Esparcet plot situated on the mountain slope (Malgorzata Conder)

Crop rotation including annual crops and Esparcet cultivation (塔吉克斯坦)

描述

Crop rotation with current Esparcet production

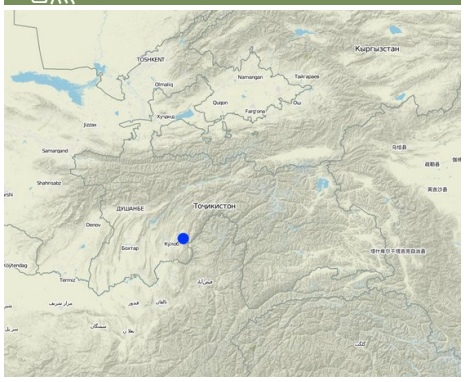
An Esparcet plot of one hectare is located on a hillslope in the Chukurak watershed. The owner lives in the valley far away from the plot. During the harvest, he is staying in the hills a whole week, because a daily journey to his house would take too much time. For the last three years, the farmer is cultivating Esparcet with the main aim to feed his cows. In two years, he will switch to a wheat or chickpea plot. In total, the farmer owns19 hectares of cropland, out of which the Esparcet plot accounts for 20% of his income. Next to the Esparcet plot, other farmers cultivate wheat and chickpea. In contrast to Esparcet, those plots must be protected from boars. Even though irrigation is impossible and the water point is situated far away, Esparcet grows very well because of the straight and spread-out roots. Esparcet is beneficial for the state of soil fertility and soil stabilization. Their seeds are more expensive than wheat seeds, but also result in a higher harvest. Esparcet can be harvested up to three times a year depending on water availability.

Purpose of the Technology: The main purpose of Esparcet cultivation is fodder production for the cows. The farmer owns other plots where he cultivates wheat. Moreover, it's a good location for an Esparcet plot: Even though water is not available Esparcet maintains the soil moisture and nutrients while reducing soil erosion. Thanks to the crop rotation, the soil is in a healthy state. Yield quantity and quality are very satisfying for the farmer.

Establishment / maintenance activities and inputs: The farmer stresses that good knowledge is needed to know where, what and how to cultivate. He learned from other farmers. Before establishing the perennial crop, he first planted a nurse crop of fodder grain in spring. Nurse crops strengthen soil stability while minimizing weed and overly sunlight. Plowing, sowing and cutting are initial as well as recurrent activities. No fertilizer and no plot guarding are needed. Initial costs when growing Esparcet are higher than for wheat, because Esparcet seeds are more expensive. Additionally, seeds of the nurse crop are needed.
Not to neglect is the long way from the farmers' house to the plot which takes time and fuel, but the farmers of that hillslope often give a lift to each other. Also during harvest the neighboring farmers are helping out.

Natural / human environment: The plot on the hillslope is located far away from the farmer's' village Sarmaydon 2. It's situated at around 2000m asl below the hill peaks, where boars are entering. On three sides, the plot is delimited naturally by incised riverbeds which make accessibility more difficult. Due to the high altitude, there are low temperatures and high moisture. Above the Esparcet cultivation, wheat and chickpea plots are cultivated leading to off-site effects on the Esparcet plot. In the Esparcet plot, a deep rill developed originating from the wheat plot situated upslope.

地点



地点: Muminabad, Khatlon, Tajikistan, 塔吉克斯坦

分析的技术场所数量:

选定地点的地理参考
- 70.06055, 38.01633

技术传播: 均匀地分布在一个区域 (approx. < 0.1 平方千米（10 公顷）)

在永久保护区？:

实施日期: 不到10年前（最近）

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

Growing Esparcet (Malgorzata Conder)

技术分类

主要目的

- [x] 改良生产
- [ ] 减少、预防、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/提高生物多样性
- [ ] 降低灾害风险
- [ ] 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 - 小麦（春季），谷类 - 小麦（冬季），Lucerne, Esparcet, Chickpea

