

### Tree seedling production for Road-side Planting

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# Outline

Å	Tree selection
₿	Setting up the nursery
	Water Sources for Tree nursery
	Tree planting and watering – Case studies
$\checkmark$	Conclusions

# **Tree Selection**

- The right tree in the right position is the key principle Roadside environment is harsh.
- Selection criteria are based on the medicinal, nutritional, economic and ecological value of the trees, adaptability, the cultural values, and their ability to absorb carbon dioxide.
- Hardness of the tree species,
- Diversity of tree species to spread risk Flood, diseases
- A clear above and below ground site analysis,
- ability to improve drainage, trap dust, and reduce surface runoff.
- Evergreen to trap dust
- Source of food Fruit, leaves
- Provision of Shade



#### Africa Tree Finder

#### ICRAF Maps & Navigation

3+

O This app is available for all of your devices

#### Add to wishlist



The app so far covers Burundi, Ethiopia, Kenya, Malawi, Rwanda, Tanzania, Uganda, and Zambia, and it has the following capabilities

- Shows the distribution of potential natural vegetation
- Includes a species selection tool—'the right tree for the right place'—that accounts for the goods and services desired
- Links tree species to online databases
- Informs users about the trees and shrubs that originally occurred at the location of interest
- Identifies potential ecotypes within species and recommends well-adapted seed sources for particular sites. (Kindt et al., 2015)
- <u>https://play.google.com/store/apps/details?id=co</u> <u>m.icraf.gsl.africatreefinder&amp;hl=en\_US</u>

Table 2: List of common roadside tree species and their characteristics (source: http://tropical.theferns.info/)

No.	Scientific name	Common Name	Criteria for selection
1.	Jacaranda mimosifolia	Jacaranda	Evergreen, grows 5-16 m tall, ornamental, fast-growing, drought-resistant, termite resistant, sprouts easily if damaged
2.	Spathodea campanulata	Nandi flame	Grows to be a large tree, up to 25 m, with a broad crown; ornamental, drought-resistant, termite resistant
3.	Delonix regia	Flame tree	Deciduous, medium-sized tree with spreading canopy; drought- resistant, termite resistant
4.	Azadirachta indica	Neem	Fast-growing, evergreen, drought and pest resistant





# Tree species - Examples

### Setting up the Nursery

- The area should be well drained and free from waterlogging
- The plants should be exposed to direct sunlight
- The nursery should be close to a water source for ease of irrigation. Road water harvesting has been occasionally used for roadside tree planting.
- The area should be well protected from pets and wild animals.
- The area should be flat or gently sloping, with a slope ranging from 0 to 30 degrees.
- The number of seedlings depends on the planting pattern used, which can either be square or rectangular.
- The recommended spacing between two lines is either 10 cm or the width of your palm, and spacing between the plants is 10 cm (ICRAF, 2013). Further, the recommended height for transplanting trees is between 30 cm and 45 cm.







Water sources for tree nursery

**Road Run-off catchment systems** 

- 1. Hemispherical underground tanks
- 2. Lined rectangular tanks
- 3. Unlined ponds



# Water sources for tree nursery

- Road runoff in a check dam
- Diversion of spring water







# Roof Catchment Systems

Road runoff pond system

# Site preparation

Determine the size of the planting area	Width: The planting area should be 3 to 5 times as wide as the roots or root ball.	Depth: topmost root to be 1 to 3 inches above the soil surface (Gilman & Sadowski, 2007).	Volume: create enough loose soil for adequate root growth. (Trees Energy Conservation, 2019).
Remove the competing vegetation	Remove competing vegetation mechanically or chemically.	Apply minimum mechanical soil disturbance or tillage – Expensive option	Where chemicals or herbicides are used, follow the manufacture instructions – Less environment friendly
Prepare the soil	Soil conditions influence the tree to survive and mature.	Loosen soil to enhance root growth	Do not disturb the bottom of the planting area

General Tree Planting and Watering guidelines

- Follow local government guidelines on road tree planting
- A month before planting reduce the watering frequency by half
- Expose the seedlings to more sunshine
- Root prune frequently
- Dig planting holes before onset of rains:
- The size of planting hole depends on size of seedling: Typical size is 30 com x 30 cm. In drylands double the size for more water harvesting
- Loosen soil before planting
- Plant at the onset of the rainy season
- Harvest road runoff for irrigation during dry spells
- Frequently inspect young trees for pests and diseases
- Irrigate when required to increase tree survival rates







Developing scaling model from Lare experience, Nakuru Kenya.

