



**SANDRA CRISTINA
MARQUES VALENTE**

**PARTICIPAÇÃO PÚBLICA NA GESTÃO FLORESTAL
SUSTENTÁVEL EM ÁREAS AFETADAS POR FOGOS**

**STAKEHOLDER PARTICIPATION IN SUSTAINABLE
FOREST MANAGEMENT IN FIRE-PRONE AREAS**



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Tese apresentada à Universidade de Aveiro para cumprimento dos requisitos necessários à obtenção do grau de Doutor em Ciências e Engenharia do Ambiente, realizada sob a orientação científica da Doutora Celeste Coelho, Professora Catedrática do Departamento de Ambiente e Ordenamento da Universidade de Aveiro e coorientação do Doutor Hanspeter Liniger, Investigador Sénior do Centre for Development and Environment, University of Bern.

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palavras-chave

Gestão Forestal Sustentável; participação pública; fogos florestais; metodologia participativa; agentes florestais; Portugal.

resumo

Os incêndios florestais, associados ao abandono do espaço rural, a pequena propriedade florestal e o desinteresse e o absentismo dos proprietários florestais têm sido apontados como fatores que têm afetado a sustentabilidade das florestas em Portugal. Apesar da formulação de políticas e de instrumentos de planeamento e de gestão florestal para lidar com estes constrangimentos, são ainda escassos os progressos para uma Gestão Forestal Sustentável. A nível internacional e europeu, a participação dos agentes já representa um aspeto-chave no processo de definição e de implementação de estratégias que promovam a multifuncionalidade da floresta, mas também se adequem às necessidades e aos interesses dos agentes locais.

A temática da tese esteve focada nesta discussão, argumentando que existe uma escassa participação dos agentes nos processos de tomada de decisão relativos ao setor florestal. O principal objetivo da investigação foi o desenvolvimento de uma metodologia participativa para a discussão e negociação de estratégias locais para a Gestão Forestal Sustentável, que maximizem o potencial produtivo e o papel sócio-ambiental das florestas, diminuam o risco de incêndio e promovam o crescente interesse e participação dos agentes locais na gestão florestal.

A tese está estruturada em três partes. A primeira parte apresenta uma avaliação do sector florestal nacional, com base numa revisão bibliográfica e numa comparação de indicadores, políticas e instrumentos de planeamento e gestão florestal (Capítulo 2) e com base num estudo de perceção social desenvolvido numa área de estudo localizada na região Centro de Portugal. Este estudo analisa as perceções técnicas (decisores políticos e técnicos) e sociais (proprietários florestais e outros membros da comunidade local) sobre as florestas, a gestão florestal e os incêndios florestais (Capítulo 4). As 'Zonas de Intervenção Florestal', enquanto ferramenta recente para a cooperação e organização dos proprietários e produtores florestais, foram também analisadas (Capítulo 3). A segunda parte da tese é dedicada à análise de processos de participação pública, com base numa revisão bibliográfica sobre os benefícios, níveis, abordagens e métodos de participação (Capítulo 5) e numa avaliação de processos de participação pública desenvolvidos em Portugal (Capítulo 6). A terceira parte da tese foca-se no desenho e no teste da metodologia participativa proposta no âmbito desta tese (Capítulo 7) e na formulação de algumas orientações para melhoria dos processos participativos na gestão florestal (Capítulo 8)

Os resultados confirmaram a centralidade dos incêndios florestais e dos fatores associados ao contexto socioeconómico (e.g. despovoamento e envelhecimento populacional, absentismo, falta de gestão florestal, estrutura fundiária) como os principais problemas que afetam a floresta na região Centro de Portugal. A organização e cooperação dos proprietários florestais emergiu como solução possível para lidar com estas ameaças e promover a multifuncionalidade da floresta, sendo essencial aumentar o conhecimento e a participação dos agentes nas decisões associadas à floresta. É proposta uma ferramenta para esta participação, centrada no contexto local e facilmente utilizável por todos os agentes. A implementação da metodologia participativa revelou o seu potencial no desenvolvimento de uma participação equitativa e inclusiva dos múltiplos agentes.

keywords

Sustainable Forest Management; stakeholder participation; fire hazard; participatory methodology; Portugal.

abstract

Forest fires associated with rural abandonment, small-scale forest ownership and landowners' disinterest and absenteeism are affecting the sustainability of forests in Portugal. Despite the design of policies, planning and management tools for dealing with these constraints, the progresses towards Sustainable Forest Management have been insufficient. At international and European level, stakeholder participation is a key-issue in the definition and implementation of strategies that, while promoting the multifunctionality of forests, also meet the needs and the interests of local stakeholders.

The thematic of the thesis has focused on that discussion, arguing that there is a lack of effective and adequate stakeholder participation in decision-making processes concerning the forest sector. The main aim of the research was designing a stakeholder participatory methodology for discussing and negotiating local strategies for Sustainable Forest Management, able to contribute to maximize the productive potential and the socio-environmental role of forests, reduce the fire hazard and promote an increasing interest and participation of local stakeholders in forest management.

The thesis is organized in three main parts. The first part presents an assessment of the national forest sector, through a literature review comparing indicators, policies and instruments relating to the sector (Chapter 2) and through a social perception survey implemented at a case study located in Central Portugal. The survey analysed the technical (decision-makers and technicians) and social (forest owners and other citizens) perceptions of forests, of forest management and of the fire hazard (Chapter 4). The 'Forest Intervention Area' approach, as the most recent tool for cooperation and organization of forest owners and producers, was also assessed using official data and the results from the social perception survey (Chapter 3). The second part is dedicated to stakeholder participation processes, through a literature review about the benefits, levels, approaches and methods of participation (Chapter 5) and an assessment of stakeholder participation processes developed in Portugal (Chapter 6). The third part presents the design and testing of the participatory methodology proposed in this thesis (Chapter 7) and proposes some recommendations for improving stakeholder participation in forest management (Chapter 8).

The results confirmed fire hazard and socio-economic contextual variables (depopulation and ageing, absenteeism, absence of forestry practices; land size, etc.) as central problems of Central Portugal forests. The organization and the cooperation of forest owners emerged as the possible solution for dealing with these threats, whilst promoting the multifunctionality of forests, where it is essential to increase stakeholder knowledge and participation in forest-related decisions. A tool for stakeholder participation focused on the local context and easily used by all stakeholders is proposed. The implementation of the methodology demonstrated its potential in promoting an equitable and inclusive participation among multiple stakeholders.

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LIST OF ACRONYMS

A21L		Agenda 21 Local
AFN		Autoridade Florestal Nacional [EN: National Forest Authority]
ALS		Autodidactic Learning for Sustainability
ANPC		Autoridade Nacional de Proteção Civil [EN: National Authority for Civil Protection]
CBD		Convention of Biological Diversity
CBFiM		Community-Based Fire Management
CCDR		Comissão de Coordenação de Desenvolvimento Regional [EN: Coordination Commission for Regional Development]
CDE		Centre for Development and Environment
CNR		Conselho Nacional de Reflorestação [EN: National Council of Reforestation]
CRR		Comissões Regionais de Reflorestação [EN: Regional Commission of Reforestation]
DFCI		Defesa da Floresta Contra Incêndios [EN: Forest Protection against Fires]
DGRF		Direcção-Geral dos Recursos Florestais [EN: General Directorate of Forest Resources]
DRAP		Direcção Regional de Agricultura e Pescas [EN: Regional Department of Agriculture and Fisheries]
EC		European Commission
EFFIS		European Forest Fire Information System
ENF		Estratégia Nacional para as Florestas [PT – National Forest Strategy]
FAO		Food and Agriculture Organization
FAP		Forest Action Plan
FFP		Fundo Florestal Permanente [EN: Forest Permanent Fund]
FRA		Forest Resources Assessment
GNR		Guarda Nacional Republicana [EN: National Republican Guard]
GDP		Gross Domestic Product
GO		Governmental Organization

GTF		Gabinete Técnico Florestal [EN: Forest Technical Office]
GVA		Gross Value Added
ICNB		Instituto da Conservação da Natureza e da Biodiversidade [EN: Institute for the Conservation of Nature and Biodiversity]
ICNF		Instituto da Conservação da Natureza e das Florestas [EN: Institute for the Conservation of Nature and Forests]
IFN6		6.º Inventário Florestal Nacional [EN: Sixth National Forest Inventory]
INAG		Instituto Nacional da Água [EN: Water Institute]
INRB		Instituto Nacional de Recursos Biológicos [EN: National Institute of Biological Resources]
IPF		Intergovernmental Panel on Forests
ISRIC		World Soil Information
LADA		Land Degradation Assessment
LBPF		Lei de Bases da Política Florestal [EN: Forest Policy Law]
LDA		Local Development Association
LforS		Learning for Sustainability
MADRP		Ministério da Agricultura, Desenvolvimento Rural e Pescas [EN: Ministry of Agriculture, Rural Development and Fisheries]
MAMAOT		Ministério da Agricultura, Mar, Ambiente e Ordenamento do Território [EN: Ministry of Agriculture, Sea, Environment and Regional Planning]
MCPFE		Ministerial Conference on the Protection of Forests in Europe
MDG		Millennium Development Goals
NFP		National Forest Programme
NGO		Non-Governmental Organization
NIPF		Non-Industrial Private Forest
OPF		Organização de Produtores Florestais [EN: Forest Producers Organization]
PAF		Programa de Ação Florestal [EN: Forest Action Programme]
PDDFCI		Plano Distrital de Defesa da Floresta contra Incêndios [EN: District Plan for Forest Protection against Fires]
PDSFP		Plano de Desenvolvimento Sustentável da Floresta Portuguesa [EN: Plan for Sustainable Development of Portuguese Forest]

PEIF		Plano Específico de Intervenção Florestal [EN: Specific Plan for Forest Intervention]
PGF		Plano de Gestão Florestal [EN: Forest Management Plan]
PMDFCI		Plano Municipal de Defesa da Floresta contra Incêndios [EN: Municipal Plan for Forest Protection against Fires]
PNDFCI		Plano Nacional de Defesa da Floresta contra Incêndios [EN: National Plan for Forest Protection against Fires]
PREMAC		Plano de Redução e Melhoria da Administração Central [EN: Plan for Reduction and Improvement of Central Administration]
PRODER		Programa de Desenvolvimento Rural [EN: Rural Development Programme]
PROF		Plano Regional de Ordenamento Florestal [EN: Regional Forest Plan]
QREN		Quadro de Referência Estratégico Nacional [EN: National Strategic Reference Framework]
RTD		Research and Technological Development
SDC		Swiss Agency for Development and Cooperation
SEFDR		Secretaria de Estado das Florestas e do Desenvolvimento Rural [EN: Ministry of State of Forests and Rural Development]
SFM		Sustainable Forest Management
SLM		Sustainable Land Management
SNDFCI		Sistema Nacional de Defesa da Floresta contra Incêndios [EN: National System to Forest Protection against Fires]
UNCCD		United Nations Convention to Combat Desertification
UNCED		United Nations Conference on Environment and Development
UNFCCC		United Nations Framework Convention on Climate Change
UNFF		United Nations Forum on Forests
USA		United States of America
WASWC		World Association of Soil and Water Conservation
WOCAT		World Overview of Conservation Approaches and Technologies
ZIF		Zona de Intervenção Florestal [EN: Forest Intervention Area]



CHAPTER 1

INTRODUCTION

- 1.1. Research scope
 - 1.1.1. Sustainable Forest Management
 - 1.1.2. Stakeholder participation
- 1.2. Aims and objectives
- 1.3. Research design
- 1.4. Thesis structure



1.1. Research scope

1.1.1. Sustainable Forest Management

Sustainable Forest Management (SFM) can be defined as:

«the stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems.»

MCPFE, 1993a: 1

The SFM concept has been widely disseminated since the 1990s, associated with sustainable development challenges, and has moved from maximizing the sustainable yield of forests to ensuring the multifunctional role of forests, especially in what concerns the intangible forest ecosystem services (FAO/ECE/ILO, 2000). Those services not only include the conservation of biodiversity, soil and water protection and the promotion of recreation and leisure, but are also concerned with carbon sequestration and climate change mitigation (FAO, 2010a; FAO 2010b) and with the Millennium Development Goals (MDG; UNFF, 2007).

The focus under SFM and the international and European pressure to mitigate forest degradation, to enhance forests' multifunctionality and to empower people in forest decisions (UNFF, 2007) boosted new trends in forest-related policies and in decision-making processes, especially at national contexts. This last challenge is related with the use of bottom-up approaches in policy and decision-making processes, finding new ways of communication and cooperation between State and society, incorporating the needs and interests of all forest stakeholders in the definition of the *full value* of forests (Buttoud, 2000; Ananda, 2007).

Forestland and shrubland represent together more than 65% of the Portuguese territory and those areas were affected by recent changes and a huge human intervention (Pereira et al., 2009). During the last century, the Portuguese forest has registered three main periods of change: i) forest area expansion; ii) industrial expansion and increase in forest use; and iii) demands for improvement on quality, efficiency and in the value of forests.

Despite the expansion of forests in Portugal, their management has not followed this trend and has even decreased, *«...increasing stand-level fuel accumulation and landscape-scale fuel connectivity»* (Fernandes, 2010: 417). This has been visible in the frequency and intensity of wildfires in the last 30 years. Subsequent to the 2003 and 2005 wildfires, the national forest policy had changed, especially in terms of the planning system to Forest Protection against Fires (DFCI), but also in developing new instruments, such as the Forest Intervention Areas (ZIF) approach.



One of the main faults of forestry policy-making is highlighted by the revision of the Portuguese works about participatory approaches to the definition and implementation of forest policy measures. Despite the increasing emphasis at global levels is into a greater cooperation and integration of all stakeholders, in Portugal these aspects are in the sphere of the State and are limited to public consultation.

