Green manures grown for production of seed to allow its distribution for use at larger scale. (Gerba Leta)

Green Manures (埃塞俄比亚)

Xa'oo Magarisaa

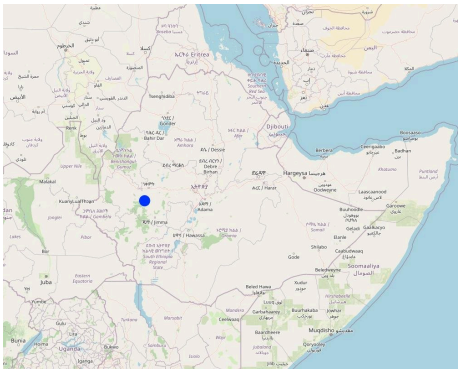
描

Green manures are fast-growing legumes sown in a field, weeks or even months before the main crop is planted. These are plants that are deliberately grown for incorporation into the soil to improve fertility and organic matter content.

Green manures are grown with the prime purpose of building up as much biomass as possible. However, they also play a role in covering the ground and protecting it from solar radiation and soil erosion. These are plants that are deliberately grown for incorporation into the soil to improve soil fertility and organic matter content. They are generally fast-growing legumes sown in a field several weeks or months before the main crop is planted. Legumes are chosen due to their ability to fix atmospheric nitrogen, their drought tolerance, quick growth, and adaptation to adverse conditions. Green manures have the potential to restore soil fertility and have an ameliorating effect on climate change via the sequestration of atmospheric carbon.
Green manures supply the soil with great amounts of fresh biomass. After incorporation into the soil, the biomass is decomposed by soil organisms within a few weeks under humid and warm conditions. Most nutrients are then readily available to a new crop. A small proportion is also transformed into stable soil organic matter, contributing to better soil structure, better aeration, improved drainage, increased soil water and nutrient holding capacity, and reduced erodibility of the soil by wind or water. Soil microbial activity is increased, as is the availability of macro and micronutrients in forms that the plants can use. They also have a root system that holds the soil in place.

Green manures are often applied to degraded land that demands management interventions. The purpose of introducing the technology reported here is primarily to multiply seeds for the scaling out of the technology. Among the common green manure crops which are being used in Ethiopia are lupin and lablab. Land users benefit from the sale of the seed itself as well as the fact that green manures increase production and help to changes unproductive and abandoned land into productive assets. This technology has been distributed to virtually all Integrated Soil Fertility Management project (ISFM+) intervention woredas/regions as a component of intervention technologies/practices.

地



地点: Mirga Mute, Bedele district, Oromia, 埃塞俄比亚

分析的技术场所数量: 2-10个场所

选定地点的地理参考
- 36.34407, 8.48284

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

在永久保护区？: 否

实施日期: 2020

介绍类型
- 土地使 创新
- 作为传 >50 年分
- 在实 / 期
- ✓ 外 干

A lupin crop grown as green manure right before its incorporation into the soil. (GERBA LETA)

技术分

主要目的

- [x] 改 产
- [x] 减少、 、恢复土地 化
- [x] 保护 态
- [ ] 合其他技术保护 下域 区域
- [x] 保持/提 多样性
- [ ] 低 害
- [ ] 应 候变化 天 及其影响
- [ ] 减 候变化及其影响
- [x] 创 有 影响
- [ ] 创 有 会影响

土地利用

同一土地单元内 合使 土地

农田

- 一年一作

每年 季 数
作制度:不适用
作制度:不适用

供水

- [x] 养
- [ ] 合
- [ ] 充分

土地退化相关的目的

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

解决的退化问题

土壤水蚀 - Wt 土地 失 侵

化学性土壤退化 - Cn 力下 和有机 含 下 , Ca 化

物理性土壤退化 - Pc 压实

生物性退化 - Bc 植 , Bl 减少壤寿命损失

SLM组

- 农 合
- 改 植
- 土壤 力 合

SLM措施

农艺措施 - A1 植 和土壤 , A2 层有机质土壤 力 A3 土壤 处

管理措施 - M5 化 控制

技术图

技术规范

技术建 与 护 动、投入和

投入和成本的计算

- 成本为 每个技术区域和 单位Sanga 换 1公 换 **1 公顷 = 1ha = 8 sanga**

影响成本的最重要因素

为Cost is highly volatile in Ethiopia. It could be attributed to global and national economic crises and price changes.

