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

Water harvest (肯尼亚)

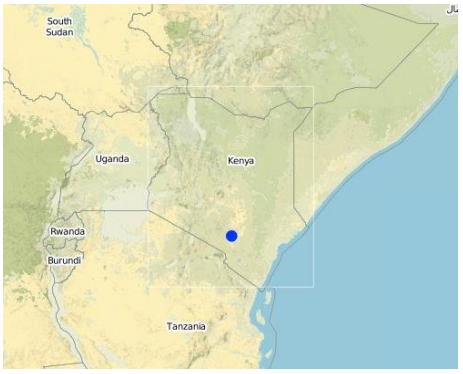
Kunasa maji ya muua yanuyobubugika na kuyuelekeza shambani kwa uzakshaji-Alex R.Adual RSCU/SIDA1996

描

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.

地点



地点: KiMuiki, Kitise, Mburo, Kwa Kauisi, Eastern, 肯尼亚

分析的技术场所数量:

选定地点的地理参考
- 37.95, -2.2

技术传播:

实施日期: 不到10年前 最

介绍类型
- 土地使用者的创新
- 作为传统系统的一 分 50 年
- 在实 /研究期
- ☑ 外 目 干

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

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

技术分类

主要目的

- [ ] 改 生产
- [x] 减少、 、恢复土地 化
- [ ] 保护生态系统
- [ ] 结合其他技术保护流域/下游区域
- [ ] 保持/提 生物多样性
- [ ] 低灾害
- [ ] 应气候变化/极端天气及其影响
- [ ] 减缓气候变化及其影响
- [ ] 创 有益的经济影响
- [ ] 创 有益的社会影响

土地利用

农田 - 一年一作
主 农作物 经济作物及粮 作物jor food crop: Maize
Other: C.peas

混合（作物/放牧/树木），包括农林 - 农林牧业
主 产品服务: 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

