Robusta coffee and indegenous trees (Cordia Abbysinica is the dominant spp) (Iddiphonce Mwasikundima (Box 30 Ngara Kagera Tanzania))

In situ mulching of coffee using Cordia Abbysinica ( )

Kgutela igitutu ckimwani

Use of indigenous trees to provide shade and leaves droppings as mulch for coffee production

Establishment of Robusta coffee farms by an individual,on a cropland by mixing indigenous tree spp which provide a shade and dropping leaves save as natural mulch.The technology has been developed through land user initiatives over 40 years ago. Establishment activities include land clearing and preparation,preparation of holes,seed collection and planting which involve family labor Seeds are collected from neighboring village from mature trees. Holes are prepared randomly about 4 meters apart. No inputs are applied at the establishment stage only hand tools are used (hand hoe, matchet)
Shade trees are planted after establishment of coffee which are randomly planted, tree spp dominating is Cordia abbysinica which has broader leaves and easy to decompose.Other tree spp included are Erythrina,Meosopsis eminii,Ficus thornngii,Makhamia lutea and Tephrosia vogelii.
Maintenance include weeding which is done by pulling weeds by hand or using hand hoe at early stage after establishment because few leaves have dropped. The farm is mainly meant for coffee production however,few crops which are cassava bananas, fruit trees Jack fruit, Mangoes, Citrus spp which are planted in the peripherals,and Dracaena sppplanted to demarcate the farm along road side.
Pruning of tree branches is done before the shade is heavy as to allow ventilation.Coffee pruning is done to an individual tree depending on number of branches it has at time of harvesting, normally 4 branches are left. Bending of coffee branches is practiced to avoid branch breaking during harvesting.
Settlement is within the farm with few livestock which are sheep, cattle and chicken.

Purpose of the Technology: To increase coffee production by mixing coffee with indigenous tree spp which drop / shed its leaves.Selected trees are those broad leaved which its leaves decompose easily hence improve soil fertility and due to high accumulation of dropped leaves there is an increase in soil moisture content.
Trees act as wind break hence no flower drop.Dracaena spp are planted very close along the road side to demarcate his plot from neighbors and public infrastructure and this helps to reduce land conflicts among neighbors and community as well.
Hand weeding is done as the technology suppress weeds to the big shade.

Establishment / maintenance activities and inputs: A farmer bought a piece of land from the village government.Establishment activities include land clearance by removal of shrubs using a matchet.This is followed by land preparations and planting holes which are 30cm depth and 30cm width. These activities are done from May to July by family labor.Planting is normally done between September and October by collecting seedlings from mature trees in neighbors fields.Planting of indigenous tree spp is done randomly after coffee planting to allow ventilation 80 different spps are planted in 1.5 acres. Seeds and seedlings are obtained from neighbors farms.Maintenance includes weeding which is done using family labor who use hand hoe. This is done twice a year in May and December to January. Pruning and bending of coffee tree branches is done once per year after harvesting of coffee as well as trees in June and July using a matchet. Each coffee tree is treated individually only 4 branches are allowed per tree. Bending is done to avoid breaking of branches during coffee harvesting.
Gap filling is done few months after transplanting between February and March at the beginning of long rains. and this was followed pruning and bending of coffee branches.
Demarcation of coffee farm using Dracaena (shrub) done on one side of his farm along the road.

Natural / human environment: Land use type: Establishment of coffee has been done on crop land.
Agronomic: Natural mulch from leaves falling on ground.
Vegetative: Demarcation of boundary using Dracaena spp.
Climatic zone: Sub humid more than 269 growing days.

: Ngara District, Tanzania,

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- 30.62804, -2.47416

: (approx. < 0.1 2 (10))

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: 10-50

(> 50)

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slope: 2-5% gentle slope
Soil type: Clay loam
Soil depth: Deep
Tools and inputs: Hand hoes,bush knife,axe, seeds and cuttings.
Land ownership: Individually owned.