- 成本□ □ 使□ □ ETB 币□
- □ □ □ 换□ 为1 □ 元兑 53.12 ETB
- □ □ 劳工□ 每日平均工□ 200成本□

技术建立活动

1. Land preparation (时□ /□ □ Dry season)
2. Planting (时□ /□ □ Sow the green manure seeds during the short rainy season in March/April, about 45-60 days before planting the main crop.)
3. Slash and plowing over (时□ /□ □ Plow in the green manure about 2 weeks before planting the main crop, i.e. in June/July.)

技术建立的投入和成本 (per 1.5 Sanga)

对投入进行具体说明	单位	数量	单位成本 (ETB)	每项投入的总成本 (ETB)	土地使用者承担的成本%
劳动力					
Land preparation	PDs	3.0	200.0	600.0	100.0
Slashing and plow over	PDs	1.5	200.0	300.0	100.0
Planting	PDs	1.5	200.0	300.0	100.0
植物材料					
Green manure seed	kg	37.5	8.0	300.0	
技术建立所需总成本				**1'500.0**	
技术建□ 总成本□ □ 元				*28.24*	

技术维护活动

1. Labor for land preparation, planting, and slashing over. (时□ /□ □ Before planting the main crop.)

技术维护的投入和成本 (per 1.5 Sanga)

对投入进行具体说明	单位	数量	单位成本 (ETB)	每项投入的总成本 (ETB)	土地使用者承担的成本%
劳动力					
Land preparation, planting, slashing and plow over	PDs	4.5	200.0	900.0	100.0
植物材料					
Seeds	PDs	37.5	8.0	300.0	100.0
技术维护所需总成本				**1'200.0**	
技术□ 护总成本□ □ 元				*22.59*	

□ □ □ 境

年平均降雨量

- ☐ < 250□ □
- ☐ 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□ □

农业气候带

- ☐ □ □ □
- ☑ 半□ □
- ☐ 半干旱
- ☐ 干旱

关于气候的规范

Receives rainfall with a summer maximum. January to March is a dry season. The area receives short rains from March to April and maximum rain from June to September.

□ □ □ 名□adele□

斜坡

- ☐ □ 平□0-2%□
- ☑ □ □ 3-5%□
- ☑ 平□ □ 6-10%□
- ☐ □ 坡□11-15%□
- ☐ 崎岖□ 16-30%□
- ☐ □ 峭□31-60%□
- ☐ □ 常□ 峭□60%□

地形

- ☑ □ □原□平原
- ☐ 山□
- ☐ 山坡
- ☐ 山地斜坡
- ☐ □ 坡
- ☐ □ 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.
- ☐ 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□ 关

土壤深度

- ☑ □ 常□ 0-20厘□ □
- ☑ □ □21-50厘□ □
- ☐ 中□ □ 度□51-80厘□ □
- ☐ □ □81-120厘□ □
- ☐ □ 常□ > 120厘□ □

土壤质地（表土）

- ☐ □ □/□ □ □ □ □ □
- ☑ 中□ □ 壤土、□ 土□
- ☐ □ □/□ □ □ □ □ 土□

土壤质地（地表以下>20厘米）

- ☐ □ □/□ □ □ □ □ □
- ☑ 中□ □ 壤土、□ 土□
- ☐ □ □/□ □ □ □ □ 土□

表土有机质含量

- ☐ □ 3%□
- ☐ 中□ 1-3%□
- ☑ 低□ <1%□

地下水位

- ☐ □ □ 上
- ☐ < 5□
- ☑ 5-50□
- ☐ > 50□

地表水的可用性

- ☐ □ □
- ☑ 好
- ☐ 中□
- ☐ 匮乏/□ 有

水质（未处理）

- ☑ □ 好□ □ □
- ☐ 不□ □ □ □ □ □ □ 处
- ☐ 仅供农业使□ □ □ □ □
- ☐ 不可□

□ □ □ 参□ □□

盐度是个问题吗？

- ☐ 是
- ☑ 否

洪水发生

- ☐ 是
- ☑ 否

物种多样性

- [ ]
- [x] 中
- [ ] 低

栖息地多样性

- [ ]
- [x] 中
- [ ] 低

应 技术 土地使 征

市场定位

- [ ] 合 商业
- [ ] 商业/市场

非农收入

- [ ] 低于全 收入10%
- [x] 收入 10-50%
- [ ] > 收入 50%

相对财富水平

- [ ] 常
- [x] 平均 平
- [ ] 丰富
- [ ] 常丰富

机械化水平

- [x] 手工作业
- [x] 力 引
- [ ] 机械化/ 动

定栖或游牧

- [x] 定栖
- [ ] 半
- [ ]