供水

- [x] 养
- [ ] 混合 水灌溉
- [ ] 充分灌溉

每年的生长季节数: 2
该技术实施前的土地利用: 不 用
牲畜密度: 不 用

土地退化相关的目的

- [x] 止土地 化
- [ ] 减少土地 化
- [ ] 修复/恢复严 化的土地
- [ ] 应土地 化
- [ ] 不 用

解决的退化问题

土壤水蚀 - Wt 土流失 侵

化学性土壤退化 - Cn 肥力下 和有机 含 下

物理性土壤退化 - Pk 熟化和结壳i 土

SLM组

- 水

SLM措施

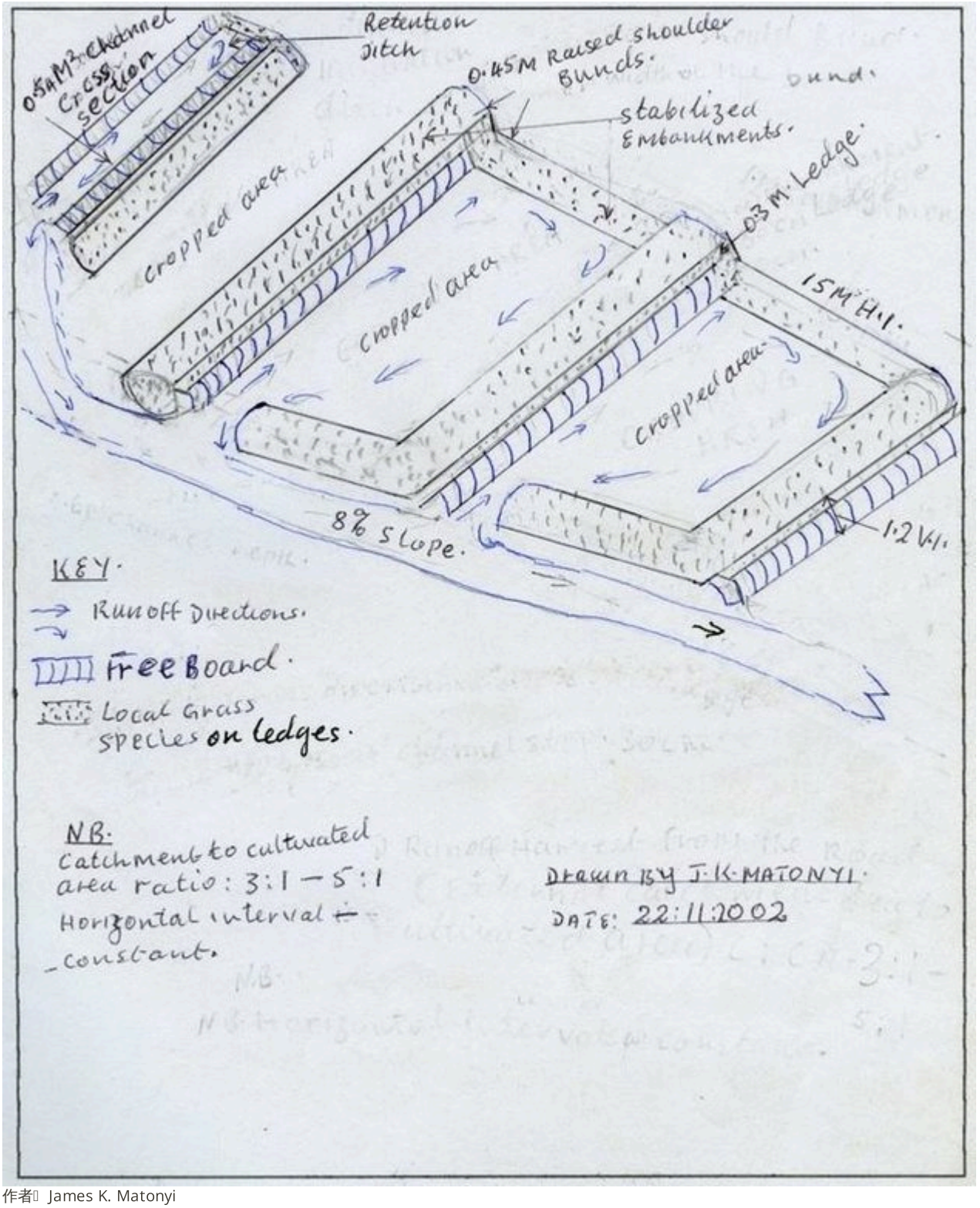
农艺措施 -

植物措施 - V2 和多年生 本植物

结构措施 - S3 分级沟渠、渠 、水

技术图纸

技术规范



作者 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

技术建立与维护□ 活动、投入和□ 用

投入和成本的计算
- □ 算的成本为□
- 成本□ 算使用的□ **美元**
- 汇率□ 换算为美元□ 1 美元 = 不□ 用
- □ 用劳工的每日平均工□ 成本92

影响成本的最重要因素
Factors affecting the costs include hard ground at SWC peak period, labour, slope, catchment area, channel size and source of income

技术建立活动
1. grass planting on embankments (时□ /□ 率after onset of rain)
2. fruits seedling transplanting (时□ /□ 率october rain)
3. dispersed tree seedlings transplanting (时□ /□ 率october rain)
4. retention/infiltration ditches (时□ /□ 率after crop harvest)
5. Bench terraces (时□ /□ 率after crop harvest)

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

技术建立的投入和成本

对投入进行具体说明	单位	数量	单位成本 (美元)	每项投入的总成本 (美元)	土地使用者承担的成本%
劳动力					
Labour	ha	1.0	296.0	296.0	100.0
设备					
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
植物材料					
Seeds	ha	1.0	76.3	76.3	100.0
Seedligs	ha	1.0	79.5	79.5	100.0
肥料和杀菌剂					
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
施工材料					
Stone	ha	1.0	244.0	244.0	100.0
技术建立所需总成本				**1'369.0**	