The present research focuses on four main objectives towards SFM, and which are particularly relevant in the Portuguese context:

- i) Reducing the **forest fire hazard**: as a major cause of land degradation and desertification in the whole Mediterranean basin. In Portugal, especially in the central region, wildfires have suffered an increase in the last 30 years in their frequency, intensity and area affected by fires, which are associated with the loss of human life, with intangible social and psychological damage, with material damages and with the environmental impacts largely described by Silva et al. (2007). This problem is even more complex when some of the burned areas are hit again in a short period (Campo et al., 2006).
- ii) Maximizing the **productive role of forests** - agriculture and forestry were, for a long time, the main economic activities of rural areas (MADRP, 2007). However, since the 1950s, and associated with a huge rural depopulation and ageing, the rural landscape in north and central Portugal has been changing into large areas of forest (funded by public afforestation or reforestation programmes) and shrubland (resulting from intense and repetitive wildfires). This forest is owned by small-scale private forest owners.
- iii) Increasing the **socio-environmental role of forests** - the forests have also changed into the integration of other dimensions besides the economic function, especially due to the international commitments and agreements to maximize the contribution of forest to carbon sequestration, climate change mitigation and to the MDG.
- iv) Enhancing **stakeholder participation in forestry decisions** - which will contribute to the aforementioned key issues and where the present research was mostly focussed. Stakeholder participation has been described as having the potential to improve the social learning process, which can contribute: i) to change the relationship between the stakeholders and the natural resources; ii) to change social perceptions of natural resources; and iii) to strengthen local capacity (Stringer et al., 2006). Several experiences of participatory forestry and community-based management approaches have been applied and discussed worldwide (Beckley and Korber, 1996; Ananda and Herath, 2003a; 2003b; Ananda, 2007; Atmiş et al., 2007; Wollenberg et al., 2006), highlighting the benefits and limits of these approaches. But the lack of knowledge and limited participation among the general public on forest-related issues are still recognized issues (EC, 2009). In countries with long top-down policy tradition and with low active citizenship this is even more evident, and participatory experiences are almost nonexistent or misused.



1.1.2. Stakeholder participation

Stakeholder participation can be defined as:

«...a voluntary process whereby people, individually or through organised groups, can exchange information, express opinions and articulate interests, and have the potential to influence decisions or the outcome of the matter in hand.»

ILO, 2000: 6

Stakeholder participation has emerged throughout the world in several sectors of public life, where environmental and natural resource management are of utmost importance. Pluralist and democratic societies are now more aware and demanding about their role in decision-making processes, expressed in the origin of diverse civic movements and community-based approaches to natural resources management.

The rationale for using bottom-up or grass-roots approaches is supported by the idea that the ones who have experienced the problems and the fragile ecosystems have the right to be part of the solutions, which provide their livelihoods (Blackstock et al., 2007; Reed, 2008; Wandersman, 2009). Besides formulating better decisions, by putting together a set of multiple and different perspectives providing a global view and incorporating local resources, stakeholder participation can also contribute to a greater social acceptance and implementation of those decisions.

In recent years, a set of participatory approaches have gained a wider acceptance in political and scientific spheres (Prell et al., 2006). However, the limits of these approaches are also clear and the *«...lack of definition and transparency of chosen processes and objectives often leads to more problems»* (Buchy and Hoverman, 2000: 15). Moreover, the balance between participation as a means to an end - focus on outputs - or as an end by itself – focus on process - (Warburton, 1997; Buchy and Hoverman, 2000) needs to be underpinned in a careful analysis of the aims of participation, the stakeholder selection, the process design and the context where participation takes place.

Having this in mind, the need for stakeholder participation in forestry decision-making in Portugal is supported by two central arguments:

- i) the failures of traditional and centralized decision-making processes, unable to deal with the characteristics of the forestry decisions, which are dynamic, multi-dimensional, complex, uncertain, long-term and that affect and are affected by multiple stakeholders;
- ii) the societal demand for more democratic and participatory processes and the need to enhance active citizenship and local communities capacity building, especially in a context of public funding shortage.



1.2. Aim and objectives

The central assumption of this research is that forest management towards sustainability can be improved by changing the current framework of decision-making into a more participatory approach, where stakeholders take part in and are co-responsible for decisions concerning forests. Based on this premise, the main aim of this research is to develop a participatory methodology, able to engage key-stakeholders and local communities in the definition of local SFM strategies in fire-prone areas.

The central aim is divided into five specific objectives:

1. Understand the concept of SFM and its impact in forest policy and in the decision-making processes in what concerns: the forest fire hazard; the productive role of forests; the social-environmental role of forests; and the stakeholder participation in forestry decisions (Chapter 2; Chapter 3);
2. Assess and compare the political, technical and social perceptions of forests and forest management, especially concerning: the role of forests; the problems affecting forest management; the solutions and responsibilities over forest management; the forest fire hazard; and the future of forests (Chapter 4);
3. Assess and learn from previous stakeholder participation experiences in natural resource management (Chapter 5; Chapter 6);
4. Develop and test a participatory methodology for discussing and negotiating SFM strategies in fire-prone areas (Chapter 7);
5. Provide some guidelines to improve stakeholder participation in forest-related decision-making processes and, ultimately to contribute: to forest fires mitigation; to the maximization of the economic, environmental and social role of forests; and to enhance stakeholder interest and involvement in forestry decisions (Chapter 8).

1.3. Research design

The idea under the present research started to be developed in the scope of DESIRE¹ project, which aimed to select, test and upscale Sustainable Land Management (SLM) options to mitigate desertification, using a multi-stakeholder participatory approach (DESIRE, 2006). This methodology was implemented and assessed in 14 study sites located around the world - Botswana, Cape Verde, Chile, China, Greece, Morocco, Portugal, Russia, Spain, Tunisia and Turkey (Schwilch, 2012).

The implementation of the participatory methodology in Portugal, more focussed on solutions rather than problems, facilitated a multi-stakeholder learning process, contributing to the

¹ DESIRE Project (037046): Desertification Mitigation and Remediation of land – a global approach for local solution, was developed between 2007 and 2012 and funded by the EU Sixth Framework Programme (FP6). Webpage: <http://www.desire-project.eu/>



sustainable management of the land (Schwilch et al., 2012a). This experience revealed the need and opportunity to develop a participatory methodology focussed in forest management in fire-prone areas, using some elements of the DESIRE methodology. The methodology includes a crosswise perception survey over the main problems affecting forests.

The overall research design included three main parts:

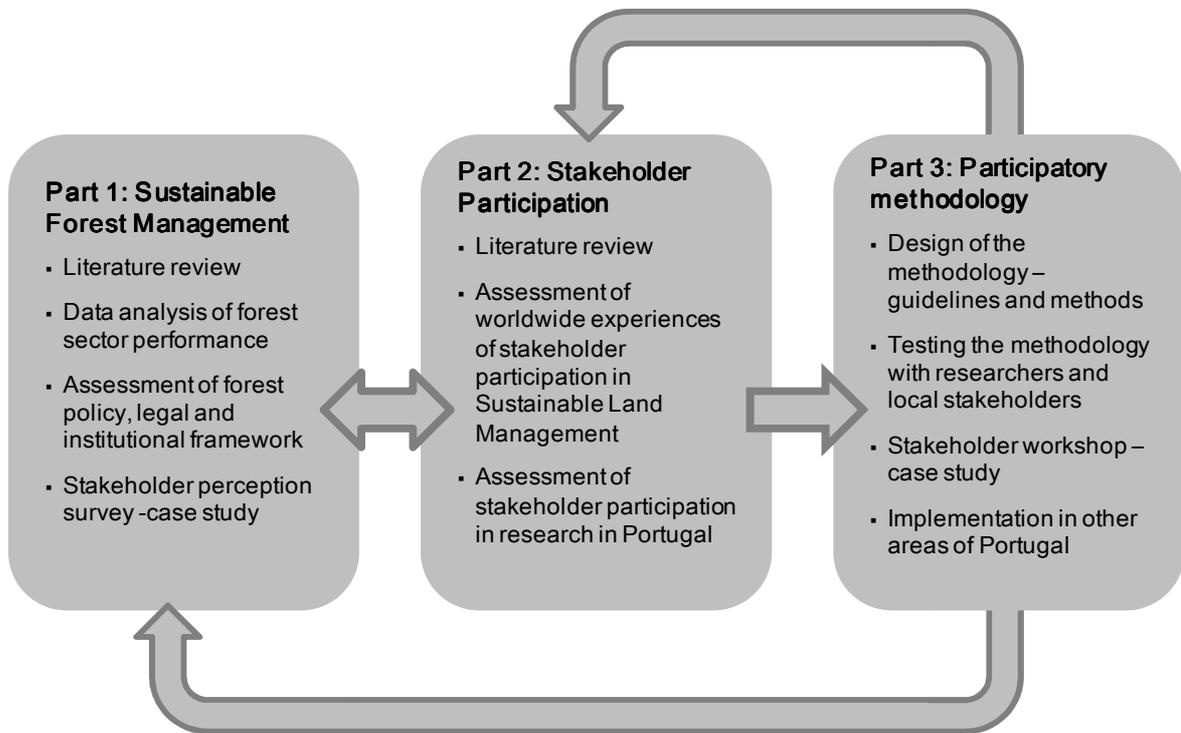


Figure 1.1: Research design

Part 1 established the framework and the setting to understand forestry and forest management in Portugal. Besides the collection of data on the state of forests, the policy, legal and institutional frameworks for the forest sector at international, European and national levels were analysed (objective 1). Recent policies regarding forest owners' organization and cooperation in Portugal were also assessed (a summary of ZIF's approach is presented in Annex 1). A social perception survey on forest and forest management (objective 2) was implemented through a questionnaire, which included 30 questions concerning: i) the knowledge of forest policies and planning tools; ii) the problems affecting the forest sector and forest management; iii) the solutions to improve forest management; iv) the roles and responsibilities of different stakeholders in forest management; and v) the future scenarios for forests. A particular emphasis was given to fire hazard as the main threat to forests in Portugal. An additional survey was also applied to forest owners, identifying their profile concerning forest management. The questionnaire templates (Annex 2 and Annex 3) were developed for this research in collaboration with several international and national experts as well as contributions from forest technicians.



The second part of the research (objective 3) comprised a literature review of public participation and participatory experiences applied worldwide, as well as the evaluation of national participatory cases through the implementation of a qualitative and quantitative survey to participants and facilitators of participatory processes developed in the research projects. The interview template was developed in the scope of project Involved² (Annex 4).

Part 3 concerned the design and implementation of a participatory methodology for discussing and selecting SFM strategies in fire-prone areas. The methodology included the implementation of the stakeholder perception survey, developed in part 1, and workshops developed at local level, targeted at both key-stakeholders and local communities (objective 4). The workshop guidelines were developed under this research (Annex 5). Before implementation in the study sites, an experimental workshop with researchers and two local stakeholders was held (report in Annex 6). The methodology was implemented in the scope of this research in one study site (report in Annex 7) and made available to other research teams to be used in other two study sites (in the scope of project ForeStake³). A small assessment questionnaire was also applied to the participants and facilitators in the three workshops (questionnaire templates in Annex 8).

1.4. Thesis structure

Subsequent to this introductory chapter (Chapter 1), Chapter 2 provides a review about SFM global concept and their key elements, coming from international and European agreements, and analyses the integration of those elements in the Portuguese policy, legal and institutional setting, especially in what concerns forest fire hazard, the productive role of forests, the social-environmental role of forests and the stakeholder participation in forestry decisions. ZIF approach, as the most recent legal approach for forest owners' cooperation in forest management, is assessed in Chapter 3, providing an up-to-date assessment of the implementation of ZIF in Portugal, but also an evaluation of the technical and social perceptions over the potential of this solution, contributing to objective 2. Chapters 2 and 3 are mainly related to the objective 1.

Chapter 4 is focussed on the results from a social perception survey on forests and forest management in a case study in central Portugal. This survey compares the political, technical and social views over the problems, the solutions and the future of forest management (objective 2).

Both chapters 5 and 6 are focussed on the stakeholder participation, aiming to provide an understanding of the stakeholder participation key issues, benefits, approaches and methodologies (Chapter 5), but also contributing with a stakeholder assessment of participatory processes developed under scientific research projects (Chapter 6). This assessment included

² Project Involved was funded by a Research Development Award from the British Academy to Mark Reed. The project is a collaboration between the University of Aberdeen, the University of Leeds, The Leuphana University and the EU funded project DESIRE. Webpage: <http://homepages.sse.leeds.ac.uk/~lecmsr/involved/>

³ ForeStake project (PTDC/AGR-CFL/099970/2008) - The role of local stakeholders to the success of forest policy in areas affected by fire in Portugal – was developed between 2010 and 2013 and funded by FEDER funds (through COMPETE Programme) and by national funds through the Fundação para a Ciência e a Tecnologia (FCT). Webpage: <http://forestake.web.ua.pt/>



perspectives from both participants and facilitators of participatory experiences about environmental and social outcomes of participation, as well as about the role of process design and the role of context in the success of participation in natural resources management.

Results from Chapter 3 were embedded in the development of the participatory methodology for discussing and negotiating a SFM strategy in fire-prone areas presented in Chapter 7. The designing process and the testing of the methodology as well as the use of this approach by other research teams are described in this chapter (objective 4).

Chapter 8 presents the main findings and conclusions as well as the challenges and limitations from the research, providing some guidelines to improve stakeholder participation in forest management, namely: to decrease forest fire hazard; to maximize the productive role of forests; to increase the socio-environmental role of forests; and to enhance stakeholder interest and participation in forestry decisions (objective 5).



CHAPTER 2

SUSTAINABLE FOREST MANAGEMENT IN PORTUGAL: FROM GLOBAL POLICIES TO LOCAL PRACTICES

- 2.1. Introduction
- 2.2. Emergence of Sustainable Forest Management
 - 2.2.1. Policy-making in forest sector
 - 2.2.2. Stakeholder participation in forest policy-making
- 2.3. Forest Resources Assessment: International, European and Portuguese overview
 - 2.3.1. World's forest resources
 - 2.3.2. European forest resources
 - 2.3.3. Portuguese forests and forest sector
- 2.4. Wildfires: a main threat to forests
 - 2.4.1. Forest wildfires in southern Europe
 - 2.4.2. Forest Protection against Fire
- 2.5. Policy, legal and institutional framework for forest management
 - 2.5.1. International guidelines and commitments
 - 2.5.2. European policy setting – guidelines for Portugal
 - 2.5.3. Portuguese policy, legal and institutional framework
 - 2.5.3.1. Legal setting, planning tools and financial instruments
 - 2.5.3.2. Institutional setting and forest stakeholders
- 2.6. Progress towards Sustainable Forest Management



«Queremos mostrar ao País a importância do sector florestal e construir os caminhos para o seu desenvolvimento sustentável.»⁴
Portuguese Minister of State of Rural Development and Forests, 2011

2.1. Introduction

When considering what key aspects should be integrated in forest management, it is clear that productive function is rather important. New challenges, however, have recently come onto the agenda, notably the value of forest practices accountability and the roles of forest in carbon sequestration, in climate change mitigation and in providing recreation and leisure amenities. All these trends have been widely discussed in the political arena, especially in terms of the development of policies and tools able to mitigate forest disturbances and to enhance the multifunctionality of forests all over the world.