Insitu mulching developed from indegenous tree debries (Iddiphonce Mwasikundima (Box 30 Ngara Kagera Tanzania))

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- ( ): /plantain/abaca
- : , citrus, , / / , Cordia abbysinica, Erythrina,Meosopsis eminii,Ficus thornngii,Makhamia lutea and Tephrosia vogelii, Jack fruit, Mandarines
  : 2

- Tethering: rapid decline of land due to expansion of settlements and crop production
  : , cattle, chicken

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- Wt:

- Cn:
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- Bc:

SLM

SLM

- A1: / , A2: / , A3: (A 3.2: Reduced tillage (> 30% soil cover))

- V1:

- M3:

Indigenous tree are randomly planted and Cordia Abbysinica accounts for 70% of the indegenous tree spps. Demarcation of a coffee farm is done using Dracaena (shrub) done on one side of the farm along the road. Natural mulching is done by tree leaves/debris falling on ground. Slope category range from 2-5% gentle slope. Average spacing of Robusta coffee is 4m x 4m.

Location: Karushya Nyamigango. Ngara/Kagera/Tanzania

Technical knowledge required for land users: high

Main technical functions: improvement of ground cover, increase in organic matter, increase in nutrient availability (supply, recycling,...), increase of infiltration, increase / maintain water stored in soil

Secondary technical functions: reduction in wind speed

Mulching
Material/ species: leavesof indigenous trees drop
Quantity/ density: 6 cm depth
Remarks: natural falling and irregular aligment

Manure / compost / residues
Material/ species: indigenous trees

Minimum tillage
Material/ species: Hand pulling sometimes use simple tools.

Aligned: -along boundary
Number of plants per (ha): 1,000
Vertical interval between rows / strips / blocks (m): 0
Spacing between rows / strips / blocks (m): 0.1
Vertical interval within rows / strips / blocks (m): 0
Width within rows / strips / blocks (m): 0

Scattered / dispersed
Number of plants per (ha): 375
Vertical interval between rows / strips / blocks (m): 3
Spacing between rows / strips / blocks (m): 60
Vertical interval within rows / strips / blocks (m): 3
Width within rows / strips / blocks (m): 60

Trees/ shrubs species: Cordia abbysinica, Ficus spp,Erythrina spp,Makhamia spp,Tephrosia spp Maesopsis spp (planted)

Fruit trees / shrubs species: avocado, mandarine,

Perennial crops species: Coffee

Other type of management: (Land protection and demarcation)
Planting Dracaena along the road side

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- Labour
- **Tanzanian shillings**
- ( ) 1 USD = 1600.0 Tanzanian shillings
- 3000.00

1. Hole preparation (/ : Nov.)
2. Seed collection and preparation (/ : Nov to Dec)
3. Seedling planting (/ : Dec)
4. Demarcation and excavation of small trench (/ : September-before long rains)
5. Preparation of cuttings (/ : September-December)
6. Actual planting (/ : September-December)
7. labour (/ : None)
8. pangas (matchet) (/ : None)
9. handhole (/ : None)
10. tree & coffee seedlings (/ : None)

			(Tanzanian shillings)	(Tanzanian shillings)	%
labour		1,0	2510,4	2510,4	100,0
tools		1,0	21,88	21,88	100,0
seeds		1,0	31,25	31,25	100,0
seedlings		1,0	61,73	61,73	100,0
				2'625.26	
				1.64	

1. Pruning-Trees-Coffee (/ : After harvesting, June-July)
2. Weeding (/ : after long rain season)
3. Gap filling (/ : March,during short rains)
4. Bending and layering (/ : Once after harvesting)
5. Gap filling (/ : before short rains)
6. Prunning (/ : Dry season)

			(Tanzanian shillings)	(Tanzanian shillings)	%
labour		1,0	63,63	63,63	100,0
seedlings		1,0	33,05	33,05	100,0
				96.68	
				0.06	

Thermal climate class: tropics. All months above 18°C

- [ ] < 250
- [ ] 251-500
- [ ] 501-750
- [ ] 751-1,000
- [ ] 1,001-1,500
- [x] 1,501-2,000
- [ ] 2,001-3,000
- [ ] 3,001-4,000
- [ ] > 4,000

