Road-side Tree Planting: Turning a problem into an opportunity

IRF webinar (March 31, 2021)

Nancy Kadenyi – Natural Resource Management Specialist, MetaMeta Kenya















Introduction to the Green Roads for Water concept







This can be



GREEN ROADS roads can become

Green Roads are instruments for climate resilience, better water management and regreening. Management of water with road infrastructure presents a triple win with very little additional investment: (1) reduced road maintenance costs, (2) reduced degradation of the landscape around roads and (3) create economic benefits for communities living around roads



Green Roads for Water objectives:



Healthier environment around roads

(reduced erosion, sedimentation, flooding and waterlogging)



Better roads (reduced water related damage on road infrastructure)



Improved livelihood opportunities for communities living around the roads

(productive use of the water harvested from roads, employment opportunities, etc.)

Green Roads for Water measures:





Diverting water from the roads to WH structures, fields, percolations ponds/pits from where the water can be used for productive purposes or for aquifer recharge

#arid, Semi-Arid Areas



#floodplains, lowlands Protection of springs, seeps and streams during road development

To ensure this important water resource from drying out

#hilly and mountain areas

Roadside Tree Planting

> #all geographies

Green Roads for Water program





- Initiated by MetaMeta in 2014
- Aim: To have roads systematically used for water management, regreening and climate resilience and introduce as standard in at least 50% of countries in the world by 2025
- Supported by: The World Bank, GRP, NWO, NERC, RAP3, Blue Gold and more
- Development of GR4W Guidelines and Guided Learning packages and Manuals
- Active in more than 10 countries
- Outreach > 6 M people

Roadside tree planting

(designing roadside tree plantations and recommendations)



Road-side Tree Planting Benefits

- Removes dust and other pollutants from the air, protecting crops, roadside communities, and livestock.
- \checkmark Reduces soil erosion: holds soils in place.
- ✓ Wind breaks that reduce desiccation and wind erosion.
- ✓ Flood control: slows and absorbs road runoff.
- \checkmark Carbon dioxide sequestration.
- Direct benefits: timber, fodder, fuelwood, fruits, pollinator habitat.
- Provides shade and keeps the road cool for road users.
- \checkmark Beautification



- Tree selection
- Setting up and running a tree nursery
- Designing Roadside Plantations
- Pre-planting management
- Tree planting and watering
- Maintenance and Post-Planting Management



Principles of Roadside Planting

Gather knowledge	Achieve a mass effect	Functional and aesthetic	Planting designs should reflect naturalistic conditions
Form and shape should be used for harmony and contrast.	Shrub use should be limited because of high maintenance costs	Consider the plant's adaptability to various environmental, climate, and soil conditions	Emphasize the use of native plants to the greatest extent possible
	Avoid selecting invasive tree species	Avoid placing trees and shrubs over underground utility lines and drainage pipes	

Types of roadside tree planting designs

Planting along venues (Avenue plantations)



Planting in greenbelts (Greenbelt plantations)



1. Criteria for identifying planting sites

- Planting sites shall be at reasonable distance from farmlands as well as from the edge of the road
- Sites shall have good access to water sources
- Sites with established animal paths shall not be considered or be fenced
- Sites shall have access to nursery
- Sites shall not be severely degraded
- Take into account the effect of the shade on crops (direction of the sun) when deciding location

2. Design of roadside vegetative barriers

Roadside plantations must have some porosity to allow the wind pass through the plantation and increase the filtering effects. Optimal porosity: 35-50%. To achieve optimum porosity planting should be approximately 5 to 20 m wide, consisting tall trees with bush layers underneath.



above: closed element (eg dense hedge) SMALL FILTERING EFFECTS

middle: porous element (eg half open hedge or row of trees with undergrowth.) GOOD FILTERING EFFECTS

below: incomplete element (eg line of trees without undergrowth)

Roadside barriers and dust movement

Road-side Tree Planting Planning

3. Road Safety Considerations

Trees can cause accidents and special mitigation measures are necessary at certain speeds to avoid them

Source: VicRoads Tree Planting Policy (2015)

Speed zone	Road safety mitigation method		
40 km/h	The impact force is unlikely to exceed human tolerances, so no specific mitigation is needed.		
50 km/h	A minimum lateral distance from road edge of 1 m should be maintained		
60 km/h	 Intersections 	at least 10 m beyond intersection on the approach and departure side	
	 Driveways 	at least 3 m between driveway and tree	
	 Lane merge locations 	3.6 m lateral distance from road edge	
	• Curves	3.6 m lateral distance from road edge for gentle curves; barrier for moderate/tight curves	
70 – 100 km/h	The impact force is highly likely to exceed human tolerances Safety barriers are the most appropriate mitigation (wire rope safety barrier, guard rail or other approved safety barrier that is suitable in high speed environments)		