Sustainable Forest Management (SFM) has emerged as an innovative approach to those new and complex challenges, preventing the univocal use of forests to economic purposes, developing other dimensions of sustainability and ensuring that future generations will not be endangered by present decisions. Social responsibility, public participation in decision-making, forest certification, compensation of environmental externalities and community-based approaches are examples of strategies that are now applied towards SFM. A central element of SFM is to approach State and society, ensuring the participation of stakeholders and local communities in the definition and implementation of forestry decisions.

Understanding forest benefits and the disturbances affecting forests as well as the policies and tools available is quite important to improve forest management practices. Despite the sovereignty of each country in forestry matters, there are international and European guidelines and commitments around the aims of SFM respecting the diversity and specificities of each national and regional context. SFM can though be addressed in many different ways, making it quite difficult to evaluate and monitor progress towards SFM.

This chapter first discusses the nature of SFM and what constitutes its key elements. These elements are related to the productive role of forests, the socio-environmental functions of forests, the decrease of forest disturbances, which in the scope of this research will be focused on fire hazard, and the increase of participatory forestry and of the societal interest on forests. After analysing data, documents and reports from the international and European levels, the integration of SFM into the Portuguese legal framework is discussed. The analysis relies on four aspects: i) forest sector performance; ii) forest fire hazard; iii) legal and policy tools to forest

⁴ Intervention made during the opening of the International Year of Forests 2011. English translation: «We want to show to the country the importance of forest sector and to build paths towards its sustainable development».



management; and iv) institutions and stakeholders for forestry matters. Those aspects are analysed at different scales, aiming to compare the progress made at global, national and local contexts towards SFM.

2.2. Emergence of Sustainable Forest Management

«Sustainable forest management has become the salient cross-cutting theme in forestry throughout the world today» (Cubbage et al., 2007: 833). The role of the forest in improving soil productivity, public health and social well-being has been recognized since the 19th century (Baptista and Santos, 2005). But the SFM concept only became relevant in the early 1990s, within the broader discussion about sustainable development, emerging as a dominant paradigm in forestry discourses (FAO, 2007a; Kant and Lee, 2004). SFM has been classified as interdisciplinary, heterogeneous, less hierarchical and more socially accountable, when compared to traditional forest management (Wang, 2004). It is also recognized as a dynamic concept (UNGA, 1992; UNGA, 1998), and should therefore be tackled as a process instead of a state to be achieved (UNFF, 2007).

Several trends have contributed to the emergence of sustainability in forestry discourses and policies. A major driver was the decline of timber production as the most important function of forests (Buttoud, 2000). The transitional period between the 20th and 21st centuries triggered a more balanced approach to forest (FAO, 2010a). The forestry development paradigm shifted from silviculture towards ecoculture, from stands to landscapes, from volume to quality, from ownership towards communities, from forest as product to forest as capital, from current income to natural capital and green finance, and from blind consumption towards consumption awareness (Jenkins and Smith, 1999). Forest management practices have now to include the accountability of these practices, the state of forest conditions and structure and the integration of economic, social, environmental and cultural dimensions (Wang, 2004).

Forests may offer multiple goods and services, and those benefits are increasingly recognized and re-discovered by society (EC, 2003). The new and multiple views over forest, mainly generated by the massive urbanization of society, highlighted the role of forest in the global carbon cycle and its contribution to climate change mitigation and adaptation, but also in offering attractive landscapes for recreation and leisure (Buttoud, 2000; FAO, 2010a). Economic-based forest management is though considered obsolete and no longer accepted by most societies, which are requesting more sustainable practices.

There is no globally agreed interpretation of the term 'sustainability', neither a widely shared understanding of what SFM means (UNFF, 2007), being recognized that SFM needs to meet ecological, economic and social dimensions (Buttoud, 2000; Bowers, 2005). The United Nations



Forum on Forests (UNFF)⁵ considered it extremely important to «...*articulate the concept of sustainable forest management in a way that is generally acceptable, easy to understand conceptually, and more concrete, in order to facilitate implementation*» (UNFF, 2007: 6).

In 2006, UNFF established four global objectives for SFM, namely:

- i) to tackle losses in forest cover and forest degradation;
- ii) to enhance forest-based economic, social and environmental benefits;
- iii) to increase protected forest; and
- iv) to mobilize financial resources for the implementation of SFM.

Those objectives were mainly related with the need to reduce deforestation, to mitigate forest disturbances and to compensate non-marketable environmental and social benefits provided by forests.

SFM can be characterized by its ambiguousness and uncertainty, which is related with the difficulty to measure forest ecosystems services, the complexity of the market, the conflicting values and individual interests, the uncertainty related with forest interventions and also the long-term dimension of those interventions (Schlüter, 2007; UNFF, 2007). These factors frequently block the progress towards SFM, being difficult to measure and to monitor the extent of that progress. Some indicators for monitoring were developed by the Food and Agriculture Organization (FAO), where the extent of forest resources, the biological diversity, the forest health and vitality, the production and protection functions of forest, the socio-economic functions and also the legal, policy and institutional framework are key criteria (FAO, 2007a).

Many countries are trying to increase their SFM levels, but empirical evidence proving that forests are actually well managed and protected is often lacking (Siry et al., 2005; UNFF, 2007). In fact, it has been quite difficult to assess ecological and social sustainability of forest management (Bowers, 2005). UNFF (2007) reported past efforts as not very successful, emphasizing that similar approaches have resulted differently in diverse ecosystems and social and cultural contexts.

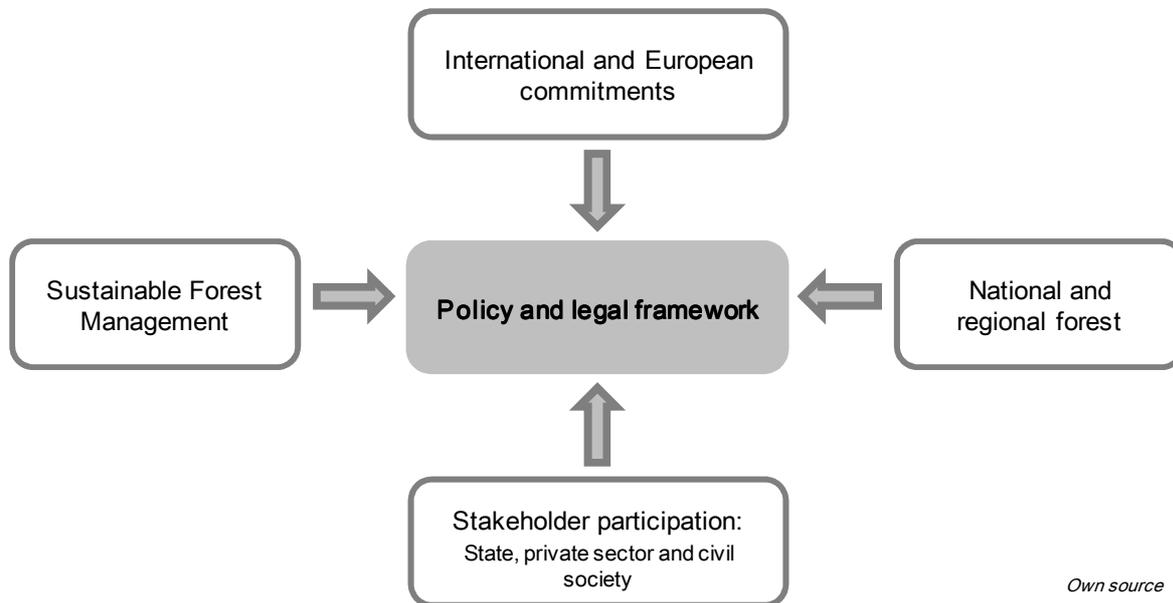
2.2.1. Policy-making in forest sector

Progress towards SFM relies on the design of suitable and successful policy guidelines and tools. In this context, UNFF (2007) enhances the role of forest governance and the interaction between governmental agencies, civil society and private sector, particularly at local level, to reinforce and support the implementation of SFM practices. On the other hand, designing sustainable forest policies involves balancing economic, socio-political and environmental complex objectives and systems as well as including multiple objectives from different stakeholders (Ananda, 2007).

⁵ UNFF is an intergovernmental policy forum (<http://www.un.org/esa/forests/>), established in 2000 by the ECOSOC Resolution/2000/35, as part of the new international arrangement on forests. The Collaborative Partnership on Forests, formed in 2001, supports and coordinates the work performed under UNFF.



The real challenge to policy-makers is bringing together the international guidelines and commitments with the aims at national and local scales, involving diverse, and sometimes conflicting, interests, and considering forest specific features (Figure 2.1).



Own source

Figure 2.1: Key aspects in forest policy and legal framework definition

The new roles of forest also raised other demands to policy makers, namely to include the *full value* of forests in policy tools (Buttoud, 2000; Cabbage et al., 2007). The understanding of this *full value* is not either consensual or easy to define and should be discussed and negotiated among the several partners (Buttoud, 2000). For many theorists and practitioners, it is intrinsically related to the forest role in the carbon cycle, in climate change mitigation and in land protection. But in some regions, this value is also linked to the role of the forest in providing communities' livelihoods and in protecting indigenous culture and rights. Therefore, to ensure the *full value*, and especially when the nature of goods and services are non-marketable, governments have to intervene with traditional policy instruments, such as regulations, subsidies, awareness campaigns, investments on education and research and better protection systems, but also providing innovative tools, such as market mechanisms, community-based approaches and forest certification schemes (Cabbage et al., 2007).

The success or failure of forest policies is influenced by several factors, such as the long history of the forest sector, the features of institutions, the leadership of the sector, the stakeholder engagement and the cooperation among different sectors and institutions (Nilsson, 2005). The available policy instruments to encourage, to compel or even to force forest management towards sustainability can also produce diverse results in different situations and contexts (Bowers, 2005; Nilsson, 2005; UNFF, 2007). A sustainable development strategy should therefore entail a unique treatment for each forest (Bowers, 2005).



Buttoud (2000) identified three distinct frameworks for policy decision in the forest sector, indicating a transition from an *instrumental rationalist conceptual approach* to the preference for more *incremental approaches*. While the instrumental framework relies on top-down decisions, excluding public needs and interests, the other two frameworks emphasised the process of negotiation and discussion, where diverse needs and interests are included, promoting the adoption of bottom-up policies (Table 2.1).

Table 2.1: Frameworks for policy-making in the forest sector

Forest policies	Instrumental rationalist conceptual framework	Communicative incremental conceptual framework	Mixed model
Who is responsible by the decision?	Public authority is responsible for making choices by the society.	Network of relationships between stakeholders and public authority.	Public authority uses participatory approaches in decision-making.
Common interest	No formal inclusion of the needs and interests expressed by the users.	Consequence of needs and interests expressed by stakeholders (social consensus).	Combines the logical rationalist sequence for identifying and classifying principles, objectives and means with a participatory approach.
Full value of forests	Normative and objective assessment of the individual components of forests.	Participatory process to discussion and negotiation among various parties.	Full value is calculated or estimated at all stages of the process.
Type of policies	Top-down redistribution policies.	Bottom-up and self-reliant policies.	Policies designed from a bottom-up process.
Main limitations	No inclusion of stakeholders' needs and interests; Individual measurement of the components of full value.	Insecurity about the integration of all important components or interests.	Possibility of embracing an endless process; Possibility of using participation as a tool to legitimate policy decisions.

Source: Adapted from Buttoud, 2000

The choice of a specific decision-making framework always delivers some opportunities and limitations. While the instrumental and rationalist approach seems to neglect the interests and the preferences of the users and responds shortly to the challenges and trends in current policy-making, participatory approaches can promote endless processes and leave some important interests aside. Moreover, bottom-up approaches have been sometimes used to legitimate public decisions.



2.2.2. Stakeholder participation in forest policy-making

The nature of the relationship between State and society has a massive influence both on decision-making process and on how public decisions are implemented. Policy-making concerning forests and the forest sector was traditionally placed on the domain of public authority. In many regions of the world, State intervention was characterized by a severe control of the policies and of the forestry operations (Wollenberg et al., 2006). However, a «...*growing environmental awareness and acceptance of participatory democracy models in policy formulation have forced the public authorities to introduce new participatory mechanisms to manage forest resources*» (Ananda, 2007: 534). This was stated in the United Nations Conference on Environment and Development (UNCED), held in 1992 in Rio de Janeiro (Brazil), where it was recognized that the authorities should guarantee equal opportunities for the participation of all interested parties (UNGA, 1992).

There are examples worldwide of stakeholder collaboration and public engagement in forest planning and management (Cheng and Mattor, 2006; Kohsaka and Handoh, 2006; Wollenberg et al., 2006). Several authors have been arguing about the benefits of social participation in forestry decision-making (Buttoud, 2000; Buchy and Hoverman, 2000; Siry et al., 2005; Bowers, 2005; Price, 2007), particularly in avoiding conflicts and misunderstandings and in improving public perceptions about forests and forest policies (Ní Dhubháin et al., 2008). This also came out from failures of regulations, information tools and even isolated subsidies schemes to encourage private forest owners to adopt a multifunctional management of forests (Carvalho et al., 2002; Coelho et al., 2004; Gossum et al., 2005).

The importance of stakeholder participation in forest policy formulation is reflected in the international agreements, such as the Non-Legally Binding Instrument on All Types of Forests (UNGA, 1998), and in the widespread adoption of the National Forest Programme (NFP) approach (FAO, 2010a). The NFP approach was developed by the Intergovernmental Panel on Forests (IPF) in 1996, positioning democratic consultation and bottom-up processes as central aspects in forestry policy-making. These programmes envisage a set of crucial elements to SFM development, namely: legal framework; planning and management tools; incentives framework; institutional setting; and Research and Technological Development (RTD) actions.

At the European level, an institutional change is occurring in the forest sector towards the understanding of the ideology of diverse stakeholders (Schlüter, 2007). The Forestry Strategy for the European Union (EU) recommends that forest policies should respect the ownership rights of landowners and ensure mechanisms to include forest owners and producers at different levels of decision-making. The NFP approach was also widely adopted in Europe as «...*a participatory, holistic, inter-sectoral and iterative process of policy planning, implementation, monitoring and evaluation at the national and/or sub-national level in order to proceed towards the further improvement of sustainable forest management...*» (MCPFE, 2003a). In fact, 37 European



countries reported to have in place a NFP or similar process and half of them developed their main policy documents within that process (FOREST EUROPE, 2011).

