Harvester working in a recently burned eucalypt plantation (Malvar,M.C)

Post-fire salvage logging; post-fire traditional logging (葡萄牙)

Extração material lenhoso pos-incêndio

描

Post-fire salvage logging is the practice of harvest the trees after fire, the employed methodology is clearcutting which involves the cut of essentially all the trees and the removal of logging residues.

In the 2015 summer a wildfire affected the Semide mountain range nearby the Lousã massif, central Portugal. The area was afforested with eucalypt and pine plantations during last XX century and nowadays landscape is composed mainly by eucalypts at different stages of development and, the understory shrub vegetation.
The research team of the University of Aveiro set up an experiment to test the effect of post-fire logging in soil erosion and other selected soil properties.

Purpose of the Technology: Post-fire logging is a common management practice usually undertaken to recover burnt timber resources, to plant new seedlings and to reduce possible insect infestation hazard. In Portugal, about 10x106 m3 of timber could be harvested every year and a considerable percentage of this figure comes from recently burned eucalypt and pine stands.
Post-fire logging could have a multiple detrimental effect on ecosystem as fire-affected ecosystems are sensitive to further disturbance. This multiplier effect concerns soil compaction, soil (fertility) losses, with serious implications for in-situ plant growth, soil biota and for downstream aquatic systems. Furthermore, post-fire logging undermines the effectiveness of costly rehabilitation efforts aimed at reducing soil erosion. Hence, the post-fire logging practice is still controversial in terms of economic benefit and environmental consequences, in many parts of the world.

Establishment / maintenance activities and inputs: The standard logging technique consists of felling burned trees either with a harvester or manually with a chainsaw depending on slope conditions and machinery available. The logs will be gathered with the harvester, using a cable-skidder or pulling logs down-slope with a cable attached to a tractor. A forwarder will transport them to the main pile prior to load and removal by trucks.
The slope will present two well differenced units according to soil surface disturbance, the skid trail or the logged area.

Natural / human environment: The eucalypt trees in the region are typically planted as monocultures for paper pulp production, and harvested every 7-14 years. The landscape reflects a long history of intense land management, with a mosaic of (semi-)natural and man-made agricultural and afforested lands. Since the 1980´s, however, wildfires have increased dramatically in frequency and extent, aided by a general warming and drying trend but driven primarily by socio-economic changes.

地点

地点: Coimbra, Coimbra, 葡萄牙

分析的技术场所数量:

选定地点的地理参考
- 不 用

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

在永久保护区？:

实施日期: 50多年前 传统

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

Skid-trail in a recently burned and logged slope (Prats,S.A.)

技术分类

主要目的

- 改良生产
- 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

森林/林地

- 植树 林

产品和服务: 木材, 材

供水

- 养
- 混合 水灌溉
- 充分灌溉

土地退化相关的目的

- 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

物理性土壤退化 - Pc 压实

生物性退化 - Bc 植 盖的减少 火灾的有害影响

SLM组

- 天然和半天然森林管理
- 森林种植管理
- Post-fire logging

SLM措施

农艺措施 - A1 植 和土壤 盖层

植物措施 - V3 植 的清理

管理措施 - M7 其它

技术图纸

技术规范

The slope will present two well differentiated units according to soil surface disturbance, the machinery trail and the logged area. The soil erosion risk will be associated with the the loss of ground cover due to mechanical disturbance. Furthermore, the machinery trail presents the risk of concentrated overland-flow with the subsequent rill formation.

Location: Semide. Coimbra

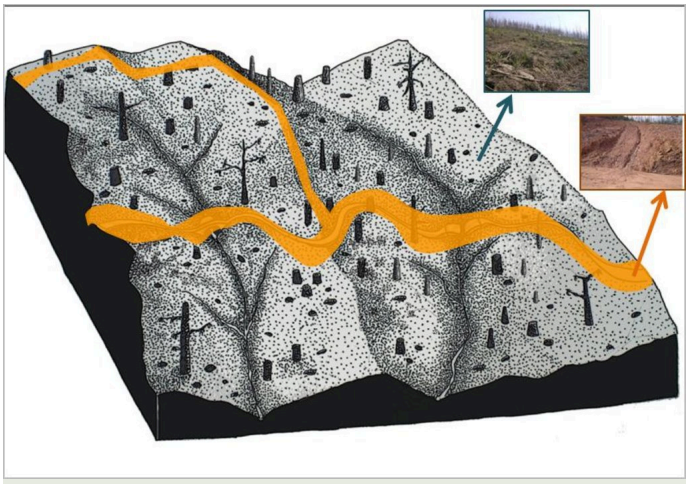
Technical knowledge required for field staff / advisors: low

Technical knowledge required for land users: low (The use of machinery is preferable but not essential)

Main technical functions: control of dispersed runoff: retain / trap, control of concentrated runoff: impede / retard, improvement of ground cover, improvement of surface structure (crusting, sealing), sediment retention / trapping, sediment harvesting

Secondary technical functions: control of raindrop splash, improvement of subsoil structure (hardpan)

Other type of management: Recover burnt timber resources and improve the re-sprout of eucalypt stumps



Author: Malvar,M.C.

