

A newsletter published by the DESIRE project - a project funded by the European Union's 6th Framework Program 'Global Change and Ecosystems'



Results from DESIRE project: A global initiative to combat desertification

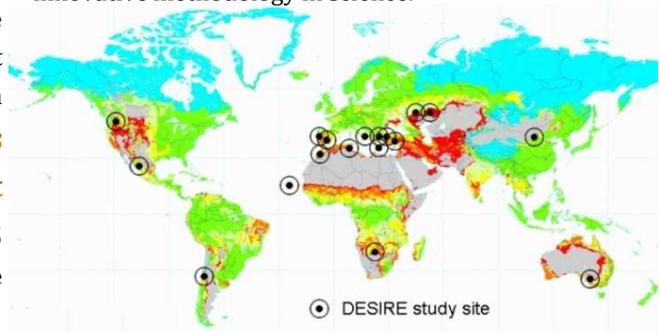
Forest fires represent a major cause of desertification in Portugal, with huge impacts on soil and water degradation and in the decreasing of rural areas productivity, which are already encompassing a very fragile socio-economic context. The forest protection network corresponds to the implementation of fuel management measures and of Forest Protection against Fires (DFCI) technologies, ensuring the resilience of the vegetation to wildfires. In this context, researchers in close collaboration with local stakeholders consider on the potential of the Primary Strips Network System for Fuel Management (RPFGC) and evaluate their impacts on soil.

Summary

Portuguese rural areas have suffered several changes in the last decades, promoting a chaotic forestry growth and increasing the frequency and intensity of forest fires, with severe impacts on desertification processes. 2003 and 2005 were particularly catastrophic years in this context, highlighting the need for a policy transition, especially in what concerns forest protection against fire. The promotion of preventive forestry and the improvement of the regional networks of forest protection against fires, including the strips for fuel management, the creation of mosaics plots of fuel management, of water points and watchtowers and other infrastructures to support fire fighting are examples of efforts made by the National Forest Authority and by the municipalities in the valorisation and protection of forest. The **Primary Strips Network System for Fuel Management (RPFGC)** corresponds to a strip with more than 125 meters of vegetation reduction, which aims to reduce large fires intensity.

Under this context, researcher from University of Aveiro, jointly with local technicians and stakeholders, monitored, under the scope DESIRE project, the implementation of the RPFGC in the Mação municipality.

DESIRE project promoted a joint work between scientists, policy makers, technicians and local stakeholders searching for promising solutions to sustainable land management. Sixteen study areas around the world, with a wide range of problems associated with desertification, developed and tested an innovative methodology in science.



● DESIRE study site

Desertification Vulnerability Map

Forest Fires...

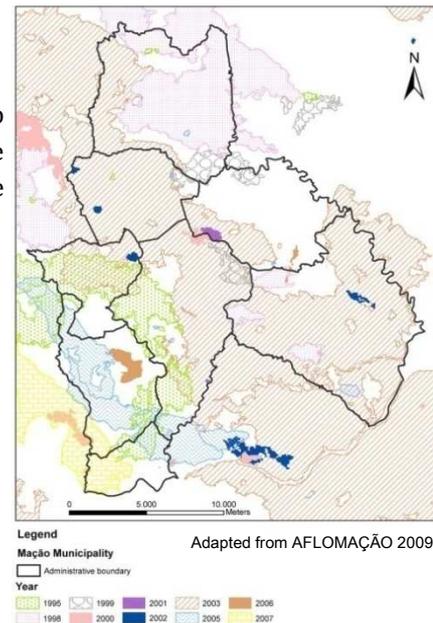
Soil degradation...

Mação municipality, located in Central Portugal, on the north Tejo river edge, was one of the Portuguese study areas selected to evaluate the effects of forest fires on land degradation and to test the implementation of solutions for fire prevention and mitigation.



Photos of Mação municipality
© UA 2008/2009

Burned Areas–Mação Municipality



Several changes occurred in the Mação municipality socioeconomic context during the fifties and sixties of the XXth^h Century. Associated to an intense process of depopulation and ageing, an abandonment of the agrosylvo-pastoral activities took place.

From 2001 to 2011, Mação municipality has lost about 13% of the population, currently has a population density of 18 inhabitants/km² (INE, 2011).

These changes created a new landscape paradigm with unmanaged and abandoned forest areas. This paradigm associated with land fragmentation and landowners absenteeism resulted in severe and catastrophic forest fires. Besides the well-known economic, social and health impacts, it is also important to consider the impacts on vegetation, soil and water, such as soil erosion, nutrients losses, biodiversity reduction and water quality degradation.