2.3. Forest Resources Assessment: International, European and Portuguese overview

This section presents data regarding forest resources and their current state, identifying global and European trends and analysing the Portuguese context.

2.3.1. World's forest resources

Forest covers more than 30% of the Earth's land area, representing 4 billion of hectares and 0,6ha per capita (FAO, 2011). However, forest resources are unevenly distributed, opposing South America and Europe, where forest represents almost 50% of their territorial area, to Asia where forest occupies less than 20% of the land (Figure 2.2). Russian Federation, representing 81% of European forest area, and Brazil contributing to 60% of South America forest, are the most important countries, followed by Canada, United States of America (USA) and China. These five countries together possess more than half of the total forest area (FAO, 2010a).

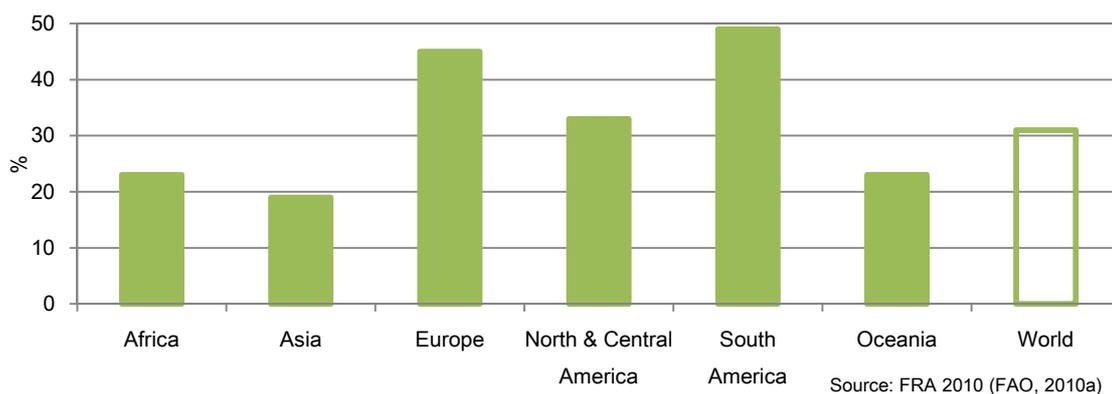


Figure 2.2: Extent of forest in the total land area by world region

Global Forest Resources Assessment (FRA) is provided each five years by FAO, presenting the main characteristics and trends of the world's forests. The most recent is FRA 2010, reporting data from 233 countries (FAO, 2010a). It was estimated that the global forest area declined by 3% between 1990 and 2010 (FAO, 2010a). However, in some parts of the world, such as Europe, forest area has increased during this period. The dominant forest type in all world regions is naturally regenerated forest⁶, except for South America where primary forest⁷ is the main type. Planted forest⁸ is less important, but FRA 2010 shows that, while primary forests are reducing, planted forests are increasing. Deforestation rate is slowing down in all regions. This is probably

⁶ In naturally regenerated forests there is maintenance of the original characteristics, despite the visible signs of human intervention.

⁷ Primary forests are defined as forests of native species with no clear indication of human intervention or ecological disturbance.

⁸ Planted forests result from deliberative planting or seeding with native or introduced species.



linked to international agreements and rising institutional and social awareness about the importance of forest to sustainable development.

Forest provides numerous environmental, social and economic benefits, ranging from the quantified economic assets (e.g. earnings from selling timber and non-timber products, employment) to the less tangible services and contributions to society (e.g. environmental amenities, cultural sites).

About 30% of the world’s forest is primarily used for wood and non-wood products and this function is particularly important in Europe (Figure 2.3). The area for conservation of biodiversity has increased in the last few years, representing 12% of the total forest area. The area primarily designated for soil and water conservation, avalanche control, sand dune stabilization, desertification control or coastal protection also represents 8% of the world’s forest. The multiple use of forest, i.e. forest areas combining the production of goods, protection of soil and water, conservation of biodiversity and/or provision social services, is already common in some regions of the world, namely in north and central America and in Oceania (Figure 2.3). Although very difficult to quantify, social services provided by forests (such as aesthetics, recreation, tourism, education, research and conservation of cultural or spiritual sites) are quite significant in South America, where primary forest is dominant (Figure 2.3). Legally established protected areas (e.g. natural parks, wilderness areas, etc.) have been increasing in the last few years and represent approximately 13% of the world’s forest area (FAO, 2010a).

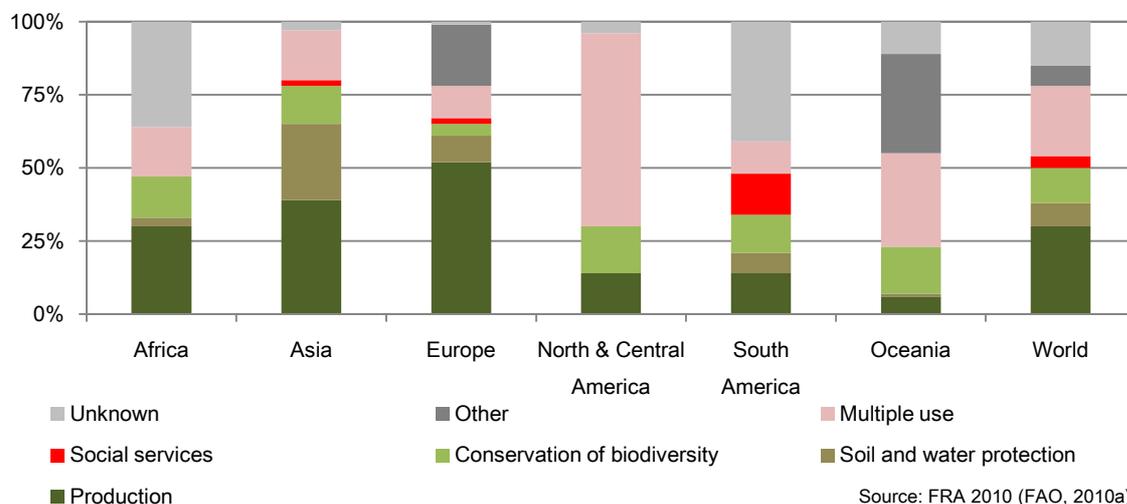


Figure 2.3: Primary designated functions of forest by world region

The employment in the forest sector, the size of the holdings, the ownership and the socio-economic conditions of forest communities are also rather important criteria for the analysis of the sector. Eighty percent of the world’s forest is public, but there is a trend into greater ownership and management by communities, individuals and private sector (FAO, 2010a). Forest activities provide wood, fuel, food and employment for local communities in rural areas, where the majority forestry activities take place (EC, 2003; Siry et al., 2005). It is estimated that forest

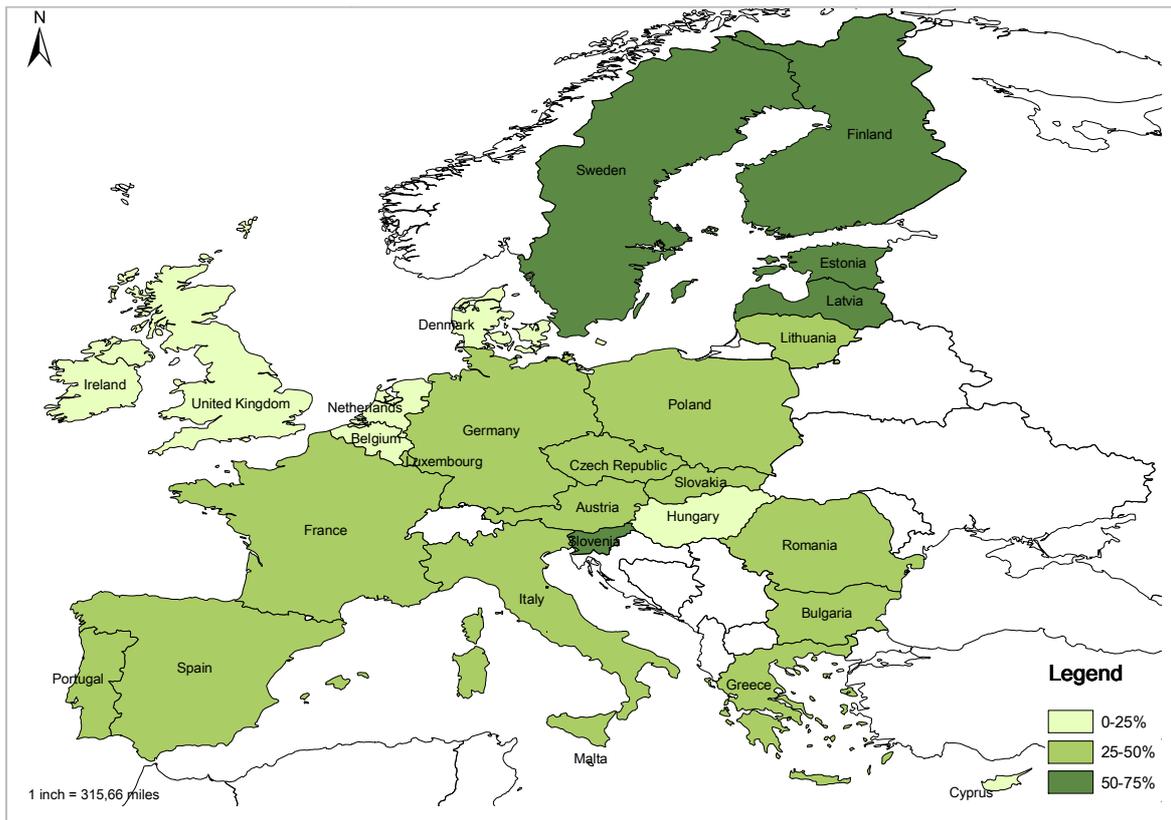


represents the source of subsistence and income to more than 6% of the world population, especially in marginalized and poor areas. FRA 2010 estimated that more than 10 million people are employed in forest management and conservation (FAO, 2010a). The global estimated contribution of the forest sector to the Gross Domestic Product (GDP) is 1% (FAO, 2011).

2.3.2. European forest resources

Around 45% of the European land is covered by forest, which contributes to 25% of the world total (FOREST EUROPE, 2011). As the Russian Federation represents more than 80% of the European forest area, the analysis performed in this section will be focussed in Europe, excluding the Russian Federation, and will be mainly focussed on the EU region.

Forest in Europe has been increasing for the past 20 years, more than 8% between 1990 and 2010 (FAO, 2011), due to planting of new forests and to natural expansion into agricultural land. From 1990 to 2010, the growing trend was positive in most EU countries, with special emphasis in Ireland, Spain, Denmark and Bulgaria (FAO, 2010a). Finland, Sweden, Slovenia, Latvia and Estonia are the EU Member States whose forest represents more than half of their land area (Figure 2.4). Portugal belongs to the second most important group.



Source: Adapted from FOREST EUROPE, 2011

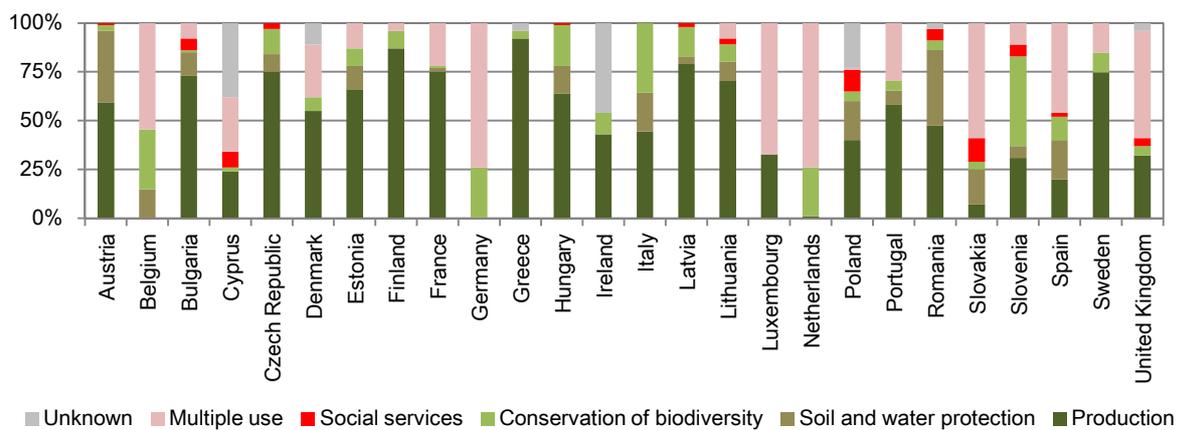
Figure 2.4: Percentage of forest in total land area in EU countries

Seventy percent of the European forest is naturally regenerated forest and 27% is planted forest (FAO, 2010a). The forest of forest-rich countries is mainly naturally regenerated forest. Planted



forest is of most significance in the Czech Republic, the Netherlands, Poland, Hungary, Ireland and Denmark.

More than 50% of the European forestland is primarily used for production. Analysing the EU context, this function is dominant in half of the countries, where Finland, Greece and Latvia are the most important (Figure 2.5). Multiple use of forest is also very frequent in the EU countries, especially in Netherlands, Luxembourg, United Kingdom, Slovakia, Germany and Belgium (Figure 2.5). Forest areas designated for conservation of biodiversity represent 10% of the EU forest area, while protected forest reach 12% (FAO, 2010a). It is also estimated that those areas and the area of forest for leisure and recreation activities are expanding (FOREST EUROPE, 2011).



Source: FRA 2010 (FAO, 2010a)

Figure 2.5: Primary designated functions of forest in EU countries

In Europe, around 1% of the labour force is employed in the forestry sector and this sector contributes to 1% of the GDP (FAO, 2011). The areas for production and the total wood removals declined significantly in the 1990s in Europe, recovering slightly during the last decade (FAO, 2011).

Almost 50% of the European forest (excluding Russian Federation) is private, representing more than 11 million holdings (FAO, 2010a). In EU territory, privately-owned forests represent 65% of the forest areas, distributed by more than 12 million private forest owners (EC, 2003). «*For the private forest owner, forests are both a blessing and a strain. A blessing as there are only very few other resources bringing such opportunities in services and products for its owner and manager as well as for society. A strain as its management and usage generates so much pressure from other stakeholder groups at the local, national and international levels*» (Härmälä, 2004: 27).