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 euros
- 汇率 换算为美元 1 美元 = 0.92 euros
- 用劳工的每日平均工 成本0.87

影响成本的最重要因素

Accessibility and steepness will raise the costs. The use of machinery is not a mandatory. Small land owners decrease the total cost by doing manual work with a family framework.

技术建立活动

1. 1 person with chainsaw (时 / 率24)
2. Harvester transport (in a radio of 50 km)Harvester working (with person)Forwarder (with person)Final transport (in a radio of 50 km) (时 / 率: 60)

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 (euros)	每项投入的总成本 (euros)	土地使用者承担的成本%
劳动力					
Labour	ha	1.0	1461.0	1461.0	
设备					
Machine use	ha	1.0	5870.0	5870.0	
技术建立所需总成本				**7'331.0**	
技术建立总成本 美元				*7'968.48*	

技术维护活动

n.a.

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

- [x] 潮湿的
- [x] 半湿润
- [ ] 半干旱
- [ ] 干旱

关于气候的规范

Thermal climate class: subtropics

Thermal climate class: temperate

斜坡

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

地形

- [ ] 平原
- [ ] 山脊
- [ ] 山坡
- [x] 山地斜坡
- [x] 坡
- [ ] 底

海拔

- [ ] 0-100 m a.s.l.
- [x] 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
- [ ] 不相关

土壤深度 | **土壤质地（表土）** | **土壤质地（地表以下>20厘米）** | **表土有机质含量**

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

- [x] 粗粒/ 砂
- [x] 中粒 壤土、粉土
- [ ] 细粒/ 粘土

- [ ] 粗粒/ 砂
- [ ] 中粒 壤土、粉土
- [ ] 细粒/ 粘土

- [x] >3%
- [ ] 中 1-3%
- [ ] 低 <1%

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

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

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

水 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 技术的土地使用者的特征

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

非农收入
- [ ] 低于全 收入的0%
- [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
- [ ] 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
- [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
- [ ] 0.5-1 公
- [ ] 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
- [x] 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
- [ ] 个人 有命名

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

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

进入服务和基础设施的通道

健康	痛 ✓	好
教育	痛	✓ 好
技术援助	痛 ✓	好
就业 例如 农	痛 ✓	好
市场	痛	✓ 好
能源	痛	✓ 好
和交	痛	✓ 好
用水和卫生 施	痛	✓ 好
服务	痛 ✓	好

影响

社会经济影响

木材生产	减	✓ 增加
产品多样性	减 ✓	增加
能源生产 例如水力发电、生物发电	减	✓ 增加
收入来源的多样性	减	✓ 增加

Promoves eucalypt monocultures

Biomass

社会文化影响

娱乐机会	减少 ✓	改良

The logging of the burnt trunks arguably improves the esthetic value of the area, including by removing evidence of the fire

Improved livelihoods and human well-being	decreased	increased	Yes, because timber production is a complementary income for many families in the region

生态影响

水	减少	增加
地 径流	增加	减少
发	增加	减少
土壤水分	减少	增加
土壤 盖层	减少	改良
土壤结壳/密封	增加	减少
土壤压实	增加	减少
土壤有机物/地下C	减少	增加
害 /疾病控制	减少	增加
火灾	增加	减少
	增加	减少
Soil erosion locally	increased	decreased
Habitat fragmentation	increased	decreased

场外影响

旱季稳定可 的水流 包括低流	减少	增加
下游洪水 不希望	增加	减少
下游淤积	增加	减少
地下水/河流污染	增加	减少
缓冲/ 滤能力 按土壤、植 、湿地划分	减少	改良
对 农田的破坏	增加	减少
对公共/私人基础 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
期回报	常消极	常积极

与技术维护成本相比的效益

There is no maintenance

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
干旱	常不好	常好
比 和缓的 河 洪水	常不好	常好

其他气候相关的后果

缩短生 期	常不好	常好

用和 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 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

- Short-term economic benefits

  How can they be sustained / enhanced? Decrease wildfires will increase the economic value of the timber

长处: 编制者或其他关键资源人员的观点

- The chance to obtain an economic benefit from forest plantations diminished depopulation of rural areas in the region.

  How can they be sustained / enhanced? A diversification toward native forest species cultivation (i.e. cork oak, olive trees, and chestnut tree) would be a very good alternative for the improvement of the ecosystem services, the reduction of wildfires risk and the increase of the socio-economic conditions in the region

- When timber quality is no good (due to fire) there is no economic benefit Take the advantage to modify eucalypt plantations toward more sustainable land use

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

- Increased runoff and soil erosion and possibly modify soil properties There are several mitigation treatments that can be used to decrease the risk of soil erosion/degradation after logging activities. The use of water dams in the machinery trails and/or the spread of logging residues on the uncover/disturbed soil are techniques that can give good results

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_1713/

链接的SLM数据
不 用

文件编制者

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目
- 不 用

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