Local and national stakeholders involvement



Photos of the stakeholder workshops under the scope of DESIRE project
© UA 2008/2009

Using a participatory methodology, local and national stakeholders jointly identified the main aim of sustainable land management at Mação municipality: **to reduce burned area**. The achievement of this goal demands the adoption of solutions to prevent and fight forest fires as well as to restore burned areas. However, in a sustainability context, it is essential to adopt policies and measures to revitalize the local socioeconomic dynamics, promoting an efficient land management.

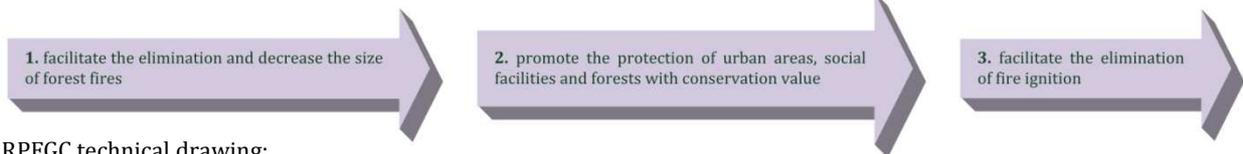
Forest Intervention Area (ZIF) was identified by the stakeholders as a strategy to deal with the current socioeconomic context, characterized by depopulation and ageing, by forest private smallholdings and by the absence of forest management and the consequent high fire risk. Currently, Mação municipality has 5 ZIF.

Applied technology at Mação municipality:

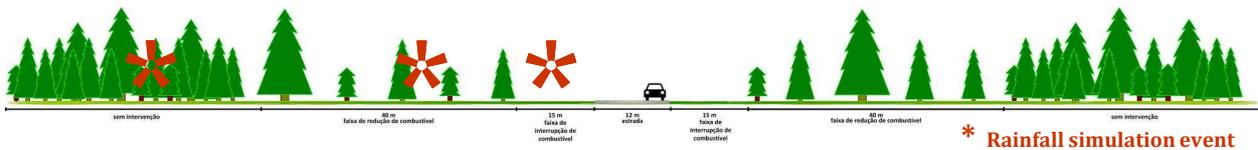
The Regional Network of Forest Protection against Fires (RDFCI), published by Decree-Law nº 124/2006, 28 June (amended by Decree-Law nº 17/2009 of 14 January), came out after the catastrophic fires of 2003 and 2005. The main function is to implement the regional strategy of protection against forest fires.

Primary Strips Network System for Fuel Management (RPFGC)

RPFGC main goals:



RPFGC technical drawing:



* Rainfall simulation event

© Soares 2010

Does RPFGC contributes to increase soil erosion and degradation?



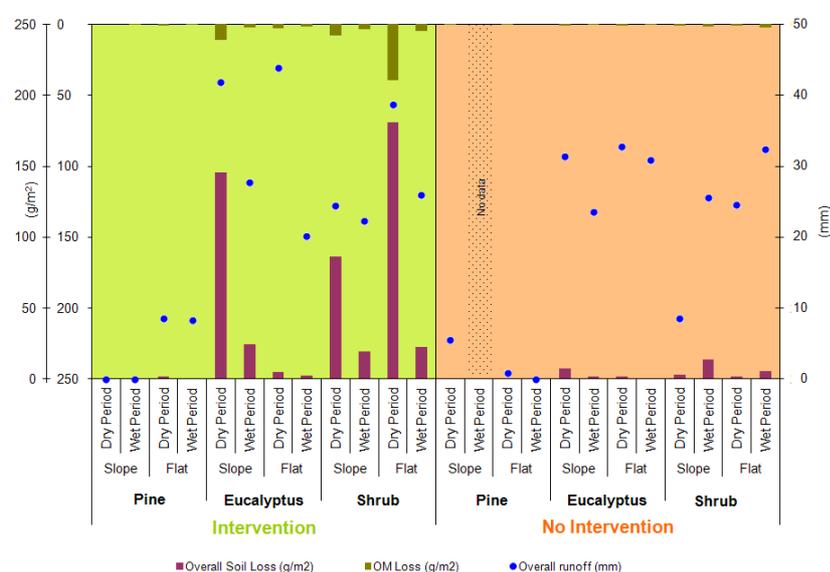
Installation of RPFGC at Mação © UA 2010

The first section of the RPFGC installed in Mação municipality was monitored using rainfall simulation tests in order to evaluate the effects of the implementation in the soil, organic matter and surface runoff.