2.3.3. Portuguese forests and forest sector

Portugal is the EU's eighth highest country with forest and other wooded area cover by surface area (EC, 2008). Based on the preliminary results from the Sixth National Forest Inventory (IFN6), forest is the main land use in Portugal (almost 3.2 millions of hectares), representing 35% of the



total mainland area (Figure 2.6). Shrubland and pasture land are the second most important land use class, covering 32% of the national territory.

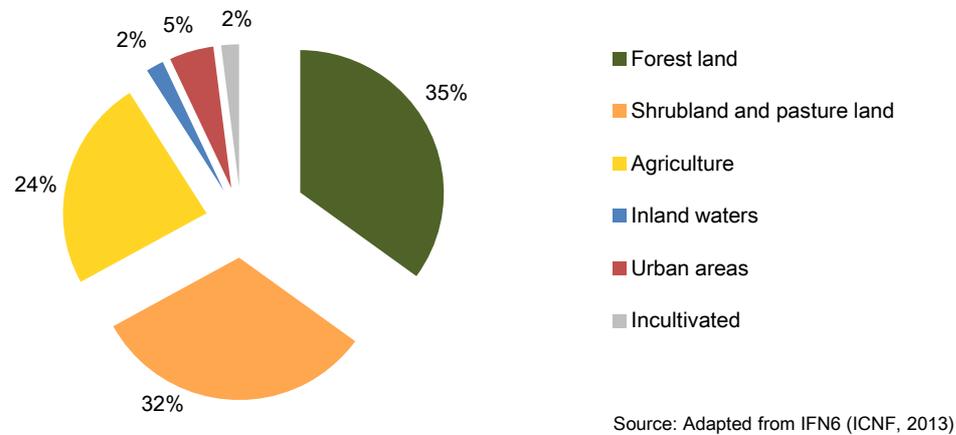


Figure 2.6: Land use classes for mainland Portugal (2010)

Forest area increased during the 20th century, partly due to State intervention, but mainly due to investments of private owners and producers (DGRF, 2007). However, this expansion has occurred in an unorganized manner and without proper spatial planning (DGF, 1998). Until the 1960s, the investments were complemented by the existent rural agrarian system, using shrubs and litter for fodder and bedding for animals and then as manure to fertilise the land. Although FRA 2010 reported an increase in Portuguese forests in the last 20 years (FAO 2010a), the preliminary results of Sixth National Forest Inventory (IFN6) showed that national forest area decreased 4.6% from 1995 to 2010 (around 0.3% per year). Abandonment of agriculture and the increase of shrubland and pasture land are also reported trends in the IFN6 (Figure 2.7).

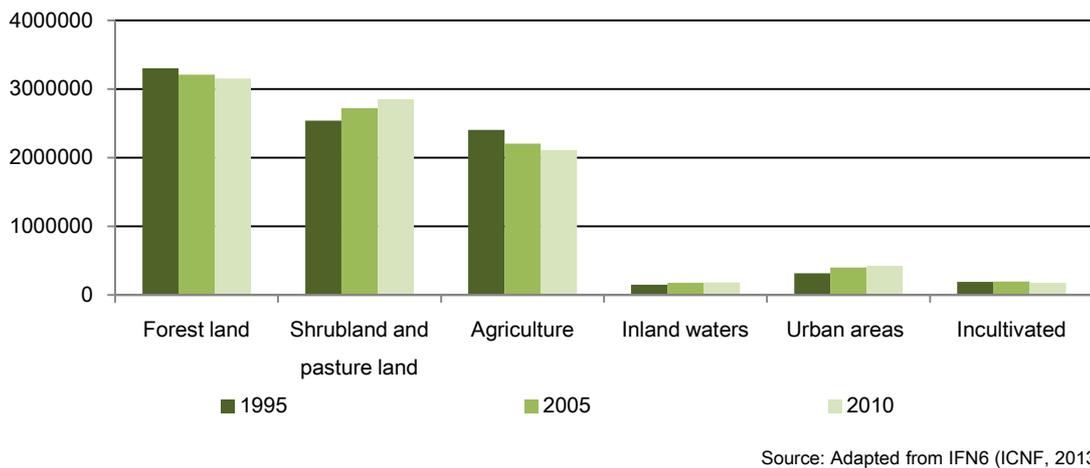
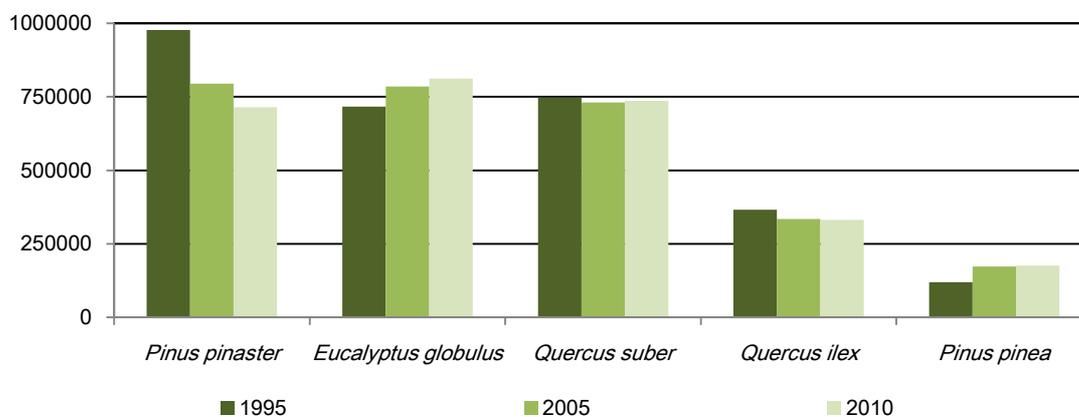


Figure 2.7: Changes in land-use in Portugal between 1995 till 2010

Concerning forest areas, there are three major tree species in Portugal: i) *Eucalyptus globulus* (26%); *Quercus suber* (23%); and ii) *Pinus pinaster* (23%). The remaining area is occupied by *Quercus ilex* (11%), by *Pinus pinea* (6%) and other broadleaf and conifer species (17%). The



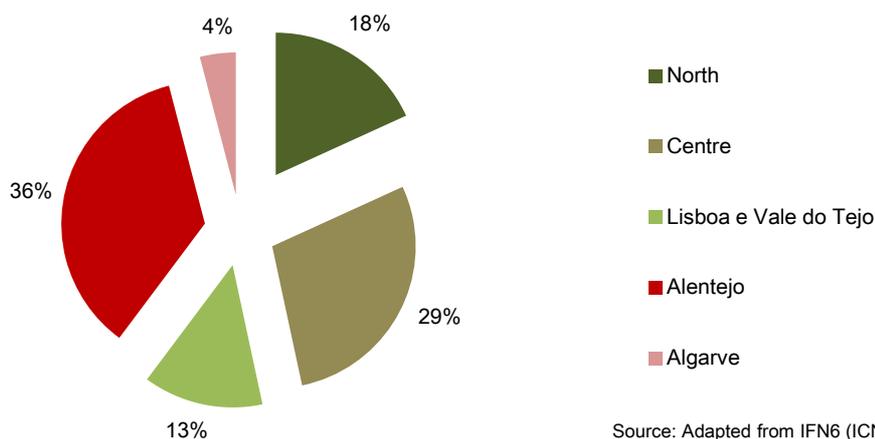
decrease of *Pinus pinaster* areas and the expansion of *Eucalyptus globulus* was the most significant trend in the last decades (Figure 2.8).



Source: Adapted from IFN6 (ICNF, 2013)

Figure 2.8: Changes in forest species in Portugal between 1995 till 2010

The regional distribution of forest within Portugal is shown in Figure 2.9. Alentejo region contributes 36% of the Portuguese forest areas, followed by central region (29%). There are considerable differences in terms of species distribution in the north and south parts of Portugal. While north and central regions are mainly occupied by conifers (maritime pine) and by introduced fast-growing eucalyptus species (in plantations), Alentejo region is mainly occupied by the *montado* system, combining cork oak with silviculture and grazing activities (Coelho, 2002; 2003). The areas occupied by *Pinus pinea* are growing both in Lisboa e Vale do Tejo and Algarve regions.



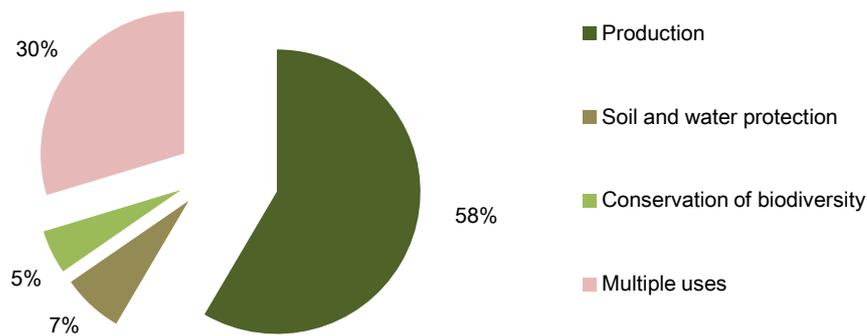
Source: Adapted from IFN6 (ICNF, 2013)

Figure 2.9: Distribution of forest areas by Portuguese regions

More than half of the Portuguese forest is primarily designated for production (Figure 2.10), not only as a timber supplier but also by the presence of important pulp and paper and cork industries (FOREST EUROPE, 2011). The second most important function is multiple use (30%), combining production, soil and water protection and silvo-pastoral, hunting and fishery (Santos et al., 2005).



The environmental functions of forests were undervalued by decision-makers and by the general population for a long time. This was probably linked to the low weight of Portuguese forest areas primarily designated for conservation of biodiversity when compared with global and European values (Figure 2.10). However, the principles shared by EU countries highlighted ecosystems protection and landscape conservation as important functions of forest areas in all regions (Amaral, 2009). The areas primarily designated for soil and water protection and for conservation of biodiversity in Portugal represent 7% and 5%, which are below the world and European rates.



Source: FRA 2010 (FAO, 2010a)

Figure 2.10: Primary function of Portuguese forests

Private ownership, meaning forest owned by individuals, families, communities, private cooperatives, corporations and other business entities, private religious and educational institutions, is dominant in Portugal, representing more than 90% of the forestland (Table 2.2). Communal forests (*baldios*) are also particularly relevant in north and central regions, mostly managed by public forest services.

Table 2.2: Forest ownership distribution in Portugal in 1995

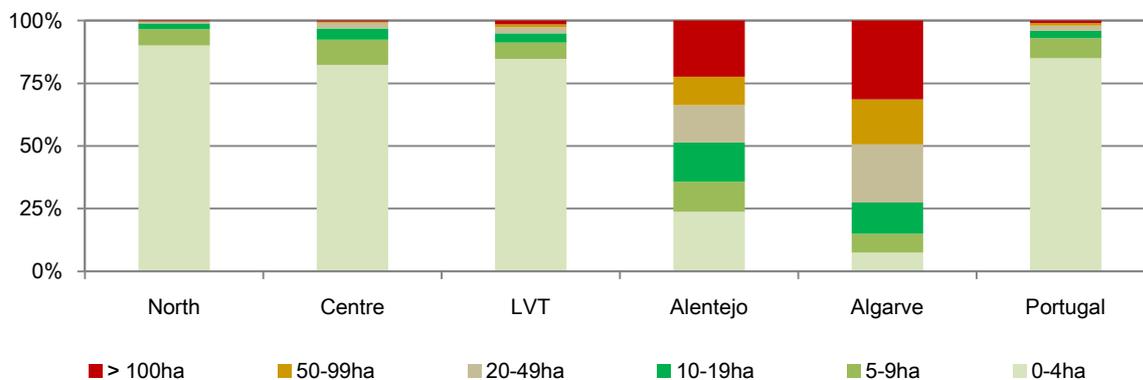
Type of ownership		% of forest land
State forest		1.2
Communal forest (<i>baldios</i>)		5.4
Private forest	Industrial Private Sector	6.5
	Non-Industrial Private Forest	86.9
	Total	93.4

Source: Mendes, 2007a

Generally, private forest corresponds to smallholdings (below 10ha) in northern and central regions and to large agro-forestry exploitations (above 100ha) in the south regions of Portugal (Coelho, 2002; 2003). Due to the absence of quantitative official information about the size of forest ownership by regions, data collected by Mendes (2007a) were used to demonstrate the weight of small-scale forest in Portugal and the differences at regional level (Figure 2.11; Figure



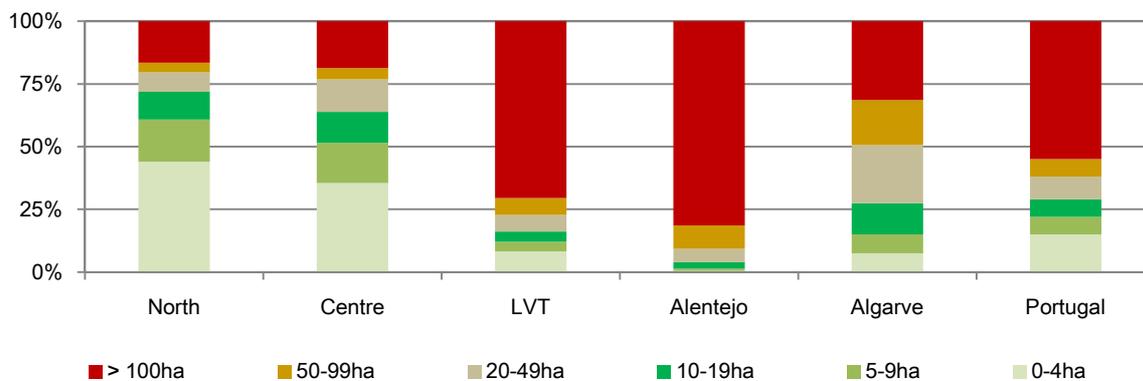
2.12). In terms of the number of holdings by size class, 85% of the holdings in Portugal are below 4ha, and these holdings are mainly located in north, central and Lisboa e Vale do Tejo regions (Figure 2.11). The holdings above 100ha are located in Alentejo and Algarve regions.



Source: Adapted from INE (1997) in Mendes (2007)

Figure 2.11: Number of forest holdings of each size class in Portugal (1995)

The analysis of the contribution of each type of holding to forest total area highlighted that the holdings below 5ha, which are dominant, only contribute 15% of the national forest area. In terms of forest area, however, these holdings are still quite important in north and central regions, contributing, respectively, to 44% and 36% of the total forest area in those regions (Figure 2.12).