技术维护活动

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

技术维护的投入和成本

对投入进行具体说明	单位	数量	单位成本 (美元)	每项投入的总成本 (美元)	土地使用者承担的成本%
劳动力					
Labour	ha	1.0	98.0	98.0	100.0
设备					
Animal traction	ha	1.0	72.3	72.3	100.0
植物材料					
Seeds	ha	1.0	67.3	67.3	100.0
Seedlings	ha	1.0	55.7	55.7	100.0
肥料和杀菌剂					
Fertilizer	ha	1.0	44.2	44.2	100.0
Biocides	ha	1.0	21.5	21.5	100.0
施工材料					
Earth	ha	1.0	244.0	244.0	100.0
技术维护所需总成本				**603.0**	

然环境

年平均降雨量
- [ ] < 250毫米
- [x] 251-500毫米
- [ ] 501-750毫米
- [ ] 751-1,000毫米
- [ ] 1,001-1,500毫米
- [ ] 1,501-2,000毫米
- [ ] 2,001-3,000毫米
- [ ] 3,001-4,000毫米
- [ ] > 4,000毫米

农业气候带
- [ ] 潮湿的
- [ ] 半湿润
- [x] 半干旱
- [x] 干旱

关于气候的规范
以毫米为单位 算的年平均 350.0
semi-arid: LGP-70-180

arid: LGP-60-120

斜坡
- [ ] 水平 0-2%
- [ ] 缓 3-5%
- [x] 平缓 6-10%
- [x] 滚坡 11-15%
- [ ] 崎岖 16-30%
- [ ] 峭 31-60%
- [ ] 常 峭 >60%

地形
- [ ] 平原
- [ ] 山
- [ ] 山坡
- [ ] 山地斜坡
- [x] 坡
- [x] 底

海拔
- [ ] 0-100 m a.s.l.
- [ ] 101-500 m a.s.l.
- [ ] 501-1,000 m a.s.l.
- [x] 1,001-1,500 m a.s.l.
- [ ] 1,501-2,000 m a.s.l.
- [ ] 2,001-2,500 m a.s.l.
- [ ] 2,501-3,000 m a.s.l.
- [ ] 3,001-4,000 m a.s.l.
- [ ] > 4,000 m a.s.l.

.....应用的技术
- [ ] 凸形情况
- [ ] 凹 情况
- [ ] 不相关

土壤深度
- [ ] 常浅 0-20厘米
- [x] 浅 21-50厘米
- [x] 中等深度 51-80厘米
- [ ] 深 81-120厘米
- [ ] 常深 > 120厘米