Photos of rainfall simulations at Mação © UA 2012

Total Soil Loss (g/m²) vs Total Organic Matter Loss (g/m²) vs Overall Runoff (mm)



The plots selection considered the following parameters:

- ↳ Land use: pine, eucalyptus and shrubland;
- ↳ slope: flat and sloped areas;
- ↳ intervention: intervention and no intervention areas.

Rainfall simulations were made in two different seasons:

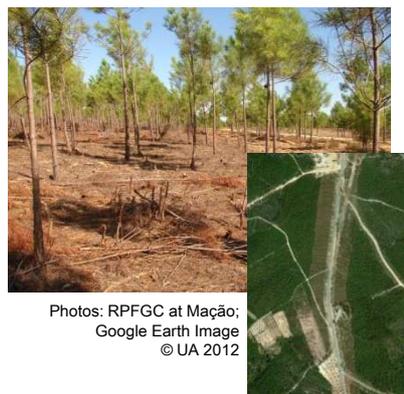
Dry period and wet period.

- ↳ The implementation of the technology did not influenced significantly runoff production.
- ↳ The technology influenced soil loss and affected significantly the loss of organic matter in Eucalyptus and Shrubs plots.
- ↳ The land use type affected runoff production, soil and organic matter losses, especially observed between Pine/Eucalyptus and Pine/Shrubs.
- ↳ Pine plots presented low values of runoff production, soil and organic matter losses when compared with the other plots, particularly due to the natural needle mulch.

Recommendations for RPFGC implementation:

RPFGC is a measure to prevent large fires, defined in general law, and which should be implemented by the municipalities in the scope of Forest Protection against Fires System.

The implementation requires a significant reduction of the vegetation cover, however it has been detected a **low contribution to soil erosion** production when compared to the rates observed after fire. Notwithstanding, soils are already very degraded and with a poor nutrient layer. This demands a carefully implementation of the technology, choosing the best practices for implementation and with less intrusion for the natural resources, minimizing soil erosion and fertility loss.



Photos: RPFGC at Mação;
Google Earth Image
© UA 2012

RPFGC implementation is included in a set of measures to protect forest against fire, which should be followed by other measures of spatial planning and management. Due to the high costs associated to RPFGC, it is very important to find legal and financial means to ensure the maintenance of this technology.

It is recommended:

- ➔ **Simplification of the legal setting and the register of land, creating benefits and incentives for the most active forest owners and producers;**
- ➔ **Awareness and training to forest owners and their organizations to the importance of this technology;**
- ➔ **Financial and fiscal support for the implementation;**
- ➔ **Implementation of Forest Intervention Areas, subsidizing a pilot area for good practices demonstration;**
- ➔ **Increase forestry good practices;**
- ➔ **Promotion of participation of local agents and technicians into the formulation of policy tools and laws. Participation will improve decisions, reflecting real needs and priorities and the social acceptance of the technology.**



Many thanks to all contributors to this research, especially to Eng. António Louro, João Fernandes, Nuno Bragança, Marta Ventinhas e Inês Mariano. Your inestimable support, availability and enthusiasm contributed to our commitment to this investigation. Thank you very much!

O projecto DESIRE (2007-2012) é financiado pela Comissão Europeia, VI Programa Quadro, 'Global Change and Ecosystems' e reúne a experiência de 26 institutos de pesquisa internacionais e organizações não-governamentais (ONGs). Este projecto é coordenado pela ALTERRA - instituto de investigação de um ambiente verde vivo, na Holanda.

Copyright: www.desire-project.eu/disclaimer
Página da internet: <http://www.desire-project.eu>
Sistema de Informação: <http://www.desire-his.eu/>

Contacto do Coordenador do projecto DESIRE: Coen.Ritsema@wur.nl
Comunicações DESIRE: ngprojects3@googlegmail.com

Departamento de Ambiente e Ordenamento / Celeste Coelho, Universidade de Aveiro, 3810-193 Aveiro, Portugal. • Telefone: +351 234 370 200 • Fax: +351 234 370 309 • Email: coelho@ua.pt

Departamento de Ciências Exactas e do Ambiente / António Ferreira, Escola Superior Agrária de Coimbra, Bencanta, 3040-316 Coimbra, Portugal. • Telefone: +351 239 802 940 • Fax: +351 239 802 979 • Email: aferreira@esac.pt

As opiniões expressas neste boletim e no site são as do consórcio do projecto DESIRE e não reflectem necessariamente a opinião da Comissão Europeia.

• Autores: Celeste Coelho, João Soares e Sandra Valente •