Source: Adapted from INE (1997) in Mendes (2007)

Figure 2.12: Forest land by size classes of forest holdings in Portugal, in 1995

The exceedingly small-scale of forest holdings represents a major constraint in terms of forest management (see: Chapter 3). Land size was not such an important issue when agriculture, combined with forestry activities, represented the main occupation and source of income in rural areas, as this traditional system allowed the maintenance of a low fuel landscape, more resilient to wildfires. But the complementarity of forestry and farming started to decline in the 1960s with rural depopulation, ageing and population tertiarization (MADRP, 2007), leading to an increase of forestland, and to the enhancement of the role of private forest owners (Baptista and Santos, 2005). In 2011, the forest sector was responsible for 113,000 direct jobs, representing 1.6% of the



labour force (FAO, 2011), and contributed to 3% of the Gross Value Added (GVA) and 10% of national exports (AFN, 2011a).

2.4. Wildfires: a main threat to forests

The world's forest health and vitality are affected on a yearly basis by fires, droughts, landslides, species invasion, insect and disease outbreaks and climatic events (FAO, 2010a). Almost every year, large-scale forest fires stress the social, economic and ecological costs of uncontrolled fires throughout the world. Notwithstanding, data from FRA 2010 show that annually each type of forest disturbance, including fire, affects less than 1% or 2% of the world forests.

Regional values can be much higher. Despite the differences among world regions in terms of fire hazard dimension, there is some consensus around the list of human-induced causes. These causes include land clearing and other agricultural activities, maintenance of grasslands for livestock management, extraction of non-wood forest products, industrial development, resettlement, hunting, negligence and arson. Rural out-migration, especially in Australia and Mediterranean countries, is also affecting forest management.

While large fires are quite well-known by their catastrophic consequences, small fires can play a beneficial role in forest management, especially in forest ecosystems where it can help to retain their vigour and reproductive capacity (FAO, 2010a). Therefore, fire cannot be fully extinguished from natural resource management activities and is quite important to the ecology of landscapes (Ganz and Moore, 2002), maintaining the ecosystem dynamics, the biodiversity and the productivity, and meeting land management goals (FAO, 2007b).

2.4.1. Forest wildfires in southern Europe

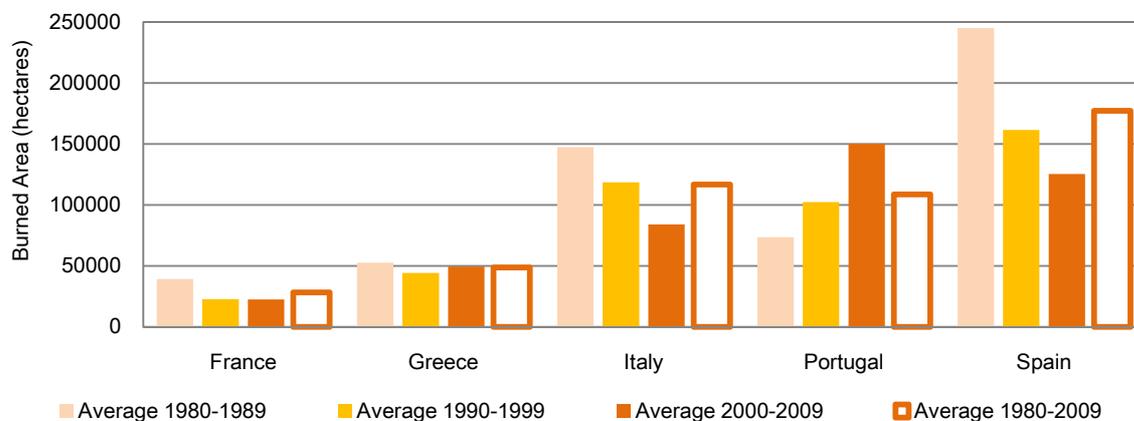
The special emphasis given to fire hazard in this research is linked to the wildfires being a major threat to Mediterranean forests (Palahi et al., 2008; EFIMED, 2009; JRC/EU, 2010). Fire is part of the Mediterranean ecosystem, but it is also the main cause of the destruction of forestland, where besides France, Greece, Italy, Portugal and Spain, also included are Turkey, Israel, Morocco and Algeria (FAO, 2007b).

In Europe, fire only affects around 0.1% of the total forest area each year. However, this value grows to 0.6% if the analysis is limited to the south European countries. The European Forest Fire Information System (EFFIS)⁹, which collects and provides information on wildfires in Europe, points out Portugal, Spain, Italy, Greece and France as the five EU countries most affected by large fires, despite the improvements made in fire suppression systems in those countries (JRC/EU, 2010). If we take the burned area average in the last 30 years into consideration, more than 3% of the Portuguese forest area has been burned each year, while in Greece and Italy this value

⁹ See: <http://effis.jrc.ec.europa.eu/>



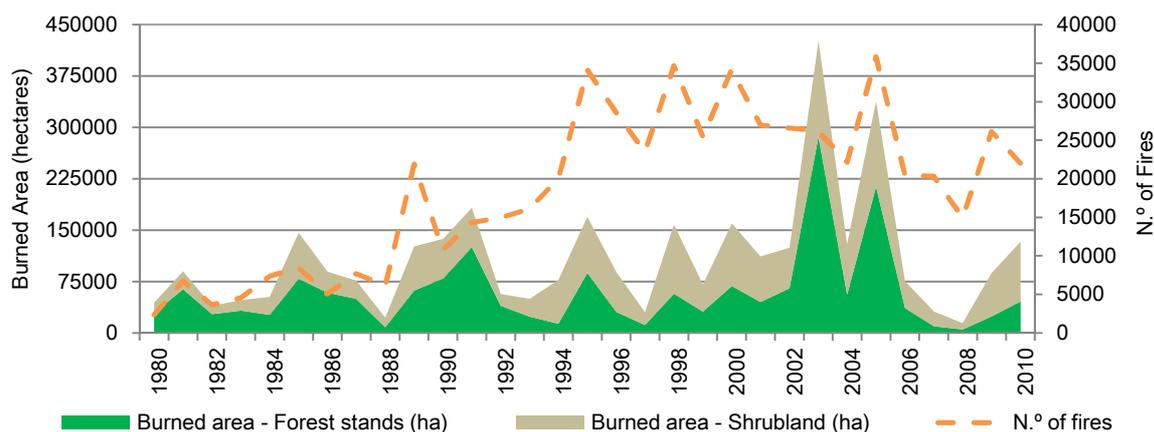
decreases to 1.2% (JRC/EU, 2010). All countries, except Portugal, have shown signs of a decreasing trend in terms of the burned area (Figure 2.13).



Source: JRC/EU, 2010

Figure 2.13: Burned area in five southern EU Member States

In Portugal, fire hazard has been the touchtone of the national forest public authority. Fires have been rather common events since the early 1980s. Figure 2.14 shows the burned area, both forest stands and shrubland, and the number of fires in the last thirty-year period. 2003 and 2005 were particularly catastrophic (Figure 2.14) and, since then, fires have been at the top of the agenda of public concern in Portugal (Ferreira et al., 2008). In these two years, the total Portuguese burned area was even higher than the total burned area of Spain, France, Italy and Greece together (Fernandes, 2007), exceeding 400,000ha in 2003 and almost 350,000ha in 2005. In 2003, the forest stands affected by fire reached 9% of the national forest area.



Source: AFN, 1980-2010

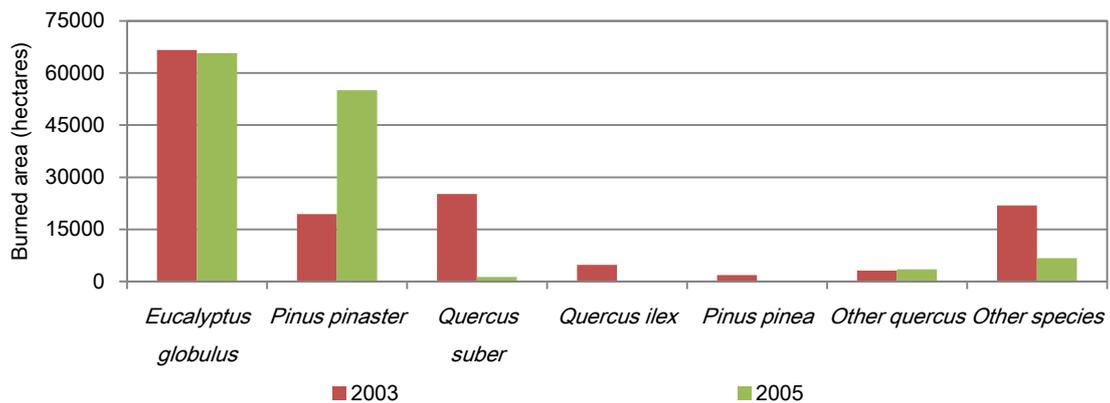
Figure 2.14: Changes in the number of fires and burned area in Portugal

The number of ignitions did not always follow the extent of burned area (Figure 2.14). In fact, the number of ignitions since 1995 has been quite high, exceeding 25,000 episodes almost every year. Moreira et al. (2010a) discuss that, although an increasing number of ignitions in high populated



areas and in agricultural and urban-rural interface areas, the fires resulting in larger burned areas are located in sparsely populated areas and where forestland or shrubland are the dominant land uses.

In terms of forest species affected by fire, eucalyptus and maritime pine stands have been the most affected areas. *Pinus pinaster* and *Eucalyptus globulus* are the main reforestation species of the Mediterranean basin and are highly combustible when compared to oaks (Conacher and Sala, 1998; Fernandes, 2007). In 2003, however, 25,000ha of *Quercus suber* were also damaged by fire (Figure 2.15).



Source: INE, 2003; 2005

Figure 2.15: Burned area (forest stands) by tree species in 2003 and 2005

Fire causes in southern Europe are mainly linked to human action, either negligence or arson. Fire intensity and severity are related with long droughts, expansion of woodland or shrubland, accumulation of dead wood and litter, abandonment of traditional land management practices, among other factors (Piussi and Farrell, 2000). In Portugal, fire causes have been studied since the 1990s, with arson and negligence being the most common causes. Negligence is mainly related with farming practices, such as stubble burning, clearance of the ground, burning for pastures improvement and use of machinery (Damasceno and Silva, 2007). Unknown causes still represent 25% of the national fire ignitions.

Some socio-economic factors have also been studied, such as the increase of fuel load, due to rural out-migration and land abandonment, and changes in vegetation type associated with afforestation practices. Forest mismanagement, farmland abandonment, urban perimeters expanded to forest and to agricultural abandoned areas and the absence of an effective spatial planning, but also an illiterate and aged population, a deficient capacity of fire detection, the insufficient means and infrastructures to fight fires (water points, paths, areal means, etc.) and the lack of coordination and communication inside and outside institutions are some of the drivers described in the National Plan for Forest Protection against Fires (PNDFCI). Other related aspects are the unmanageable size of forest plots and the absence of an updated land registry (Amaral, 2009) as well as the absence of private investment caused by the vulnerability of forest to fires (Mendes, 2003).



Timber losses are undoubtedly the impacts from fire that were recognized most. The 2003 fires also caused 21 human deaths, destruction of many buildings and public infra-structures, and there were many damages to farming and cattle breeding. In fact, the economic and the psychological damages caused by fires receive a lot of attention by the media during summer season. But desertification in southern Europe region is also frequently associated with the regularity and severity of fire (Piusi and Farrell, 2000; Coelho et al., 2005).

This is the case in Portugal where fires have produced a major impact on soil and water degradation (Silva et al., 2007, Ferreira et al., 2008; Ferreira et al., 2009). Portugal has one of the biggest soil erosion indexes in Europe (MADRP, 2007). Erosion and other degradation processes are also associated with a harsh climate, steep slopes, thin vegetation cover and poor agricultural and forestry practices (Silva et al., 2007; Bowyer et al., 2008), such as mechanical tillage, soil mobilization, deep ripping. Many studies have proved that fires can lead to considerable hydrological and geomorphological change, both directly by weathering bedrock surfaces and changing soil structure and properties, and indirectly through the effects of changes to soil and vegetation (Ferreira et al., 2008; Shakesby and Doerr, 2006; Shakesby, 2011; Stoof, 2011). Another important aspect is the repeated incidence of fires in previously affected areas, which contributes to accelerate soil degradation processes (Campo et al., 2006).

2.4.2. Forest Protection against Fire

Fire management activities are usually divided into three main components: fire prevention, fire suppression and post-fire management. However, most of the fire management budget usually goes to suppression (FAO, 2007b). The continuous increase of fire frequency and intensity has been questioning the effectiveness of costly technologies for fire suppression and, therefore, emphasizing holistic management and proactive approaches, mostly centred on prevention activities (Ganz and Moore, 2002; FAO, 2007b). These activities include reducing fuel load and creating buffer areas and green or bare strips to prevent the spread of the fire, but also raising societal awareness and education, through awareness campaigns, leaflets, newspaper, radio and television. In Portugal, those campaigns were mainly developed by the public administration. From a short analysis provided by Damasceno and Silva (2007), it seems that the messages have not been provided consistently and using sometimes a blaming tone instead of educational (e.g. *Be careful. Do not cause fire! or And you... are you sure of not being guilty?*).

Portugal has in place, since 2006, a National System to Forest Protection against Fires (SNDFCI)¹⁰, which defines the action axis to Forest Protection against Fires (DFCI), namely: i) structural prevention, increasing the territory resilience to fire and improving people behaviour in forest areas; ii) vigilance, detection and inspection; and iii) combat and post-fire vigilance (Figure 2.16). Each area is under the responsibility of a different public authority or institute, under the jurisdiction of different ministries.

¹⁰ Decree-Law no.124/2006, 28 June. Diário da República, no.123, I Series A: 4586-4599.



Figure 2.16: Main pillars and competences under the SNDFCI

In terms of planning, there is a national plan (PNDFCI) that establishes the strategy and actions to promote forest management for fire hazard mitigation, concerning five axes of intervention: i) increase the territorial resilience; ii) reduce fire occurrence; iii) improve fire fighting and management; iv) recover ecosystems; and v) improve the organic and functional structure. Each Portuguese district and municipality has a specific commission for DFCI, which is responsible by the formulation of the respective plans for DFCI (see: Section 2.5.3.1.).

