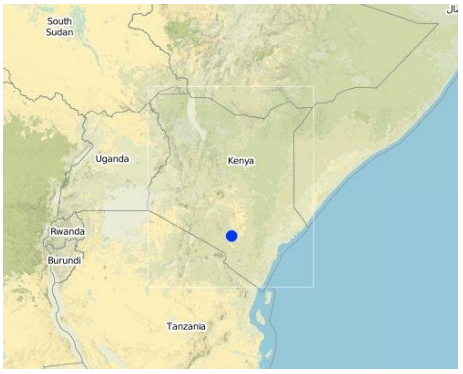
Water harvest from the road (Highway) (Justus N.Mutinda, David K. Wam)

Water harvest ( )

Kunasa maji ya muua yanuyobubugika na kuyuelekeza shambani kwa uzakshaji-Alex R.Adual RSCU/SIDA1996

Water harvest for agricultural production in Asals

Water harvest enhances extra moisture and reduces risk of crop failure. It can either be external or internal. The activities also reduce runoff/overland flow and soil loss.
Manure and fertilizer improve soil water holding capacity and soil properties.
Appropriate tillage for improvement of infiltration rate of the soil.



: KiMuiki, Kitise, Mburo, Kwa Kauisi, Eastern,

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- 37.95, -2.2

:

: 10
( )

(> 50)

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Retention/nfiltration ditch (Justus N.Mutinda, David K. Wam)

Agroforestry establishment (mangoes plot) (Justus N.Mutinda, David K.Wamb)

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(-) : Major food crop: Maize Other: C.peas

(/ /) -

/ : Major cash crop CT: fruits Selective felling of (semi-) natural forests for fuelwood purpose Clear felling of (semi-)natural forests for agricultural production Forest also for fruits and nuts

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- Wt:

- Cn:

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SLM

SLM

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- V2:

2

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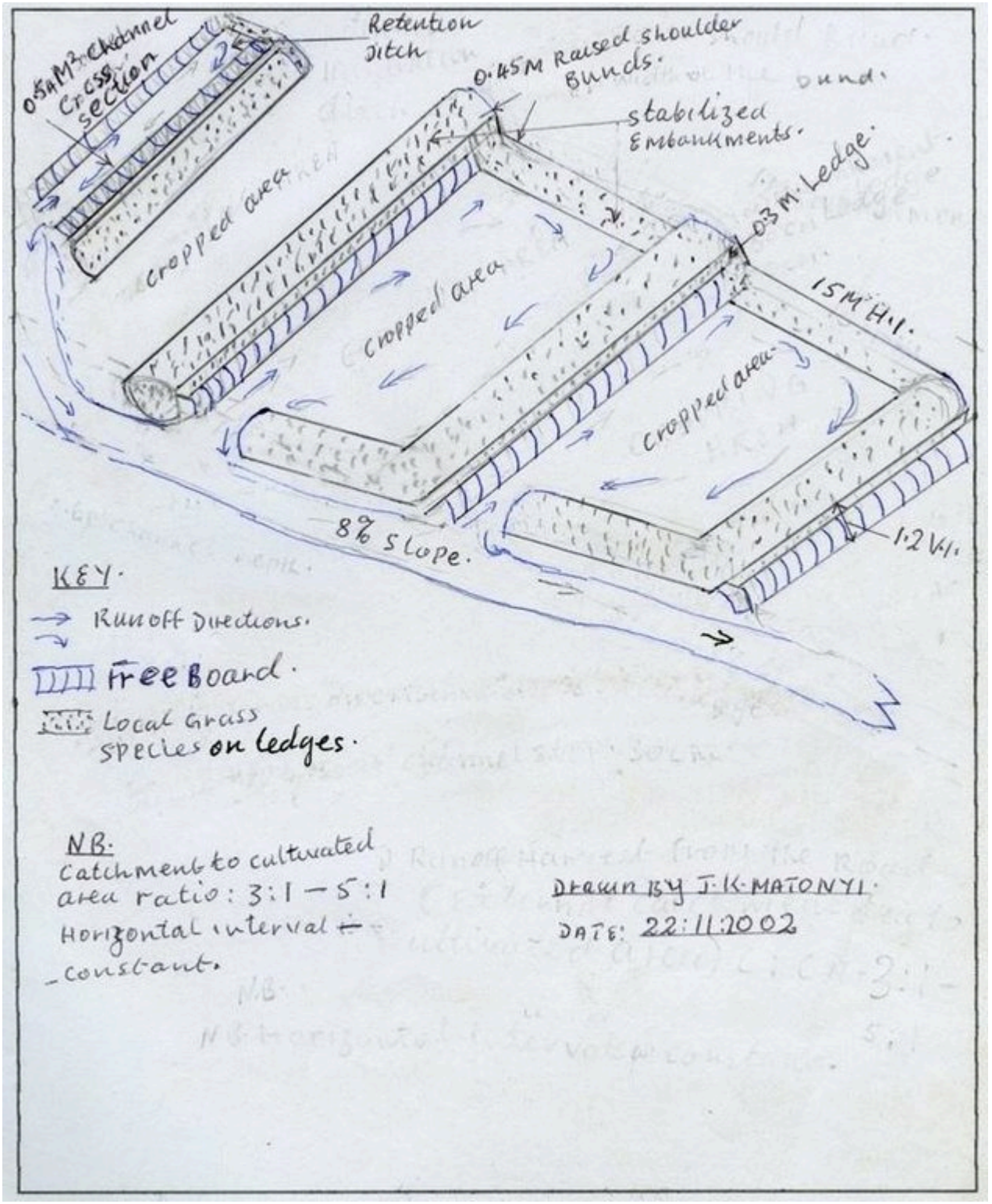

