Photo of Ferula assa-foetida plant cultivated in a terrace (Shabir Shahem (HELVETAS Swiss Intercooperation, Afghanistan))

Cultivation of Hing (Ferula assa-foetida) in the watershed (阿富汗)

Kesht Angoza da abriza

描述

Ferula assa-foetida is an important medicinal plant, a valued cash crop and a native plant of Afghanistan's range-lands.

Cultivation of hing (Ferula assa-foetida) in watersheds is documented by the Sustainable Land Management Project which is implemented by HELVETAS Swiss Intercooperation and funded by the Swiss Agency for Development and Cooperation (SDC). Ferula assa-foetida, or hing, is a medicinal plant that grows well in shallow sandy and alkaline soils in semi-arid climates and at high altitudes and is a native plant of Afghanistan's upper catchment areas. Due to the enduring conflict and the consequent breakdown of community-managed grazing in upper catchment areas, most range-lands in Afghanistan are been seriously degraded. Uncontrolled grazing of animals and growing cereal crops on range-lands are the main contributors to the loss of vegetation coverage in upper catchments. One of the negative consequences are flash floods occurring several times a year, damaging agricultural lands, irrigation canals, houses and other infrastructure while often also causing fatalities.

In order to decrease the risk of flash floods, improve pastures and extend cash crop cultivation in upper catchment areas, HELVETAS Swiss Intercooperation has implemented community-based watershed activities such as structural and agronomic measures to control water runoff.

Hing has been identified as a suitable agronomic measure in watershed management in Saighan district. HELVETAS Swiss Intercooperation and the target communities selected hing as a valuable cash crop and a suitable plant for watershed rehabilitation. Today, hing is cultivated on 1,400,000 m2 (140 ha) in nine watersheds and with the participation of 1500 families. The growing period of hing depends on the local climate but tends to be 5-10 years and culminates in the pants' flowering. During the first five years hing has grey colored leaves. Later a stem appears and grows more than a meter high. The stem is large and yellow and at the end of the main and subordinate stems are yellow flowers. The width of the hing root varies between 7-15 cm and usually goes as deep as 30-40 cm into the soil. Hing plantations have been established with the involvement of the local communities and are managed by the responsible watershed committee. The harvest of hing is organized by the watershed committee and all households have the right to participate and sell hing for income generation. To maintain watershed activities, such as hing cultivation, a safe box has been created for each community-managed watershed. The watershed committee manages the safe box and collects funds for maintenance, community development and emergency projects, according to the watershed management plan which has been developed by the local communities with support of HELVETAS Swiss Intercooperation.

Natural / human environment: Bamyan is a remote province of Afghanistan with a high poverty rate. It has a semi-arid climate with cold winters and hot and dry summers. During winter, temperatures can drop below -22 degrees. Summer temperatures can reach to 34 degrees in the month of July. The average annual rainfall in the area is about 230 mm and some years can be very dry. 90% of the population relies on subsistence agriculture for their livelihoods and off-farm activities are marginal. The growing season in Saighan district is relatively short from April to October and farmers can produce only one crop per year. Farmers with access to irrigation water cultivate cash crops, for example potato and vegetables, in addition to staple (wheat) and fodder crops. Those without access to irrigation water cultivate wheat and fodder crops only. Water scarcity from May to September may result in a lack of high value crops.

地点

地点: Saighan, Bamyan, 阿富汗

分析的技术场所数量: 2-10个场所

选定地点的地理参考
- 不适用

技术传播: 均匀地分布在一个区域 (1.4 km²)

在永久保护区？:

实施日期: 不到10年前 最近

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

Photo of sowing Ferula assa-foetida seed in watershed (Shabir Shahem (HELVETAS Swiss Intercooperation, Afghanistan))

技术分类

主要目的

- [ ] 改良生产
- [x] 减少、 防、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
- [x] 创造有益的经济影响
- [ ] 创造有益的社会影响

土地利用

同一土地单元内混合使用的土地 是 - 农牧业 包括农牧结合

农田

- 多年一作 木本药用、芳 、杀虫植物多年生植物

牧场

- 半游牧畜牧业
- 收割和携带/ 放牧

供水

- [x] 养
- [ ] 混合 水灌溉
- [ ] 充分灌溉

土地退化相关的目的

- [ ] 防止土地退化
- [ ] 减少土地退化
- [x] 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

SLM组

- cultivation of medical plants

SLM措施

农艺措施 - A1 植被和土壤覆盖层

技术图纸

技术规范

Cultivation plan of Ferula assa-foetida:
Plant to plant distance 100 cm.
Line to line distance 100 cm.
Seed depth 1-1.5 cm with;
3-6 seeds in one spot.