Road-side Tree Planting Planning

4. Road Visibility

No trees or shrubs on the inside of cut slopes around curves



No trees or shrubs on the inside curve of an embanked road construction



Road-side Tree Planting Planning

5. Planting

Size of tree	Planting verge
Large sized trees (15-30 m high)	> 3 m
Medium sized trees (5-15 m high)	1.5m to 3.0m
Small sized trees (less than 10 m)	< 1.6 m





Country experiences

(case studies: Ethiopia, Kenya and Uganda)

Case study: Ethiopia

MetaMeta experience:

- 2016: First roadside tree planting training in Amhara
- 2017-18: Training follow up government experts from North Achefer woreda in Amhara region launched a roadside tree planting drive with the aim to create a model to showcase the benefits of roadside tree planting
- 2018: Roadside tree planting incorporated in the 2019 National Watershed campaign in the region of Amhara. During this campaign, 1560km of roadside planted with 795011 number of seedlings in Amhara
- 2019: Ethiopian Government launched a nationwide initiative to plant 4 Billion tree by 2024. Roadside tree planting was decided to be practiced in all zones of Amhara (750,000 Birr allocated from Road Authorities for roadside tree planting)
- 2019: Pre-plantation workshop for main implementers in Injibara, Kombolcha, Bahir Dar and Debre Tabor (preparation for 2020 National Watershed Campaign)
- 2020: Roadside tree planting is practiced in more regions (Tigray, Oromia and SSNPR)
- 2021 24: More trainings and implementation under our Green Future Farming project

Case study: Ethiopia

Roadside tree planting as part of the Green Legacy Initiative

Launched in 2019 by Ethiopia Prime Minister Abiy Ahmed, the Green Legacy initiative is part of the Government's plan to plant 20 billion seedlings by2024. The objective of this initiative is to counter the effects of deforestation and climate change and build a green and climate-resilient economy. The plan for 2020, was to plant 5 billion trees during the rainy season.



B **#GREENLEGACY** CONTINUES



Case study: Uganda

MetaMeta experience:

- 2018-19: Training to local communities on Roadside Tree planting and implementation in 16 sites (under the REACH program in Kween and Kanungu Districts)
- 2019: Green Roads for Water training in Entebbe with a special focus on roadside tree planting (in collaboration with the Head of Environment Unit, Ministry of Works and Transport in Uganda)
- 2020-21: Exploring more opportunities for Uganda

Case study: Uganda

Green Right of Way Program (GROW) by the Uganda National Roads Authority (UNRA)

This program is to plant trees along all UNRA road projects for the restoration of the environment. It was launched in 2017.



Case study: Kenya

MetaMeta experience:

- 2018: Road water harvesting and roadside tree planting workshop in Kitui rural subcounty, Kwa Vonza Ward.
- 2019: 3-days workshop Road water harvesting and roadside tree planting workshop in Machakos county.
- 2020: Preparation of the Roadside tree planting manual with the support of various local organizations
- 2021: Exploring more opportunities

Case study: Kenya

Roadside tree planting as part of the reforestation program "Greening Kenya"

The Kenyan government took the opportunity of the 27th International Biodiversity Day on May 22, 2020, to recall its ambitious reforestation project. Objective: to plant 1.8 billion trees by 2022 in order to preserve biodiversity.



Roadside tree planting (Supporting material)



Green Roads Guidelines

<u>Please access the draft version</u> of the Green Roads for Water <u>Guidelines through this link.</u>

Supported by:





14 Making it work: community engagement

15 Conclusions: it pays off

Roadside Tree Planting Manual

This manual highlights step-bystep procedures for roadside tree planting, management and management practices as well as the benefits that can be generated by this activity. You can access it through this link.

Supported by:

















Flood-Based Livelihoods Network Foundation



Additional Resources

- Video <u>Ethiopia: Rural Roads and Dust</u>
- Scientific article <u>Roadside Planting in</u> <u>Ethiopia: Turning a Problem into an</u> <u>Opportunity</u>
- Policy Note <u>Roadside planting:</u> <u>creating employment and economic</u> <u>benefits while protecting communities</u> <u>and the environment</u>

hank you!

For more information contact : www.roadsforwater.org fvansteenbergen@metameta.nl adeligianni@metameta.nl nkadenyi@metameta.nl







1. 157





See Charles





THE WORLD BANK