Agricultural contour terraces next to the upper catchment area

Flat Contour Terraces (也门)

المدرجات الكنتورية

描述

Old flat terraces were built in accordance with the contour lines and surrounded by stones to create a suitable environment for the growth of crops, slope stabilization and reduce the risk of runoff and increasing water harvesting.

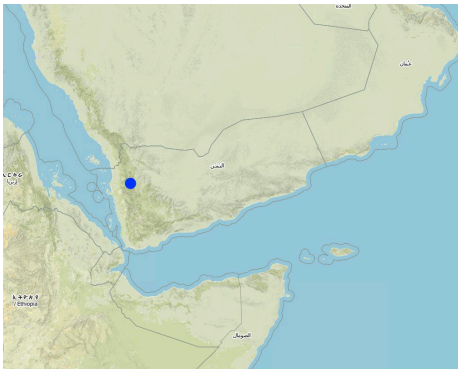
The Yemeni farmer challenged the nature cruel and adopted to cope with the needs and requirements, including the construction of agricultural terraces utilizing all the resources available in the region, where he worked first on the extraction of soil located on the slopes of the mountains and booked by building a wall of stones around where were collected and brought stones from different places. Walls were built in very geometric creativity very well designed so that they work to minimize the risk of soil erosion and increase the use of water runoff without damages to the established terraces so through the construction of terraces along contour lines and making outlets in each terrace to drain excess water.

The process of building terraces using stones according to the contours, which works to prevent soil erosion and erosion, as well as help to increase soil moisture as a result harvest runoff, which leads to meet the needs of crop water and thereby increase production.

The main objective of building terraces is to increase production. The soil depth at the beginning of the establishment of the stands to be very shallow and increasing soil depth as a result of increasing deposits the soil.This process is booked by increasing the height of the wall that range between 1-3 meters, and a width runway between 1-6 meters As for the length of the runway It is 5 - 80 meters according to the contour line, which runs on reserve deposits and protect the soil from erosion.. Finally terraces are planted with annual crops mainly cereals crops, as well as perennial trees such as coffee, diamond, Qat and other perennial trees.

The terraces of the projects long-term where you need a long time to build due to the use of hands in the construction process as a result you cannot use the mechanisms, for maintenance operations in view of the building stands on the regions of steep and where the rate of runoff high result of heavy rains in a short time in addition to Regression factor that leads to increase the speed of the flow of water, which operate on a cliff erosion terraces in the event of lack of maintenance, which makes the process of ongoing maintenance is an urgent need to ensure the preservation and sustainability of the stands.

地点



地点: Kahlan Afar, Hajah Governorate, 也门

分析的技术场所数量:

选定地点的地理参考

- 43.70736, 15.70772

技术传播: 均匀地分布在一个区域

在永久保护区？:

实施日期: 50多年前 传统

介绍类型

- [ ] 通过土地使用者的创新
- [x] 作为传统系统的一部分 > 50 年
- [ ] 在实 /研究期
- [ ] 通过 外部干

Agricultural terraces in the middle of the catchment area

技术分类

主要目的

- [x] 改良生产
- [x] 减少、 、恢复土地退化
- [ ] 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
- [ ] 适应气候变化/极端天气及其影响
- [ ] 减缓气候变化及其影响
- [ ] 创造有益的经济影响
- [ ] 创造有益的社会影响

土地利用

农田

- 一年一作: 谷类 - 大 , 谷物类 - 玉米, 谷类 - 其他, 谷类 - 小
  春季 豆科牧草和豆类 - 豆子, lentils
- 乔木与灌木的种植: 咖啡 天种植, Diamond

每年的生长季节数: 2

供水

- [x] 养
- [ ] 混合 水灌溉
- [ ] 充分灌溉

土地退化相关的目的

- [ ] 止土地退化
- [x] 减少土地退化
- [ ] 修复/恢复严重退化的土地
- [ ] 适应土地退化
- [ ] 不适用

解决的退化问题

土壤水蚀 - Wt 表土流失, 地表侵蚀，Wg 冲沟侵蚀, 沟蚀

生物性退化 - Bc 植被覆盖的减少

水质恶化 - Ha 干旱化

SLM组

- 横坡措施

SLM措施

农艺措施 - A3 土壤表 处理

结构措施 - S1 地

技术图纸

技术规范

terraces built along contour lines

Location: Hajah Governorate. Kahlan Afer

Date: 10-2-2013

Technical knowledge required for field staff / advisors: moderate (does not have only a little experience)

Technical knowledge required for land users: low (Has enough experience)

Main technical functions: reduction of slope angle, reduction of slope length, water harvesting / increase water supply, sediment retention / trapping, sediment harvesting, reduction surface runoff