每年的生长季节数: 1

牧场

供水

- [x] 雨养
- [ ] 混合雨水灌溉
- [ ] 充分灌溉

土地退化相关的目的

- [x] 防止土地退化
- [ ] 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，Wo：场外劣化效应

化学性土壤退化 - Cn：肥力下降和有机质含量下降（非侵蚀所致）

物理性土壤退化 - Pc：压实

SLM组

- 畜牧业和牧场管理
- 改良植物品种/动物品种

SLM措施

农艺措施 - A1：植被和土壤覆盖层, A2：有机质/土壤肥力

技术图纸

技术规范

The Esparcet plot is located on a hillslope and is laterally delimited by embankments. The density of the vegetation cover varies within the plot. A rill building was observed in the upper part of the plot, originating in the wheat cultivation with very low vegetation cover located upslope.

Location: Chukurak watershed. Muminabad, Khatlon, Tajikistan

Date: 14.02.2013

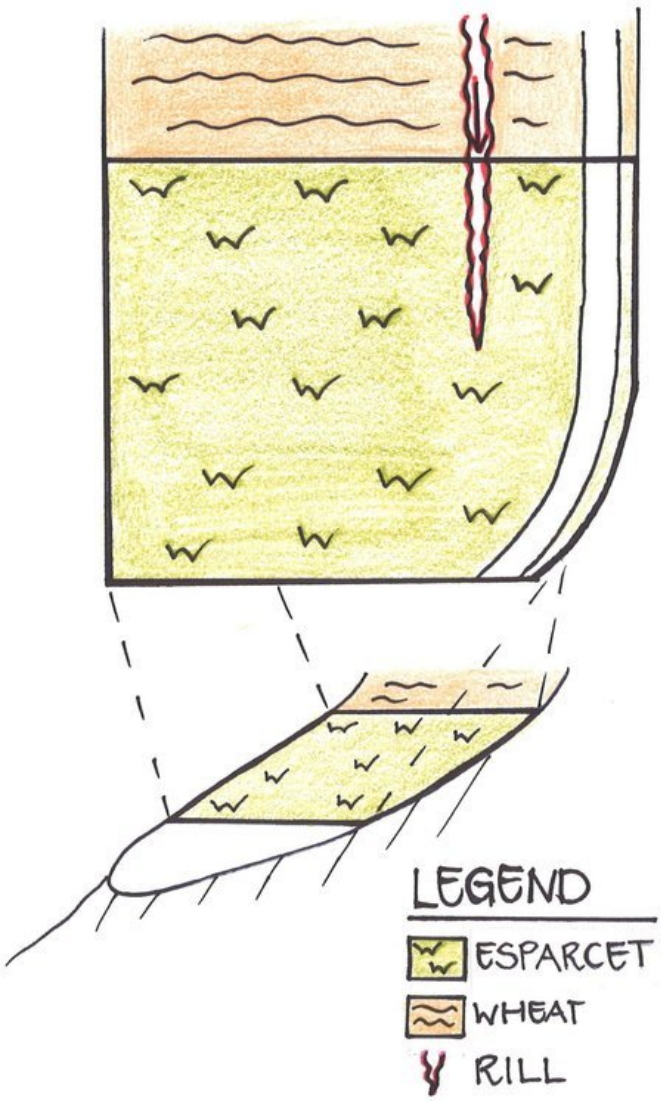
Technical knowledge required for field staff / advisors: low (Basic agricultural knowledge is required. If technical knowledge about cultivation is available Esparcet cropping is not especially challenging. Nurse crop may be possibly applied.)