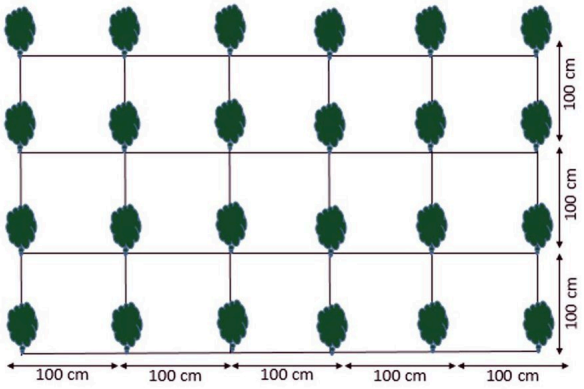
Location: Saighan watersheds. Bamyan
Date: 18/04/2016

Technical knowledge required for field staff / advisors: high
Technical knowledge required for land users: moderate
Main technical functions: control of raindrop splash, improvement of surface structure (crusting, sealing), increase of infiltration, Increase vegetation cover through cash crop

Better crop cover
Material/ species: Ferula assa-foetida
Quantity/ density: 4 plant/m2
Remarks: plant to plant and line to line 100 cm

Mixed cropping / intercropping
Material/ species: Ferula assa-foetida and other domestic plants
Quantity/ density: 1 m2
Remarks: Growing domestic plants between Ferula assa-foetida plants

Cover cropping
Material/ species: Ferula assa-foetida and other plants cover the naked area



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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 **Afghani**
- 汇率 换算为美元 1 美元 = 67.69 Afghani
- 用劳工的每日平均工资成本5.17

影响成本的最重要因素
Good quality seeds are available in Tajikistan. If the government of Tajikistan limits exporting seeds to Afghanistan, seed costs may increase.

技术建立活动
n.a.

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 (Afghani)	每项投入的总成本 (Afghani)	土地使用者承担的成本%
劳动力					
labour	ha	1.0	12.92	12.92	25.0
植物材料					
seeds	ha	1.0	115.0	115.0	25.0
技术建立所需总成本				**127.92**	
技术建立总成本 美元				*1.89*	

技术维护活动
1. Hiring guard for protection of watershed from uncontrolled grazing (时间/ 率None)

自然环境

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
- [ ] 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%
- [x] 滚坡 11-15%
- [x] 崎岖 16-30%
- [ ] 峭 31-60%
- [ ] 常 峭 >60%

地形
- [ ] 高原
- [ ] 山脊
- [x] 山坡
- [x] 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
- [ ] 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)
- [ ] 常深(>120厘米)

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

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

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

地下水位
- [ ] 表上
- [ ] < 5米
- [x] 5-50米
- [ ] > 50米

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

水质（未处理）
- [ ] 良好(用水)
- [ ] 不良(用水)(要处理)
- [x] 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
- [ ] 生计(自给)
- [ ] 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
- [x] 平均水平
- [ ] 丰富
- [ ] 常丰富

机械化水平
- [ ] 手工作业
- [ ] 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
- [x] 团体/社区
- [ ] 合作社
- [ ] 员工(公司、政府)

性别
- [x] 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
- [ ] 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

规模
- [ ] 小规模的
- [x] 中等规模的
- [ ] 大规模的

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

土地使用权
- [ ] 自由进入(无组织)
- [x] 社区(有组织)
- [ ] 租赁
- [ ] 个人

用水权
- [ ] 自由进入(无组织)
- [x] 社区(有组织)
- [ ] 租赁
- [ ] 个人

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
农业收入

(减少) ... ✓ 增加

社会文化影响
社区机构

削弱 ... ✓ 加强

Watershed committee manage the income of Ferula assa-foetida productions through safe box investment

contribution to human well-being

decreased ... ✓ increased

Improve the economic opportunities of the community to generate income

生态影响

地表径流

增加 低

SLM之前的数量: 5
SLM之后的数量: 25
Vegetation coverage

土壤水分

增加

SLM之前的数量: 10
SLM之后的数量: 30
When the plants grow more, cover area and infilterate runoff

土壤流失

增加 低

SLM之前的数量: 5
SLM之后的数量: 50
Vegetation coverage

有益物种 捕 者、蚯蚓、传粉者 增加

场外影响

下游洪水 不希望

增加 减少

Vegetation coverage

对邻近农田的破坏

增加 减少

Reduction of flash flood protect lower part resources

对公共/私人基础设施的破坏

增加 减少

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

The establishment costs are high because hing yields only after five years. However, the investments and maintenance costs are quickly returned once hing can be harvested.

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

局地 暴 常不好 常好

比较和缓的 河道 洪水 常不好 常好

其他气候相关的后果

缩短生长期 常不好 常好 答案 未知

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%

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

- Increase in production of the valuable plants in the upland areas.
- Protection of the lower lands from the risk of flash floods.

长处: 编制者或其他关键资源人员的观点

- Introduction and increase in valuable cash crop cultivation in unproductive lands.
- New income opportunity and increase in income of the community members.
- Reducing flash flood through increasing vegetation coverage

弱点/缺点/风险: 土地使用者的观点如何克服

- The watershed area is common land. Need active watershed committee members to manage well (good governance).

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

- People lack alternatives and have therefore no stake to protect the upland areas. Negotiation with herders to reduce the number of their livestock because of introduction of as new alternative source of income.
- Tangible benefits are only visible after five years.

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_1306/

链接的SLM数据
不适用

文件编制者

机构
- HELVETAS (Swiss Intercooperation)

目
- 不适用

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