: James K. Matonyi
technical drawing catchment to cultural area ratio: 3:1 - 5:1 Horizontal interval constant

Makueni district

Date: 22.11.2002

Technical knowledge required for field staff / advisors: moderate

Technical knowledge required for land users: high

Main technical functions: water harvesting / increase water supply

Secondary technical functions: increase / maintain water stored in soil, increase in soil fertility

Relay cropping
Material/ species: improved mango trees
Quantity/ density: 124
Remarks: 9 m^2

Manure / compost / residues
Material/ species: FYM/compost
Quantity/ density: 12.5 t/ha

Breaking compacted topsoil
Remarks: appropriate tillage

Aligned: -contour
Vegetative material: G : grass
Vertical interval between rows / strips / blocks (m): 1.2
Spacing between rows / strips / blocks (m): 0.6x0.3
Vertical interval within rows / strips / blocks (m): 15
Width within rows / strips / blocks (m): 1.5

Scattered / dispersed
Vegetative material: T : trees / shrubs
Number of plants per (ha): 40

In blocks
Vegetative material: T : trees / shrubs
Number of plants per (ha): 124
Vertical interval between rows / strips / blocks (m): 9
Spacing between rows / strips / blocks (m): 9x9
Vertical interval within rows / strips / blocks (m): 9

Trees/ shrubs species: Cacia scamea, Accacia albida

Fruit trees / shrubs species: mango, citrus, pawpaw

Grass species: ceuchrus cuharis, erayroster superba

Slope (which determines the spacing indicated above): 8.00%

If the original slope has changed as a result of the Technology, the slope today is (see figure below): 0.00%

Gradient along the rows / strips: 0.20%

Retention/infiltration ditch/pit, sediment/sand trap
Vertical interval between structures (m): 1.2
Depth of ditches/pits/dams (m): 0.6
Width of ditches/pits/dams (m): 1.2
Length of ditches/pits/dams (m): 100
Height of bunds/banks/others (m): 0.45
Width of bunds/banks/others (m): 1.5

Terrace: bench level
Vertical interval between structures (m): 1.2
Spacing between structures (m): 15
Depth of ditches/pits/dams (m): 0.6
Length of ditches/pits/dams (m): 100
Height of bunds/banks/others (m): 0.45

Construction material (earth): earth moving for SWC embankment construction

Slope (which determines the spacing indicated above): 8%

Lateral gradient along the structure: 0.2%

Vegetation is used for stabilisation of structures.

Change of land use type: stock holding capacity of land

- Factors affecting the costs include hard ground at SWC peak period, labour, slope, catchment area, channel size and source of income
- ( ) 1 USD =
- 1.92

1. grass planting on embankments (/ : after onset of rain)
2. fruits seedling transplanting (/ : october rain)
3. dispersed tree seedlings transplanting (/ : october rain)
4. retention/infiltration ditches (/ : after crop harvest)

5. Bench terraces (/ : after crop harvest)
6. external water harvest channels (/ : before raining season)
7. structure stabilization (/ : onset of rain)
8. manure/fertilizer application (/ : after crop harvest)
9. Bush clearing (/ : after grazing)
10. reseeding/grass planting in bare parches (/ : dry season)
11. fodder establishment (/ : rainy season)
12. removal of unwanted shrubs (/ : following rotational sequence)

			( )	( )	%
Labour	ha	1,0	296,0	296,0	100,0
Machine use	ha	1,0	32,5	32,5	100,0
Animal traction	ha	1,0	72,3	72,3	100,0
Tools	ha	1,0	385,0	385,0	100,0
Seeds	ha	1,0	76,3	76,3	100,0
Seedligs	ha	1,0	79,5	79,5	100,0
Fertilizer	ha	1,0	58,0	58,0	100,0
Biocides	ha	1,0	47,4	47,4	100,0
Compost/manure	ha	1,0	78,0	78,0	100,0
Stone	ha	1,0	244,0	244,0	100,0
				1'369.0	

1. tillaging (/ : before rain / annually)
2. tillaging (/ : on set / seasonally)
3. manure application (/ : dry season / annually)
4. grass cutting and gapping (/ : onset of rain /twice per season)
5. prunning and trimming (/ : after every harvest /annual)
6. pollading and copsing (/ : when intended /after several years)
7. retention/infiltration (/ : before onset of rain/seasonally)
8. ditch cleaning (/ : before onset of rain/anually)
9. Bench terraces repairing (/ : before onset of rain/when necessary)
10. Water channel cleaning/repairing (/ : dry period/seasonally)
11. grass cutting for stall feedinf (/ : rainy season / at maturity stage)
12. gapping (/ : rainy season / seasonally)