Technical knowledge required for land users: low

Main technical functions: control of concentrated runoff: retain / trap, control of concentrated runoff: impede / retard, control of concentrated runoff: drain / divert, improvement of ground cover, improvement of topsoil structure (compaction), stabilisation of soil (eg by tree roots against land slides), increase / maintain water stored in soil

Secondary technical functions: increase of surface roughness, improvement of surface structure (crusting, sealing), improvement of subsoil structure (hardpan), increase in organic matter, increase in nutrient availability (supply, recycling,...), increase of infiltration, sediment retention / trapping, sediment harvesting

Rotations / fallows
Material/ species: Esparcet
Quantity/ density: 3.75t/ha
Remarks: with fodder grain as nurse crop



Author: Malgorzata Conder

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
- 雇用劳工的每日平均工资成本：12.40

影响成本的最重要因素

The most determinate factor is theoretically the cost to harvest the Esparcet. Labour input is not based on money, but on mutual support among the farmers. So the farmer will have to work on plots of other farmers to compensate the support he gets. Besides, seeds and tractor renting are the most expensive aspects of Esparcet cultivation.

技术建立活动

1. Plowing- lab. light: 1.5 hours, 1 person (时间/频率: None)
2. Plowing - tractor rent (时间/频率: None)
3. Plowing - petrol (时间/频率: None)
4. Fodder grain seeds (时间/频率: None)
5. Esparcet seeds (时间/频率: None)
6. Sowing Grain and Esparcet - lab.light: 1.5 hours, 1 person (时间/频率: None)

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					
Plowing	Person/day	0.2	15.5	3.1	100.0
Sowing	Esparcet seeds	0.2	15.5	3.1	100.0
设备					
Tractor rent	hours	3.0	6.9	20.7	100.0
Petrol for plowing	litres	40.0	1.14	45.6	100.0
植物材料					
Fodder Grain seeds	kg	70.0	0.414285	29.0	100.0
Esparcet seeds	kg	20.0	6.21	124.2	100.0

技术建立所需总成本	**225.7**	
技术建立总成本，美元	*225.7*	

技术维护活动

1. Cutting Esparcet (时间/频率: 2 times a year (1. cut and 2. cut))

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					
Cutting Esparcet	Person/day	94.5	12.43	1174.63	100.0
machine use to cut	hours	2.0	31.1	62.2	100.0
设备					
Petrol	litres	40.0	1.14	45.6	100.0
技术维护所需总成本				**1'282.43**	
技术维护总成本，美元				*1'282.43*	

自然环境

年平均降雨量

- [ ] < 250毫米
- [ ] 251-500毫米
- [ ] 501-750毫米
- [ ] 751-1,000毫米
- [x] 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
- [ ] 半干旱
- [ ] 干旱

关于气候的规范

Totally 800mm: 700mm in winter-spring, July-Sept dry season (At 1200m asl, weather Station Muminabad). Precipitation increases with the altitude: in average 60mm per 100m (in here approx.1300mm)
Thermal climate class: temperate

LPG from April until September

斜坡

- [ ] 水平（0-2%）
- [ ] 缓降（3-5%）
- [ ] 平缓（6-10%）
- [ ] 滚坡（11-15%）
- [x] 崎岖（16-30%）
- [ ] 陡峭（31-60%）
- [ ] 非常陡峭（>60%）

地形

- [ ] 高原/平原
- [ ] 山脊
- [ ] 山坡
- [x] 山地斜坡
- [ ] 麓坡
- [ ] 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.
- [ ] 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
- [ ] 凹陷情况
- [ ] 不相关

土壤深度

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

- [ ] 高（>3%）
- [x] 中（1-3%）
- [ ] 低（<1%）

地下水位

- [ ] 表面上
- [x] < 5米
- [ ] 5-50米
- [ ] > 50米

地表水的可用性

- [ ] 过量
- [ ] 好
- [x] 中等
- [ ] 匮乏/没有

水质（未处理）

- [ ] 良好饮用水
- [ ] 不良饮用水（需要处理）
- [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

