<br>for agricultural use only<br>(irrigation)<br>unusable | Is salinity a problem?<br>Yes<br>No<br>Occurrence of flooding<br>Yes<br>No                                                                                                                      |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Species diversity<br>high<br>medium<br>low                                                                                                                              | Habitat diversity<br>high<br>medium<br>Iow                                                                              |                                                                                                                                                          |                                                                                                                                                                                                 |  |
| CHARACTERISTICS OF                                                                                                                                                      | LAND USERS APPLYING THE                                                                                                 | TECHNOLOGY                                                                                                                                               |                                                                                                                                                                                                 |  |
| Market orientation<br>subsistence (self-supply)<br>mixed (subsistence/<br>commercial)<br>commercial/ market                                                             | Off-farm income<br>✓ less than 10% of all income<br>10-50% of all income<br>> 50% of all income                         | Relative level of wealth<br>very poor<br>poor<br>average<br>rich<br>very rich                                                                            | Level of mechanization<br>manual work<br>animal traction<br>mechanized/ motorized                                                                                                               |  |
| Sedentary or nomadic<br>Sedentary<br>Semi-nomadic<br>Nomadic                                                                                                            | Individuals or groups<br>individual/ household<br>groups/ community<br>cooperative<br>employee (company,<br>government) | Gender<br>women<br>men                                                                                                                                   | Age<br>children<br>youth<br>middle-aged<br>elderly                                                                                                                                              |  |
| Area used per household<br>< 0.5 ha<br>0.5-1 ha<br>1-2 ha<br>2-5 ha<br>5-15 ha<br>15-50 ha<br>50-100 ha<br>100-500 ha<br>500-1,000 ha<br>1,000-10,000 ha<br>> 10,000 ha | Scale<br>small-scale<br>medium-scale<br>large-scale                                                                     | Land ownership<br>state<br>company<br>communal/ village<br>group<br>individual, not titled<br>individual, titled                                         | Land use rights<br>open access (unorganized)<br>communal (organized)<br>leased<br>✓ individual<br>Water use rights<br>open access (unorganized)<br>communal (organized)<br>leased<br>individual |  |

## Access to services and infrastructure

| Socio-economic impacts               |                     |                                                   |  |
|--------------------------------------|---------------------|---------------------------------------------------|--|
| Socio-cultural impacts               |                     |                                                   |  |
| Ecological impacts<br>surface runoff | increased decreased | Quantity before SLM: 50<br>Ouantity after SLM: 20 |  |
| soil loss                            | increased decreased | Quantity before SLM: 25<br>Ouantity after SLM: 15 |  |

## Off-site impacts

| Benefits compared with est              | ablishment costs                                        |
|-----------------------------------------|---------------------------------------------------------|
| Short-term returns                      | very negative                                           |
| Long-term returns                       | very negative                                           |
| Benefits compared with ma               | intenance costs                                         |
|                                         |                                                         |
| Short-term returns                      | very negative                                           |
| Short-term returns<br>Long-term returns | very negative very positive very positive very positive |
| Short-term returns<br>Long-term returns | very negative                                           |

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## ADOPTION AND ADAPTATION

Percentage of land users in the area who have adopted the Technology

single cases/ experimental 1-10% 11-50%

> 50%

Number of households and/ or area covered 210 households in an area of 10 ha

Has the Technology been modified recently to adapt to changing conditions?

Yes No

#### To which changing conditions?

- climatic change/ extremes
- changing markets
- labour availability (e.g. due to migration)

## CONCLUSIONS AND LESSONS LEARNT

#### Strengths: land user's view

Strengths: compiler's or other key resource person's view

Of all those who have adopted the Technology, how many have done so without receiving material incentives?

![](_page_4_Picture_15.jpeg)

51-90% 91-100%

Weaknesses/ disadvantages/ risks: land user's viewhow to overcome

Weaknesses/ disadvantages/ risks: compiler's or other key resource person's viewhow to overcome

Reviewer

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REFERENCES

Compiler James Gatero Njuki Editors

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**Resource persons** James Gatero Njuki - State employee

Full description in the WOCAT database https://qcat.wocat.net/en/wocat/technologies/view/technologies\_1094/

## Linked SLM data

n.a.

## Documentation was faciliated by

Institution

• Ministry of Agriculture and Livestock Development of Kenya (MoA) - Kenya

Project

• n.a.

#### Key references

• farm management handbook of Kenya. 1983.: SWC branch, MoA, Nairobi

• minor roads soil conservation project. Final report. 1992.: Ministry of Public Works. Nairobi.

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