			( )	( )	%
Labour	ha	1,0	98,0	98,0	100,0
Animal traction	ha	1,0	72,3	72,3	100,0
Seeds	ha	1,0	67,3	67,3	100,0
Seedlings	ha	1,0	55,7	55,7	100,0
Fertilizer	ha	1,0	44,2	44,2	100,0
Biocides	ha	1,0	21,5	21,5	100,0
Earth	ha	1,0	244,0	244,0	100,0
				603.0	

350.0

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

- [x]
- [x]

semi-arid: LGP-70-180

arid: LGP-60-120

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

- [ ]
- [ ]
- [ ]
- [x]
- [x]

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

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

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

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

- [ ] < 5
- [ ] 5-50
- [ ] > 50

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SLM

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

- [ ] 10%
- [x] 10-50%
- [ ] 50%

- [x]
- [x]
- [ ]

- [x]
- [x]
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- [ ]
- [ ]

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

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- [ ]
- [x]
- [x]

- [ ] ( ) ( )
- [x] ( )
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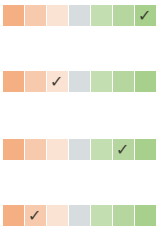
- [ ] ( )



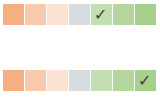
Extra output 50%

given area reduced by 14%

Extra income 27.5%

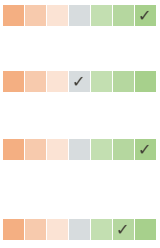
requires high labour costs

SLM /



in capacity building

to land user



SLM: 32
SLM: 14

risking occasion

external WH.

SLM: 20
SLM: 10

WH combination

( )

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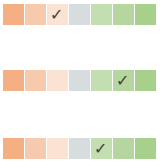

irrigation potential reduced

rainfall runoff trapped

silt retained on cropland

-

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1-10%
10-50%
50%

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0-10%
10-50%
50-90%
90-100%

/

630 household covered an area of 9%

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( )

:

- induces the technique of implementation

  How can they be sustained / enhanced? land users be aquidance with the technology and its importance.
- land users acquires more grass for stall feeding.

  How can they be sustained / enhanced? introduction of intensive grazing system.
- reduces floods of heavy storms downsteram.

  How can they be sustained / enhanced? Proper tillage to curb soil crusting and hardban.

:

- water harvest increases farm production and reduces risks of crop failure.

  How can they be sustained / enhanced? To stabilize SWC structure embankments, desilt channels and retention ditches.
- Improvement in infiltration rate and moisture holding capacity.

  How can they be sustained / enhanced? Use of manure, organic matter, inorganic fertlizer and appropriate tillage.
- Reduces soil, fertility, runoff and overland flow losses

  How can they be sustained / enhanced? Maximum adaptability of the SWC technology to ustain high production level.
- Enhanced vegetative cover for moisture retention.

  How can they be sustained / enhanced? Intercropping, mulching and repairing where needed.
- Reduces erosion by wind and other land degradation.

  How can they be sustained / enhanced? Appropriate stocking rate andd replanting trees and grass.

/ / :

- consumes a lot of time to implement the technology the land user awareness of the importance of the activity.
- Technology area resists a direct grazing to mitiate stall feeding
- the technology design is beyond the farmers knowledge. continuous interaction with SWC specialists.

/ / :

- Land area reduced by SWC structures constructed. Use of certified seeds, manure and fertilizer.
- soil fertility is interfered with. more manure and organic matter use.
- High labour cost requirement to implement the technology. Introduced source of smooth loan and policy for ASALS.
- Risk of water logging where soil drainage is unaimable. acquired knowledge of different soil types and applicable technology and system.
- cost-benefit return can last long to be realized. to maintain record for both, implementing cost and income from the given area (SWC area)

Editors

Kithinji Mutunga David Streiff

: 6 2011 : 27 2017

Peter Maithya Mutisya - SLM
Michael Ndengele - SLM
Lucas Makau Nguluu - SLM
Kithinji Mutunga (kithinji.mutunga@fao.org) - SLM
Francis Mbote (pc+changeme2@nalep.co.ke) - SLM
Alex R. Adunal - SLM

https://qcat.wocat.net/km/wocat/technologies/view/technologies_1097/

SLM

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

- SWC manual for Kenya by D:B: Thomas. 1997.: Mard Kenya, free
- SWC technology Dev. in ASAL by Kithinji Mutunga: SWC branch, free
- SC in Kenya, Carl G.Wenner. 1984.: Aici, free
- ony superb DXE-180 video: Mard Kenya, free
- The sun will still rise: Mard Kenya, free
- Run off a friend or a foe: Mard Kenya, free