Recurrent fires have also highlighted the importance of post-fire management in Portugal (e.g. Silva et al., 2007; Moreira, et al., 2010b; Ferreira et al., 2009), leading to the definition of the Strategic Guidelines for Restoration of Burned Areas in 2006. However, this component of fire management is still receiving much less attention (Moreira et al., 2012). Research advances in post-fire rehabilitation have demonstrated the potential of short-term treatments to soil erosion mitigation and of long-term techniques to ecosystems restoration, contributing significantly to soil and water conservation (e.g. Robichaud et al., 2000; MacDonald and Robichaud, 2008; Cerdá and Robichaud, 2009; Robichaud et al., 2009; Prats et al., 2012). But these treatments are still underused in many regions of the world.

Traditional fire management practices have also regained visibility while searching for new approaches. Understanding how, when and why local communities use and manage fire is extremely important to develop and implement fire management strategies (Ganz and Moore, 2002). The Community-Based Fire Management (CBFiM) emerged as an innovative approach, where the active involvement of local people is recognized as an important factor to a successful implementation of fire management programmes (Goldammer et al., 2002). The CBFiM philosophy is to better integrate fire and people into land use and vegetation management systems, but the effects of these approaches will depend on the local, cultural, socio-economic, political and environmental setting.



2.5. Policy, legal and institutional framework for forest management

2.5.1. International guidelines and commitments

Since the UNCED, and throughout the last decades, forests have been a priority on the international political agenda, especially supporting the development of sound and wise policies to promote SFM (EC, 2003). The first non-legally binding document towards a global consensus on the management, conservation and sustainable development of forests was the 'Statement of Forest Principles' (UNGA, 1992), which came out from the UNCED, together with Chapter 11 of Agenda 21, outlining actions for combating deforestation. This document encompasses 15 principles for forest management and use, respecting the sovereign right of States to use their own resources in accordance with sustainable development principles. The statement stresses the importance of involving local communities as well as other stakeholders in the development and implementation of national forest policies. Rio conference also produced several multilateral agreements linked to SFM, such as the Convention of Biological Diversity (CBD), the United Nations Convention to Combat Desertification (UNCCD) and the United Nations Framework Convention on Climate Change (UNFCCC).

In 1998, the UNFF developed the 'Non-Legally Binding Instrument on All Type of Forests' (UNGA, 1998), which was adopted by the General Assembly of the United Nations in April 2007. This tool is voluntary and aims to strengthen the political commitment and action to implement SFM at all levels. The contribution of forests into the Millennium Development Goals (MDG) is also stressed in this document, especially in what concerns poverty eradication and environmental sustainability.

Another important document is the FAO Strategy for Forests and Forestry, defined under three major goals: i) to guarantee an informed, coordinated, transparent and participatory decision-making process; ii) to increase the recognition of forest benefits; and iii) to improve forest resources and make ecosystem services recognized and valued (FAO, 2010b). This document emphasized the importance on raising public awareness on the value of forests and benefits.

In terms of global achievements towards SFM, FRA 2010 reported that 75% of the world's forests was covered by NFP (FAO, 2010a). Forty percent of the world's forest area was already subject to a management plan, 12% has a legal protection status against exploitation and 3% is certified by a forest certification programme (Siry et al., 2005). In FRA 2010, 143 countries reported the existence of a forest policy statement and 76 had issued or updated their statements since 2000. Of the 156 countries that have a specific forest law, 69 countries, especially in Europe and Africa, reported that their current forest law was enacted or amended since 2005 (FAO, 2010a).



2.5.2. European policy setting – guidelines for Portugal

Although the responsibility for forest policy belongs to each Member State, «...*there is an increasingly complex array of EU legislation and policy initiatives within different EU sectoral policies which considerably influences the forest policies of the Member States*» (EC, 2003:1). In 1998, the European Commission (EC) adopted a Resolution on a Forestry Strategy for the EU, aiming to increase the coherence between forest policies among EU countries, demanding the inclusion of stakeholders in the development of those policies and recognising the diversity of ownership regimes. In 2005, a communication reporting on the implementation of the Forestry Strategy highlighted that the context for forest policy in the EU had evolved significantly since 1998, both through decisions directly affecting the forest sector and changes in the broader policy setting. It was then decided to develop an EU Forest Action Plan (FAP)¹¹, which was designed for 2007 till 2011, and adopted on June 2006, maintaining the sustainability and multifunctional role of forest as main principles (EC, 2008). The four objectives of the FAP were: i) to improve the long-term competitiveness and to enhance the sustainable use of forest products and services; ii) to improve and protect the environment; iii) to contribute to the quality of life, by preserving and improving the social and cultural dimensions of forests; and iv) to foster coordination and communication at multiple institutional levels.

The major initiative for cooperation between EU and other European countries was the Ministerial Conference on the Protection of Forests in Europe (MCPFE)¹². MCPFE is an international policy-making platform, launched in 1990, involving co-operation of 46 countries from Europe, to discuss common opportunities and threats related with forests and forestry, involving governmental representatives from the signatory countries, Non-Governmental Organizations (NGO), forest associations, forest enterprises and also observers from other countries. Since 1990, six Ministerial Conferences were held and 19 Resolutions were adopted (Table 2.3), covering the main objectives of SFM and providing guidelines for achieving those objectives (EC, 2003).

All the MCPFE documents provide guidelines for the sustainable development of all types of forests, placing a strong emphasis on the long-term nature and multiple use of forests. Stakeholder participation and the involvement of local communities in forestry decision-making had also increased their relevance in the MCPFE (Table 2.3). The most recent MCPFE, held in Oslo in 2011, recommended the development of policies and tools for SFM, based on a facilitating open and flexible policy dialogue, with active participation by relevant stakeholders and cross-sectoral cooperation and coordination with other actors.

¹¹ COM, 2006 (302 final). Communication from the Commission to the Council and the European Parliament of 15 June 2006 on an EU Forest Action Plan [not published in the Official Journal]

¹² FOREST EUROPE or MCPFE (<http://www.foresteuropa.org/>) was founded in 1990 and is the pan-European policy process for the sustainable development of the European forests.



The MCPFE has been described as a succeeding platform for dialogue on forests and their management in Europe (Mayer and Rametsteimer, 2004). For instance, all EU State Members, with the exception for Belgium, adopted the NFP approach and most countries have a national policy for forest and a specific forest law. Excluding Malta and Greece, where no information was provided, 44% of the countries have a national policy with less than 10 years old and 28% have a forest law with less than 10 years (FOREST EUROPE, 2011).

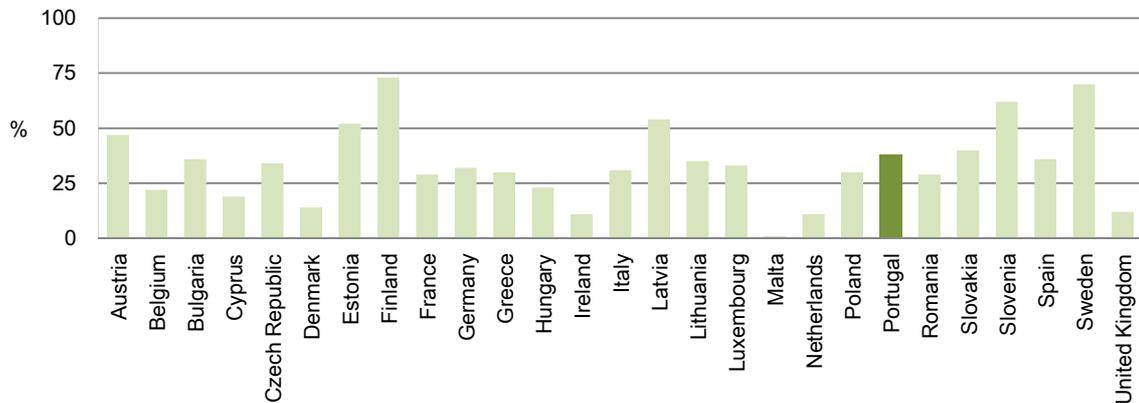
Table 2.3: Main outputs and key messages from the MCPFE

Outputs from MCPFE	Key messages concerning SFM	Date
Strasbourg General Declaration S1: Monitoring of forest ecosystems S2: Genetic resources S3: Data bank on forest fires S4: Adapting the management of mountain forests S5: Research on tree physiology S6: Research into forest ecosystems	<ul style="list-style-type: none"> ▪ Mitigation of forest problems needs to involve a large number of participants, whose behaviour affect the future of forests 	1 st MCPFE 1990
Helsinki General Declaration H1: SFM in Europe H2: Biological diversity H3: Cooperation with economies in transition H4: Adapting forests to climate change	<i>General guidelines to SFM:</i> <ul style="list-style-type: none"> ▪ Long-term nature of forest ▪ Forest multifunctionality and multiple use benefits ▪ Public awareness and appropriated training 	2 nd MCPFE 1993b
Lisbon General Declaration L1: Socio-economic aspects of SFM L2: Pan-European criteria, indicators and PEOLGS for SFM	<i>Role of society and forest owners in SFM</i> <ul style="list-style-type: none"> ▪ Need of dialogue between forest sector and general public in order to build consensus around the aims of forest policy ▪ To increase participation, education, transparency 	3 rd MCFE 1998
Vienna Declaration V1: Cross-sectoral cooperation and NFP V2: Economic viability of SFM V3: Social and cultural dimensions V4: Forest biological diversity V5: Climate change and SFM	<ul style="list-style-type: none"> ▪ To benefit rural livelihood and urban societies ▪ To build strong partnerships ▪ To tackle global challenges ▪ To put SFM commitments into action 	4 th MCPFE 2003b
Warsaw Declaration W1: Forests, wood and energy W2: Forests and water	<ul style="list-style-type: none"> ▪ Forest for Quality of Life: ▪ To achieve SFM goals defined by UNFF ▪ To achieve MDG and other agreements 	5 th MCPFE 2007
Oslo Ministerial Decision: European Forests 2020 W1: Forests, wood and energy W2: Forests and water	<ul style="list-style-type: none"> ▪ To ensure vitality, productivity & multifunctional; ▪ To contribute to sustainable development ▪ To support a green economy, livelihoods, climate change mitigation, biodiversity conservation and enhance water quality ▪ To combat desertification 	6 th MCPFE 2011

Almost 70% of the European forest area (excluding Russian Federation) is managed in accordance to a plan, which constitutes a key element towards SFM (Figure 2.17). This figure shows a better performance of Europe, when compared with the global scenario. However, by analysing EU



countries individually it is clear that southern countries are the ones with less forest area covered by a management plan (Figure 2.17). In southwest Europe some intensive management with exotic trees, fire hazard, changes in landscape pattern, high fragmentation and rural depopulation were identified as threats to SFM (FOREST EUROPE, 2011).



Source: Forest Europe, 2011

Figure 2.17: Forest area covered by a forest management plan in the EU countries

2.5.3. Portuguese policy, legal and institutional framework

During the last century, the Portuguese central administration has been changing and multiplying the number of planning, legislative, regulatory and financial tools to create a suitable framework for the forest sector (Mendes, 2008). This «...resulted in confusion and ignorance among citizens and private forest owners», affecting the credibility of central administration (DGRF, 2007: 40-41).

2.5.3.1. Legal setting, planning tools and financial instruments

The national forest legal regime has been in existence for more than 100 years, with multiple legal diplomas¹³. The main legal tools in force for the forest sector are presented in Table 2.4. There are two major reference documents for the forest sector: the Forest Policy Law (LBPF) and the National Forest Strategy (ENF).

The LBPF came into force in 1996, highlighting SFM promotion and the enhancement of forest multifunctionality as central aims. The importance of society awareness about forest value, the need of an agrarian restructuring to give spatial coherence to interventions, the support of landowners' organization, the harmonization of national policy with the international guidelines and the central role of fires as a huge disturbance to forest sustainability were already central elements in the national forest policy. Concerning stakeholder participation in forest policy-making, there are two major principles behind this law: the principle of strategic agreement and

¹³ In 2009, the Forest Code was developed to compile and update forest policy and legal tools and to define the rules for forest planning and management as well as the orientations for intervention in burned areas. However, this law was never in force and was eventually repealed in 2012.



the principle of social acceptance of responsibility. The first one is related with the promotion of participation of all stakeholders by the Governmental Organizations (GO) in the definition and implementation of forest policy; and the second is the citizen involvement in setting forest policy aims.

Table 2.4: Summary of the legal and planning tools for forest sector in Portugal

Level	Year	Instruments	Main objective
National	1996	LBPF – Forest Policy Law [Law no.33/96, 17 August. Diário da República no.190, Series I-A]	General guidelines of the national forest policy: SFM; multifunctionality; rural development; productive potential; landowners' organization; environmental role; protected forest areas; fire hazard; scientific research; public participation.
	2006	ENF – National Forest Strategy [Cabinet Council Resolution no.114/2006, 15 September. Diário da República no.179, 1ª Series]	Strategic framework for national forest sector, concerning: the mitigation of fire and other biotic hazards; spatial planning; forest productivity; reduction of market risks; efficiency and competitiveness; simplification of policy tools.
	2006	PNDFCI – National Plan for Forest Protection against Fires [Cabinet Council Resolution no.65/2006, 26 May. Diário da República no.102, Series I-B]	Strategy and actions to promote forest management, aiming to mitigate fire hazard: increase the territorial resilience; reduce fire occurrence; improve fire fighting and management; recover ecosystems; improve the organic and functional structure.
Regional	2009	PROF – Regional Forest Plan [Decree Law no.16/2009, 14 January. Official Gazette no.9, Series I. Revoke the Decree Law no.204/99]	Sectorial and regional planning tool, defining the rules for the use and management of forest areas, under ENF aims.
	2006	Strategic Guidelines for Restoration of Burned Areas [Cabinet Council Resolution no.5/2006, 18 January. Diário da República no.13, Series I-B]	Strategic guidelines to recover areas affected by fires, considering the dominant functions of forests.
	2006	PDDFCI – District Plan for Forest Protection against Fires [Decree Law no.124/2006, 28 June. Diário da República no.123, 1ª Series. Amended by Decree Law no.17/2009, 14 January. Diário da República no.9, Series I]	Strategy for DFCI at district level, under the PNDFCI and the respective PROF.
Local	2006	PMDFCI – Municipal Plan for Forest Protection against Fires [Decree Law no.124/2006, 28 June. Diário da República no.123, 1ª Series. Amended by Decree Law no.17/2009, 14 January. Diário da República no.9, Series I]	Actions to DFCI at local level, under the PNDFCI and the respective PROF.
	2009	PGF – Forest Management Plan [Decree Law no.16/2009, 14 January. Diário da República no.9, Series I. Revoke the Decree Law no.205/99]	Forest specific interventions, under the guidelines provided by the respective PROF.
	2009	PEIF – Specific Plan for forest intervention [Decree Law no.16/2009, 14 January. Diário da República no.9, Series I]	Specific tool for intervention in forest areas to prevent and combat biotic and abiotic agents.