- [ ] (0-2%)
- [ ] (3-5%)
- [ ] (6-10%)
- [ ] (11-15%)
- [x] (16-30%)
- [ ] (31-60%)
- [ ] (>60%)

- [ ] 0-100
- [ ] 101-500
- [ ] 501-1,000
- [x] 1,001-1,500
- [ ] 1,501-2,000
- [ ] 2,001-2,500
- [ ] 2,501-3,000
- [ ] 3,001-4,000
- [ ] > 4,000

( )

- [ ] (0-20)
- [ ] (21-50)
- [ ] (51-80)
- [ ] (81-120)
- [x] (> 120)

( )

- [x] / ( )
- [ ] (,)
- [ ] / ( )

(> 20)

- [ ] / ( )
- [ ] (,)
- [ ] / ( )

- [x] (>3%)
- [ ] (1-3%)
- [ ] (<1%)

( )

- [ ] < 5

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- [x] /

5-50
> 50

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SLM

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(/
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10%
10-50%
50%

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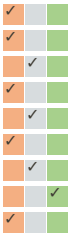
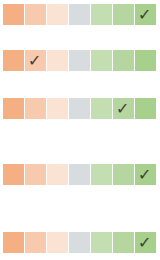
< 0.5
0.5-1
1-2
2-5
5-15
15-50
50-100
100-500
500-1,000
1,000-10,000
> 10,000

( )





SLM: 16bags/ha
SLM: 58 bags/ha

SLM: 3cub.m/ha
SLM: 12cub.m/ha

SLM: 62 kg/ha
SLM: 0 kgs/ha

SLM: 15 md/ha
SLM: 2 md/ha

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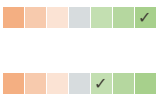

SLM: low
SLM: improved

SLM: little
SLM: inreased

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SLM /

SLM: none
SLM: available

SLM: none
SLM: available

SLM: low
SLM: high

SLM: low
SLM: high

SLM: low
SLM: high

SLM: low
SLM: high

SLM: low
SLM: medium

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SLM: low
SLM: medium

/

In 10 years he has obtained more money from sales of coffee and tree products

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/
1-10%
11-50%
> 50%

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0-10%
11-50%
51-90%
91-100%

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- Increased production

  How can they be sustained / enhanced? Promote technology among other farmers
- Easy maintenance acctivities e.g. easy to keep weeds under control

  How can they be sustained / enhanced? Ditto
- Fuel wood availability

  How can they be sustained / enhanced? Ditto
- Availability of fruits

  How can they be sustained / enhanced? Ditto
- Improved kowlledge regarding SLM and soil erosion

  How can they be sustained / enhanced? Ditto

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- This is cheap and affordable technology which can be used by smallholder farmers

  How can they be sustained / enhanced? Promote technology among other farmers
- Large potential for increased income (higher coffee yields)

  How can they be sustained / enhanced? Ditto
- Improve soil fertility

  How can they be sustained / enhanced? Promote crop and livestock intergration (manure production)
- Increased soil moisture

  How can they be sustained / enhanced? Appropriate maintenance acttivities
- Erosion control

  How can they be sustained / enhanced? Maintain sufficient soil cover

/ / :

- Land competition with food crops Promote technology among other farmers
- High cost of tools, especially pruning scissors Provide required tools

/ / :

- Risk to fire during dry season Introduce fire breaks
- In areas where frost persist can lead to fungal diseases if not well pruned Improve pruning

Editors

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: 11 2014

: 6 2019

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Philip Ileta - SLM
Iwona Piechowiak - SLM

https://qcat.wocat.net/km/wocat/technologies/view/technologies_1191/

SLM

- Food and Agriculture Organization of the United Nations (FAO) -
- The Transboundary Agro-ecosystem Management Project for the Kagera River Basin (GEF-FAO / Kagera TAMP)
- Kagera TAMP project website: http://www.fao.org/nr/kagera/en/