Secondary technical functions: increase of infiltration, water spreading

Contour tillage
Material/ species: agricultural tools, animal traction

Terrace: bench level
Vertical interval between structures (m): 1 - 3
Spacing between structures (m): 1 - 6
Height of bunds/banks/others (m): 1 - 3
Width of bunds/banks/others (m): 1 - 6
Length of bunds/banks/others (m): 5 - 80

Construction material (earth): Collecting soil and reserve deposits to increase the soil depth

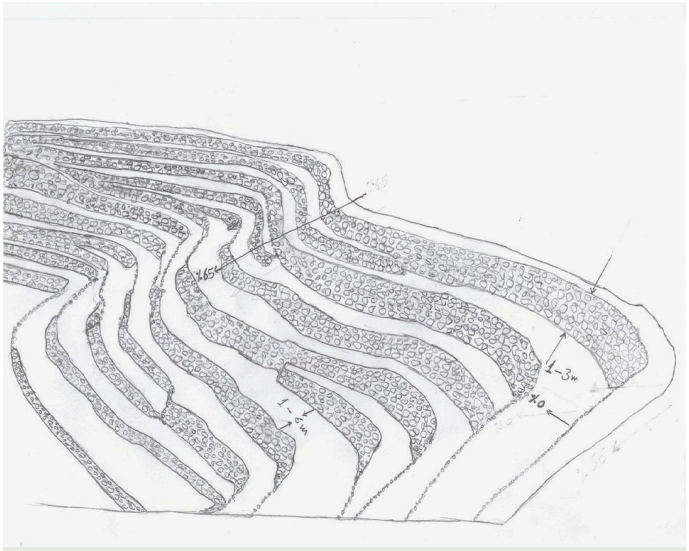
Construction material (stone): Stones available in the region

Slope (which determines the spacing indicated above): 65%

If the original slope has changed as a result of the Technology, the slope today is: 0%

Lateral gradient along the structure: 0%

For water harvesting: the ratio between the area where the harvested water is applied and the total area from which water is collected is: 1:1



Author: Algalal

技术建立与维护 活动、投入和费用

投入和成本的计算

- 计算的成本为
- 成本计算使用的货币 **美元**
- 汇率 换算为美元 1 美元 = 不适用
- 用劳工的每日平均工资成本7.00

影响成本的最重要因素

Collecting and transporting stones Severe slopes

技术建立活动

1. Extraction of soil (时 / 率Before the rainy season)
2. Collecting stones (时 / 率Before the rainy season)
3. Build a wall to establish a terrace (时 / 率Before the rainy season)

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					
Extraction of soil	ha	1.0	2500.0	2500.0	100.0
Collecting stones	ha	1.0	1162.8	1162.8	100.0
Build a wall to establish a terrace	ha	1.0	558.0	558.0	100.0
设备					
Tools	ha	1.0	46.5	46.5	100.0
Animal traction	ha	1.0	186.0	186.0	100.0
技术建立所需总成本				**4'453.3**	
技术建立总成本 美元				*4'453.3*	

技术维护活动

1. plowing along contour lines (时 / 率Before planting)
2. Repairing damaged walls (时 / 率annually after the rain)

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					
Plowing along contour lines	ha	1.0	50.0	50.0	100.0
Repairing damaged walls	ha	1.0	100.0	100.0	100.0
设备					
Tools	ha	1.0	30.0	30.0	100.0
Animal traction	ha	1.0	50.0	50.0	100.0
Tools	ha	1.0	18.6	18.6	100.0
技术维护所需总成本				**248.6**	
技术维护总成本 美元				*248.6*	

自然环境

年平均降雨量
- [ ] < 250毫米
- [x] 251-500毫米
- [x] 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
- [x] 半湿润
- [x] 半干旱
- [ ] 干旱

关于气候的规范
Thermal climate class: temperate

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

地形
- [ ] 平原
- [ ] 山脊
- [x] 山坡
- [ ] 山地斜坡
- [ ] 坡
- [ ] 谷底

海拔
- [ ] 0-100 m a.s.l.
- [ ] 101-500 m a.s.l.
- [ ] 501-1,000 m a.s.l.
- [ ] 1,001-1,500 m a.s.l.
- [ ] 1,501-2,000 m a.s.l.
- [x] 2,001-2,500 m a.s.l.
- [x] 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
- [x] 凸形情况
- [ ] 凹 情况
- [ ] 不相关