土壤质地（表土）
- [x] 粗粒/ 砂
- [x] 中粒 壤土、粉土
- [ ] 细粒/ 粘土

土壤质地（地表以下>20厘米）
- [ ] 粗粒/ 砂
- [ ] 中粒 壤土、粉土
- [ ] 细粒/ 粘土

表土有机质含量
- [ ] > 3%
- [x] 中 1-3%
- [x] 低 <1%

地下水位
- [ ] 上
- [ ] < 5米
- [ ] 5-50米
- [ ] > 50米

地表水的可用性
- [ ]
- [ ] 好
- [ ] 中等
- [ ] 匮乏/没有

水质（未处理）
- [ ] 好 用水
- [ ] 不 用水 处理
- [ ] 仅供农业使用 灌溉
- [ ] 不可用

盐度是个问题吗？
- [ ] 是
- [ ] 否

洪水发生
- [ ] 是
- [ ] 否

物种多样性
- [ ]
- [ ] 中等
- [ ] 低

栖息地多样性
- [ ]
- [ ] 中等
- [ ] 低

应用 技术的土地使用者的特征

市场定位
- [ ] 生 给
- [x] 混合 生产/商业
- [ ] 商业/市场

非农收入
- [ ] 低于全 收入的10%
- [x] 收入的10-50%
- [ ] > 收入的50%

相对财富水平
- [ ] 常 瘠
- [x] 瘠
- [x] 平均水平
- [ ] 丰富
- [ ] 常丰富

机械化水平
- [x] 手工作业
- [x] 畜力牵引
- [ ] 机械化/电动

定栖或游牧
- [ ] 定栖的
- [ ] 半游牧的
- [ ] 游牧的

个人或集体
- [ ] 个人/家庭
- [ ] 团体/社区
- [ ] 合作社
- [ ] 员工 公司、政府

性别
- [ ] 女人
- [ ] 男人

年龄
- [ ] 儿童
- [ ] 年人
- [ ] 中年人
- [ ] 老年人

每户使用面积
- [ ] < 0.5 公
- [ ] 0.5-1 公
- [x] 1-2 公
- [x] 2-5公
- [ ] 5-15公
- [ ] 15-50公
- [ ] 50-100公
- [ ] 100-500公
- [ ] 500-1,000公
- [ ] 1,000-10,000公
- [ ] > 10,000公

规模
- [ ] 小 模的
- [ ] 中等 模的
- [ ] 大 模的

土地所有权
- [ ] 州
- [ ] 公司
- [ ] 社区/村庄
- [ ] 团体
- [x] 个人 未命名
- [x] 个人 有命名

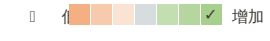
土地使用权
- [ ] 由 入 无组织
- [ ] 社区 有组织
- [ ] 租
- [x] 个人

用水权
- [ ] 由 入 无组织
- [ ] 社区 有组织
- [ ] 租
- [ ] 个人

进入服务和基础设施的通道

影响

社会经济影响
作物生产



Extra output 50%

生产区域 耕种使用中的新土地

农业收入

工作

增加 增加 增加 低

given area reduced by 14%

Extra income 27.5%

requires high labour costs

社会文化影响

社区机构

SLM/土地 化知

削弱 加强

减少 改

in capacity building

to land user

生态影响

地 径流

多余水的排放

土壤水分

土壤流失

增加 低

减少 改

增加

增加 低

SLM之前的数 : 32
SLM之后的数 : 14

risking occasion

external WH.

SLM之前的数 : 20
SLM之后的数 : 10
WH combination

场外影响

旱季稳定可 的水流 包括低流

下游洪水 不希望

下游淤积

减少 增加

增加 减少

增加 低

irrigation potential reduced

rainfall runoff trapped

silt retained on cropland

成本效益分析

与技术建立成本相比的效益

期回报 常消极 常积极

与技术维护成本相比的效益

短期回报 常消极 常积极

气候变化

-

用和 应

采用该技术的地区内土地使用者的百分比

- 单例/实
- [x] 1-10%
- 10-50%
- 大于 50%

在所有采用这种技术的人当中，有多少人在没有获得物质奖励的情况下采用了这种技术?

- 0-10%
- 10-50%
- 50-90%
- [x] 90-100%

户数和/或覆盖面积

630 household covered an area of 9%

最近是否对该技术进行了修改以适应不断变化的条件？

- 是
- 否

什么样的变化条件？

- 气候变化/极端气候
- 不断变化的市场
- 劳动力可用性 例如 由于 移

结 和吸取的教

长处: 土地使用者的观点

弱点/缺点/风险: 土地使用者的观点如何克服

- 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.

长处: 编制者或其他关键资源人员的观点

- 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.

弱点/缺点/风险: 编制者或其他关键资源人员的观点如何克服

- 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)

参考文献

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WOCAT数据库中的完整描述
https://qcat.wocat.net/zh/wocat/technologies/view/technologies_1097/

链接的SLM数据
不用

文件编制者

机构
- Ministry of Agriculture and Livestock Development of Kenya (MoA) - 肯尼亚

目
- 不用

主要参考文献

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- 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