- [ ] 高
- [x] 中等
- [ ] 低

栖息地多样性

- [ ] 高
- [ ] 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

- [ ] 非常贫瘠
- [ ] 贫瘠
- [x] 平均水平
- [ ] 丰富
- [ ] 非常丰富

机械化水平

- [x] 手工作业
- [ ] 畜力牵引
- [x] 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
- [ ] 青年人
- [ ] 中年人
- [ ] 老年人

每户使用面积

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

规模

- [x] 小规模的
- [ ] 中等规模的
- [ ] 大规模的

土地所有权

- [x] 州
- [ ] 公司
- [ ] 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）
- [ ] 社区（有组织）
- [x] 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（例如非农）	贫瘠	好
市场	贫瘠	好
能源	贫瘠	好
道路和交通	贫瘠	好
饮用水和卫生设施	贫瘠	好
金融服务	贫瘠	好

影响

社会经济影响

作物生产	降低	增加	First year only one cut possible but after that yield increases to a positive extent
饲料生产	降低	增加	
饲料质量	降低	增加	
畜牧生产	降低	增加	
生产故障风险	增加	降低	
农业投入费用	增加	降低	Esparcet seeds are relatively expensive compared to other seed types
工作量	增加	降低	No guarding needed

社会文化影响

食品安全/自给自足	减少	改良
冲突缓解	恶化	改良
Livelihoods and human well-being	reduced	improved

生态影响

地表径流	增加	降低
地下水位/含水层	下降	补水
蒸发	增加	降低
土壤水分	降低	增加
土壤覆盖层	减少	改良
土壤流失	增加	降低
土壤结壳/密封	增加	减少
土壤压实	增加	减少
养分循环/补给	降低	增加
土壤有机物/地下C	降低	增加
生物量/地上C	降低	增加
Hazards towards adverse events	improved	reduced

场外影响

下游淤积	增加	降低
缓冲/过滤能力（按土壤、植被、湿地划分）	减少	改良
对邻近农田的破坏	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	非常消极	非常积极
长期回报	非常消极	非常积极

与技术维护成本相比的效益

短期回报	非常消极	非常积极

长期回报 非常消极 非常积极

Yield is lower in the first year of the establishment but more cuts are possible in the next years. In the longer term, it is more beneficial for soil properties: Good soil nutrient and soil moisture availability, soil stabilization and reduced soil erosion and off-site effects.

气候变化

渐变气候

年温度 增加 非常不好 非常好

气候有关的极端情况（灾害）

局地暴雨 非常不好 非常好

局地风暴 非常不好 非常好 答案：未知

干旱 非常不好 非常好

比较和缓的（河道）洪水 非常不好 非常好 答案：未知

其他气候相关的后果

缩短生长期 非常不好 非常好 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

- [x] 单例/实验
- [ ] 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%
- [x] 91-100%

户数和/或覆盖面积

1 Household

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

- Good yield, if you sell it you can buy comparatively a good quantity of wheat
- Guaranteed fodder availability for livestock

长处: 编制者或其他关键资源人员的观点

- Several harvests per year (up to three harvests) possible especially in the hills where precipitation is high
- Esparcet has many beneficial on- and off-site effects concerning soil quality, reduced soil erosion etc.

  How can they be sustained / enhanced? Knowledge transfer to other farmers
- Moderate work load (no guarding of the plot from boar)

  How can they be sustained / enhanced? Promote perennial crops among local farmers

弱点/缺点/风险: 土地使用者的观点如何克服

- First year only one cut is possible, and thus the farmer has to accept a lower yield compared to the cultivation of wheat

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

- Farmers need to cultivate food crops. A small scale farmer would only produce Esparcet if he already has a wheat crop somewhere, even if the latter is less profitable Knowledge transfer

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_1150/

链接的SLM数据
不适用

文件编制者

机构
- CARITAS (Switzerland) - 瑞士
- CDE Centre for Development and Environment (CDE Centre for Development and Environment) - 瑞士

项目
- 不适用