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

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

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

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

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

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

水质（未处理）
- [x] 良好 用水
- [ ] 不良 用水 要处理
- [ ] 仅供农业使用 灌溉
- [ ] 不可用

水质请参考

盐度是个问题吗？
- [ ] 是
- [ ] 否

洪水发生
- [ ] 是
- [ ] 否

物种多样性
- [ ]
- [ ] 中等
- [x] 低

栖息地多样性
- [ ]
- [ ] 中等
- [ ] 低

应用该技术的土地使用者的特征

市场定位
- [x] 生计 自给
- [x] 混合 生计/商业
- [ ] 商业/市场

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

相对财富水平
- [ ] 常贫瘠
- [x] 贫瘠
- [ ] 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
- [x] 个人/家庭
- [ ] 团体/社区
- [ ] 合作社
- [ ] 员工 公司、政府

性别
- [ ] 女人
- [x] 男人

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

每户使用面积
- [ ] < 0.5 公

规模
- [ ] 小规模的

土地所有权
- [ ] 州

土地使用权
- [ ] 自由进入 无组织

- [x] 0.5-1 公
- [x] 1-2 公
- [ ] 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

- [x] 中等规模的
- [ ] 大规模的

- [ ] 公司
- [ ] 社区/村庄
- [ ] 团体
- [ ] 个人 未命名
- [x] 个人 有命名

- [ ] 社区 有组织
- [x] 租赁
- [x] 个人
- [x] Waqf

用水权

- [ ] 自由进入 无组织
- [x] 社区 有组织
- [ ] 租赁
- [ ] 个人
- [x] Waqf

进入服务和基础设施的通道

健康	贫瘠	好
教育	贫瘠	好
技术援助	贫瘠	好
就业 例如 农	贫瘠	好
市场	贫瘠	好
能源	贫瘠	好
道路和交通	贫瘠	好
用水和卫生设施	贫瘠	好
金融服务	贫瘠	好

影响

社会经济影响

作物生产		增加
料生产		增加
生产故	增加	低
生产区域 耕种使用中的新土地		增加
土地管理	妨碍	简化
用水的可用性		增加
农业收入		增加
工作量	增加	低

As a result of the infiltration process

社会文化影响

品安全自给自足	减少	改良
文化机会 如精神、审美以及其他	减少	改良
SLM/土地退化知识	减少	改良
livelihood and human well-being	reduced	improved

生态影响

水量		增加
水的回收/收 径流、 水、 等	减少	改良
地表径流	增加	低
多余水的排放	减少	改良
地下水位/含水层	下	补水
土壤水分		增加
土壤流失	增加	低
植物多样性		增加
栖息地多样性		增加

场外影响

水的可用性 地下水、泉水		增加
下游洪水 不希望	增加	减少
下游淤积	增加	低

reduction of sediments

成本效益分析

与技术建立成本相比的效益

短期回报	常消极	常积极
长期回报	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
长期回报	常消极	常积极

气候变化

渐变气候

年温度 增加	常不好	常好

气候有关的极端情况（灾害）
局地暴

常不好 ✓ 常好

采用和适应

采用该技术的地区内土地使用者的百分比

- 单例/实
- 1-10%
- 11-50%
- ✓ > 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%
- 11-50%
- 51-90%
- ✓ 91-100%

户数和/或覆盖面积
994 households covering 100 percent of stated area

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 由于迁移

结论和吸取的教训

长处: 土地使用者的观点

长处: 编制者或其他关键资源人员的观点

- Creating a suitable environment for the growth of various crops

  How can they be sustained / enhanced? continue the process of maintenance to maintain walls and outlets
- Water harvesting to increase soil moisture

  How can they be sustained / enhanced? maintenance of water outlet constantly ensure that no water erosion by allowing excess water to drain out through the outlets.
- reduce runoff and Prevention of soil erosion

  How can they be sustained / enhanced? ongoing maintenance of outlets.
- discharge excess water in a systematic manner

  How can they be sustained / enhanced? ongoing maintenance of water exits
- reduce the length and angle of the slope

  How can they be sustained / enhanced? Maintaining the terraces

弱点/缺点/风险: 土地使用者的观点如何克服

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

- Low productivity in the first years of the Created stands terraces due to poor soil fertility and lack of depth apply fertilizer and chemical and organic fertilizers
- In the event of very heavy rain may be susceptible to erosion terraces ongoing maintenance of the waterways and channels to ensure that no diversion of water to areas prone to erosion and maintenance of the walls of the terraces and drain excess water.
- Due to the construction of terraces on the hillsides with steep slopes, which makes it difficult to use farm machinery and agricultural work is done by hand, which requires many labor somewhat the search for new technologies that fit this purpose

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_1174/

链接的SLM数据
Approaches: leveled mountain terraces https://qcat.wocat.net/zh/wocat/approaches/view/approaches_2621/

文件编制者

机构

- Agricultural Research and Extension Authority (AREA) - 也门

目

- 不适用

主要参考文献

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