- Upscaling Drivers:
- Micro-climate change resulting in frequent droughts due to Land use change from forest to agriculture: Water buffering
- Export market for French beans
- Soil conditions: no need for plastic liner

### Road Runoff Farm Pond Scaling up Model



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### Govt to construct over 125,000 water pans to harness flood waters



PS says Govt to harness flood waters across country and transform them into vital source of livelihoods for millions in rural areas in Kenya

#### BY WAGEMA MWANGI KNA. VOI

n a surly morning in April 2016, Mr. Peter Chabo, a farmer in Kimorigho village in Taveta He was among hundreds of other farmers from Kimorigho, Darajani, Makloriti and Msengoni villages who were hit by the floods.

The flooding came with massive displacements that saw many families moved to safer grounds.

Afterwards, the families that had over the years been food-sufficient were forced to rely on relief food supplied by government and other donors.

"It was a terrible time for us in Taita Taveta because we were not used to getting fed by government," recalls Chabo.

Such scenarios of flooding, displacement and eventual drought have become an annual cycle, replicated in several counties in Kenva during become an opportunity for residents to exploit and grow food crops.

The Principal Secretary for the State Department for Irrigation Prof Fred Segor, says the government is planning to harness the flood waters across the country and transform them into vital source of livelihoods for millions of Kenyans in rural areas.

Speaking in Voi during the official opening of Africa-Asia Knowledge-sharing symposium on Flood-Based Livelihood Systems (FBLS), the PS said Kenya was keen on exploiting the massive potential flood waters can play in enhancing and bolstering food security.

The symposium brought

and Pakistan.

"Flood based Livelihood systems has the potential to contribute to Kenya's Big 4 Agenda on 100 per cent food and nutrition security," said Prof Segor.

Flood-based livelihood systems refers to innovative ways where flood waters can be harvested and harnessed to benefit the communities who bear the brunt of flooding in rainy seasons. The expected benefits include conservation and increase of water for domestic use and irrigation.

To achieve this, the government will construct 125,000 household water pans and 10 large dams, communitybased small dams, lagoons and other forms of water-



Principal Secretary for Irrigation Prof. Fred Segor addressing delegates in Voi during an Africa-Asia knowledge sharing symposium on Flood-Based Livelihood Systems (FBLS).



Macpherson Nthara, an expert from Malawi, giving a presentation during the symposium.

maining 100m3 is used for generation of electricity. The PS blamed the low na-

## Impact Case Study: Peace Women Group

- Location: Kitooni Village, Kanyaing Ward in Kitui Rural.
- Membership: 20 women (majority widowed and resource poor)
- Physical Environment: Very water stressed + heavily degraded land

- Initial investment of USD 33,000
- Monthly group income of USD 3,525 USD from sale of vegetables
- Annual group income: 42,000USD
- Expenditure on food reduced by USD 18 at community level
- Invested on 15 household ponds
- Irrigating 4.5 Ha (mainly vegetables and fruits)









### Buffering road runoff at Farm level for production

## Conclusions:



Farm pond technology impacts positively on roadside tree seedling production and planting and livelihoods.



Following local authority road tree planting guidelines is critical for success.



Markets with well developed value chains are critical drivers for the upscaling process road tree planting – Attaching value to the trees – fruit, medicine, timber and ornamental



Capacity building building necessary on tree seedling production, planting and management in the field