Effectiveness of community-based initiatives for mitigation of land degradation after wildfires.

Prats SA., Sierra-Abain P., Moraña-Fontan A., Sampedro L., Moreira X., Covelo F., Zas R.













Summary

- Pontecaldelas 2017 Wildfire, Galicia
- Community-based initiatives
- Treatments assessment

Where is Pontecaldelas?





Loss of ground cover



Fauna



CO₂ emissions



Soil erosion



Property damage



Human death





Wildfire causes?

Pyromans

Terrorism

Insuficient fire supression services

Land abandonment

Eucalypt spreading

Global warming

Land abandonment





Eucalypt spreading



Pyrophytic sp.: likes the fire





Other pyrophytic exotic invasive species



Global warming



15 October 2017

2900 ha burned in Ponte Caldelas

Local communities organized themselves to take actions



1. Consultancy

- 2. Planning & Organization
- 3. Selection of critical areas
- 4. Material adquisition
- 5. Material distribution
- 6. Treatment application
- 7. Treatment effectiveness monitoring



18 October 2017:

Consultancy about post-fire soil erosion risks and its mitigation





Community-based initiatives for burned areas: Short term

- Post-fire mulch
 - Wheat straw
 - Corn straw
 - Wood chips
 - Forest residues (shredded)
- Post-fire acorn seeding

Medium term

- Tree planting
- Exotic invasive sp.

Long term

• "Custody of territory"



Custody of territory



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Logistics of volunteers activities

- •Volunteer coordinators traineeship
- Institutional support (Local governments)
- Insurance,
- Personal protection,
- Permissions





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3. Selection of critical areas:

- High wildfire severity
 - Total crown combustion, no leaves in canopy
 - Soil cover totally consumed
 - White, red ash color
- Steep slopes, south exposed
- Human Values at risk
 - water supply structures

ACCIONES URGENTES CONTRA LA EROSIÓN EN ÁREAS FORESTALES QUEMADAS GUÍA PARA SU PLANIFICACIÓN EN GALICIA





José A. Vega, Teresa Fontúrbel, Cristina Fernández, Antorio Arellans Montserrat Díaz-Raviña, Mº Tarsy Carballas, Angela Martin, Serafín González-Prieto, Agustín Merino, Elena Benito

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1. Consultancy

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Donated mulch materials:

- Barley straw
- Wheat straw
- Shredded corn straw
- Shredded wood
- Wood chips

Corn and acorns





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Post-fire mulch











≥60%



Acorn seeding

30.000 Quercus robur acorns

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Objetives:

Assess volunteer-applied treatments:

•Post-fire mulch (wheat, corn, corn strips) effect on soil losses

•Acorn seeding success (in untreated and mulched areas)

Treatment effectiveness monitoring



Unbounded Erosion plots



Bounded small plots





sediment weight, OMC



Study

areas: Treatment, Mg ha⁻¹, cover:

★ Laforet Wheat straw mulch, 2, >60%

★ Parada Corn straw mulch,4, >60%

Corn straw mulch strips,1,<60%



Laforet site: wheat straw mulch (6 plots)







Acorn seeding

Untreated x512

Mulched x512





Erosion results



1 straw truck = 25 soil trucks



Straw effectiveness seem to decrease...



... but also soil loss decreases



Year 1:Low germination rate



Year 1:Low germination rate



Year 2: dead by drought



Mulch helps acorn growing



Conclusions

Conclusions

Community-based initiatives can be very effective when combining motivation, technical experience and scientific knowledge.



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Medium term

- Tree planting
- Exotic invasive sp. suppression

Long term

• Custody of territory

>80% reduction in soil erosion

>2% acorn success

More on post-fire soil erosion mitigation:

Prats et al. 2012 (Geoderma) Prats et al. 2013 (Land Degradation & Development) Prats et al. 2016 (Sci. Total Env.) Malvar et al. 2017 (Forest Ecology and Management) Prats et al. 2017 (Forest Ecolog. Manag.) Prats et al. 2018 (Land Degradation & Development) Keizer et al. 2018 (Catena) Vieira et al. 2018 (Env. Research) Prats et al. 2019 (Journal of Hydrology) Prats et al. 2019 (Earth Surf. Proc. Landforms)







CESAM ESP-TEAM web page:

www.cesam.ua.pt/subsites/index.php?subsiteid=71&language=pt

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Thank you for your attention Grazas!!