个人或集体

- [x] 个人/家庭
- [ ] 团体/ 区
- [ ] 合作
- [ ] 员工 公司、政府

性别

- [ ] 女人
- [x] 人

年龄

- [ ] 儿
- [ ] 年人
- [x] 中年人
- [ ] 年人

每户使用面积

- [ ] < 0.5 公
- [ ] 0.5-1 公
- [ ] 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

- [x] 小 模
- [ ] 中 模
- [ ] 大 模

土地所有权

- [x] 州
- [ ] 公司
- [ ] 团村庄
- [ ] 团体
- [ ] 个人 未命名
- [x] 个人 有命名

土地使用权

- [ ] 入 无
- [ ] 区 有
- [ ]
- [x] 个人

用水权

- [x] 入 无
- [ ] 区 有
- [x]
- [ ] 个人

进入服务和基础设施的通道

健康		好
教		好
技术援助		好
就业 例如 农		好
市场		好
		好
和交		好
和卫 施		好
服务		好
None		好

注释

Apart from electricity, the land user is closer to other public facilities and services.

影响

社会经济影响

作 产		增加
作		增加
产品多样性		增加
土地	妨	化
可 性		增加
		增加
农业投入	增加	低
农业收入		增加

It improves the organic matter content of the soil.

社会文化影响

品安全	减少	改
健康 况	恶化	改
SLM/土地 化	减少	改

As it is evidence based practice, it improves land users knowledge about SLM.

生态影响

		增加
		增加
地 径	增加	低
多余 排放	减少	改
地下 位 层	下	
土壤 分		增加

There is no facts to validate regarding the status of groundwater table.

土壤 层 减少 改
土壤 失 增加 低
土壤堆 增加
土壤 壳密封 增加 减少
土壤压实 增加 减少
养分循 / 增加

It improves soil nutrient cycling through adding more nutrients including by fixing atmospheric nitrogen.

土壤有机 /地下C 增加
度 增加 减少
植 层 增加
/地上C 增加
植 多样性 增加
有 捕 、 、传 增加
栖息地多样性 增加
害 / 控制 增加
和 室 体 排放

增加 低

Part of the plow over, remains undecomposed in the soil system and contributes to carbon sequestration.

场外影响

可 性 地下 、

增加

Off-site water availability is expected to increase but the assumption needs long-term data and documentation.

早季 定可 包括低 减少 增加
下 增加 低
室 体 影响 增加 减少

成本效 分析

与技术建立成本相比的效益

期回报 常 常 极
期回报 常 常 极

与技术维护成本相比的效益

期回报 常 常 极
期回报 常 常 极

The technology needs land users knowledge and skills and less of financial expenses.

候变化

渐变气候

年 增加 常不好 常好
年 减少 常不好 常好

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%
- 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?

- [x] 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
- [x] 否

什么样的变化条件？

- 候变化 候
- 不断变化 市场
- 劳动力可 性 例如 于

和吸取 教

长处: 土地使用者的观点

- Improve soil fertility.
- Reduce soil acidity.
- Increase grain yield.

长处: 编制者或其他关键资源人员的观点

- It stops the soil from being carried away by wind and rain by providing ground cover during early season when flash rain/wind

弱点/缺点/风险: 土地使用者的观点如何克服

- Labor demanding for establishment and maintenance. Continues awareness raising work regarding the indirect benefits generated from the technology in terms of amending the soil fertility and reducing issues of soil acidity.
- Lack of tangible benefit as most farmers expect yield. Convince the land users about the indirect benefit accrued from using green manure.

causes erosion.
- Increases soil microbial activity, and the availability of macro and micronutrients in forms that the plants can use.
- After the plow over, most nutrients are then readily available to a new crop.

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 may be unwilling to put in the labor or buy the seed needed. Advocate the sustainable benefits triggered by using green manures so that the mindset of the land users would be changed.
- Lack of awareness of green manuring as a soil fertility management option since it is a recent innovation in Ethiopia. Create more awareness and institutionalize its benefit in the mainstream agricultural extension system to reach out to large number of beneficiaries.
- Many farmers look for an immediate economic product, such as grains, from any crop that is grown. Again, this need familiarizing the land users to the in kind benefits accrued from the application of green manure. Demonstrating the technology and arranging experience exchange visit is pivotal to scale out the technology/practice.

参 文

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实施日期: Feb. 6, 2023

上次更新: April 23, 2024

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WOCAT数据库中的完整描述
https://qcat.wocat.net/zh/wocat/technologies/view/technologies_6645/

链接的SLM数据
Approaches: Integrated Soil Fertility Management (ISFM) https://qcat.wocat.net/zh/wocat/approaches/view/approaches_6732/

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- Soil protection and rehabilitation for food security (ProSo(i)l)

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