The national strategy developed in 2006, and recently revised (ICNF, 2013b), guides the public and private intervention in the forthcoming decades, where the forest sector is considered as a national wealth source, threatened by several risks related to climate change, fires, diseases and plagues, market instability, environmental externalities, among other aspects. The ENF was submitted to a two-month public consultation process, through presentation sessions in the universities and also by receiving written comments. The revision process pointed out some failures of the ENF, namely the need to revise the matrix of responsibilities, the indicators of achievement and the priorities.

The current planning system for the forest sector is divided into three levels, which corresponds to three different types of plans (Figure 2.18; Table 2.4):

- i) regional level – Regional Forest Plan (PROF): sectoral plan defined by the national competent authority setting the standards for the use of forests in each region; public involvement in PROF elaboration followed the traditional public consultation, where people could comment and give suggestions to improve the plan;
- ii) local level – Forest Management Plan (PGF): developed by landowners or their associations and submitted to central administration evaluation; and
- iii) operational level – Specific Plan for Forest Intervention (PEIF): developed by landowners or their associations and submitted to central administration evaluation.

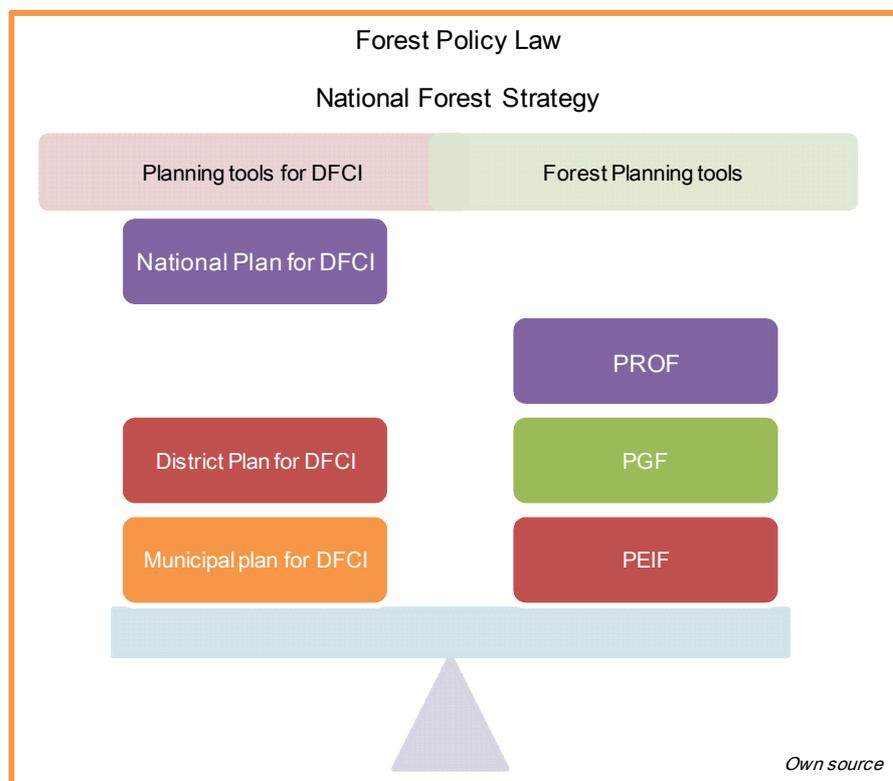


Figure 2.18: Main legal and planning tools for forest management and for DFCI in Portugal



The planning tools for DFCI, already briefly described in Section 2.4.2., are defined at national, district and municipal level (Figure 2.18). The Municipal Plan for Forest Protection against Fires (PMDFCI) also provides relevant information to the development of PEIF, which is an operational plan. At national level and following the joint work of the National Council of Reforestation (CNR) and of the several Regional Commissions of Reforestation (CRR), a set of Strategic Guidelines for Restoration of Burned Areas after the 2003 and 2004 fires were developed and adopted in 2006. These guidelines were divided into spatial planning and management models, silviculture models and territorial infrastructure.

Portugal also adopted the NFP approach to the development of the Plan for Sustainable Development of Portuguese Forest (PDSFP)¹⁴, which aimed to be a strategic framework for the national forest sector in strong cooperation with forestry stakeholders. This plan, no longer in force, was described as a mature process, integrating several contributions and subjected to an intense process of public discussion (DGF, 1998). The international obligations, the participative demand of society and the shortages in timber supply were indicated as reasons behind the Portuguese NFP (Zimmermann and Mauderli, 2002), but the plan revealed a lack of effective financial commitment.

The lack of financial mechanisms and incentives to support forest intervention in private lands is bottlenecking the implementation of forest policy and laws. Public financial instruments date back to 1957, where soil conservation was already a concern. Until the democratic regime, afforestation was the strategic measure of the national forest policy, firstly in public and common lands and secondly in supporting forestation in private lands (Coelho, 2002; 2003). However, the major support to forest actions started after Portugal joined the EU, with the Forest Action Programme (PAF), where forest intervention was seen as a responsibility of private owners, supported by public funds. After the PAF, several EU funds came out to promote the increase, maintenance and improvement of forest areas as well as the modernization of forestry practices and the promotion of sustainable practices. However, these mechanisms have not always been responded to in a positive fashion, because of problems over attributing subsidies to unprepared people, and a lack of proper extension services (Mendes, 2003). Nowadays, the national Forest Permanent Fund (FFP)¹⁵ and the Rural Development Programme (PRODER), funded by the EC, are the main sources of public support for forest management.

2.5.3.2. Institutional setting and forest stakeholders

Forests and forestry involve multiple stakeholders with different powers and interests in what concerns forest. In Portugal, due to the nature of forest ownership and to the institutional complex setting, decision-makers have not only to know who the diverse actors are but also who

¹⁴ Cabinet Council Resolution no.27/99, 8 April. Diário da República no.82, I Series B: 418.

¹⁵ FFP was created after 2003, funded by a tax over fuel, aiming to promote SFM and reduce fire risk.



should be included in decisions (Figure 2.19). Balancing those interests and needs is one of the most challenging issues of forests and forestry.

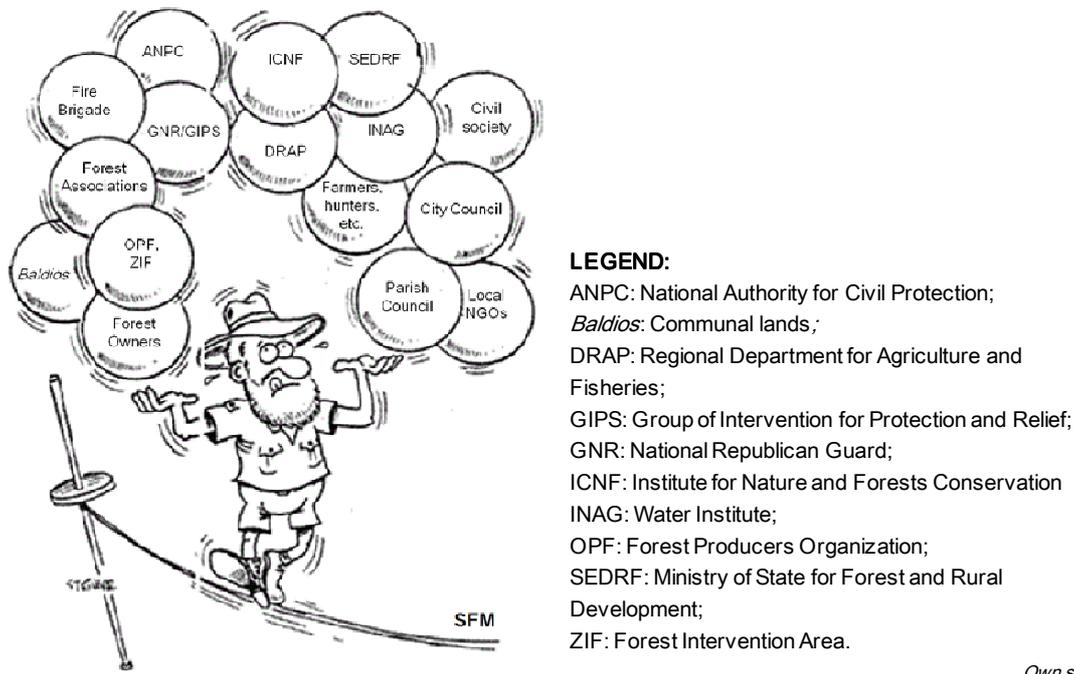


Figure 2.19: Picture illustrating the difficulty of dealing with multiple stakeholders in the forest sector

This complexity starts in the public forest services. Forest Administration of the Kingdom Woodland, created in 1824, was the first Portuguese forest public service and, since then, forest services had suffered several restructuring processes (eight times after the end of the Portuguese dictatorship in 1974). In 2008, the high authority for forest management in Portugal belonged to the National Forest Authority (AFN), under the jurisdiction of the Ministry of Agriculture, Rural Development and Fisheries (MADRP). This entity replaced the former General Directorate of Forest Resources (DGRF), and was constituted by a President, a Vice-president, and three national directors, respectively for forestry production, for forest management and for forest protection. AFN was also decentralized in five regional management departments distributed by the five Portuguese regions. The main aims of AFN¹⁶ were: i) to promote sustainable development of forest and associated resources; ii) to guarantee the balance between the different sectors, the stakeholder engagement and the organization of forest areas; iii) to increase the competitiveness within forest industry and the structural prevention in terms of forest defence. AFN was hence responsible for the definition of the national forest policy, for the management of public forestry, for the regulation of the private sector and for the promotion of Forest Intervention Areas (ZIF).

After 2011, following the implementation of the Portuguese Plan for Reduction and Improvement of Central Administration (PREMAC), the Ministry of Agriculture, Sea, Environment and Regional

¹⁶ Decree-Law no.159/2008, 8 August. Diário da República, I Series, no.153: 5355-5359.



Planning (MAMAOT) was created, merging two former Ministries. MAMAOT creation aimed to provide a more integrated vision of the territory and natural resources and to promote sustainable development. PREMAC also endorsed the merging of several public institutes, namely the fusion of the AFN and the Institute of Conservation of Nature and Biodiversity (ICNB) into the Institute for the Conservation of Nature and Forests (ICNF)¹⁷. This new body combines the competences of AFN and ICNB.

At the local level, the municipalities, particularly the Forestry Technical Office (GTF)¹⁸, are responsible for supporting the application of forest policies and tools and for the definition of the PMDFCI. There are 206 municipal GTF and 56 intermunicipal GTF. For the actions related with DFCI, each municipality has a municipal commission constituted by several stakeholders from the municipality and from national entities, such as the mayor and representatives from the fire brigade, the National Republican Guard (GNR) and the ICNF.

The important role of the State in forest sector regulation demands an increasing cooperation with forest owners and producers as well as other organizations (Borges and Amaral, 2009). Private ownership is dominant at the national level (see: Section 2.3.3.), especially small-scale non-industrial private forest. This brings into the scene multiple forest owners, such as the individual forest owners, the associated forest owners, the private industries, etc. The dominance of small-scale forest areas led to the recognition by the State of Forest Producers Organizations (OPF)¹⁹ as a central stakeholder for SFM. In fact, the number of OPF has been continuously increasing and is now 177 (Figure 2.20). These organizations can be of national, regional, municipal or complementary scope and most of them are based in central region or north region, where small-scale forest owners prevailed.

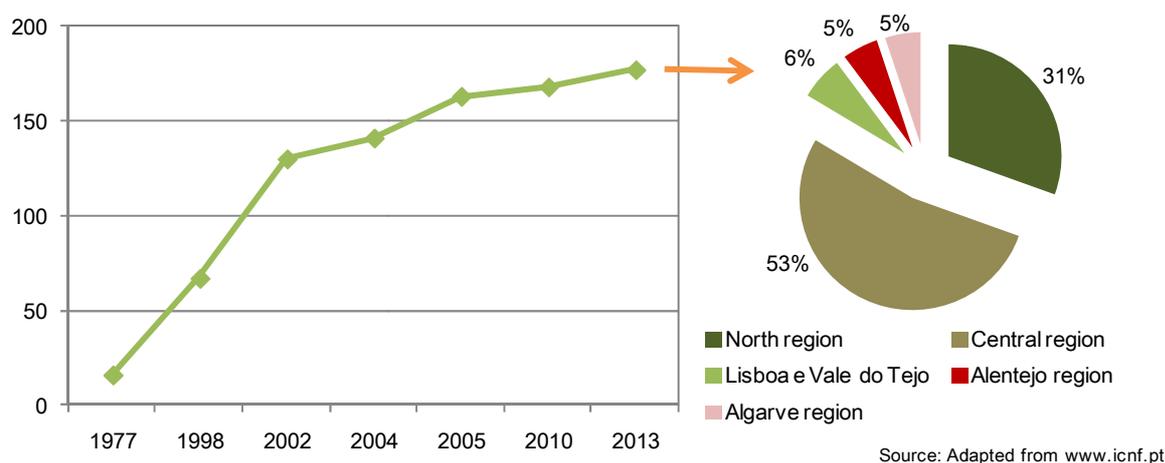


Figure 2.20: OPF change between 1977 to 2013 (left) and OPF distribution by region in 2013 (right)

¹⁷ See: <http://www.icnf.pt/florestas/>

¹⁸ The competences of GTF are defined in the Law no.20/2009, 9 May. Diário da República no.91, 1st Series: 2826-2827.

¹⁹ Government Order no.118-A/2009, 29 January. Diário da República no.20, 1st Series: 634(2)-634(4).



2.6. Progress towards Sustainable Forest Management

SFM guides forestry policies all over the world, expressed in several commitments, agreements and other outputs. This section aims to provide an insight about the progress towards SFM in Portugal, having in mind the ambiguity and uncertainty of this process, difficult to measure and which can potentially produce different outcomes in similar contexts.

Analysing forest sector performance is a crucial element to monitor the levels of SFM. Table 2.5 summarizes some indicators of the forest sector at global, European and national level. At the global level, some positive trends were pointed out, such as the mitigation of forest degradation, the increase of protected forest and areas for conservation of biodiversity, or even by indicators showing the formulation of recent policies and laws in many countries.

Portugal, however, presented some opposite indicators when compared to the international and European contexts (Table 2.5), such as the decrease of almost 5% of the forest area in 15 years, which was progressively occupied by shrubland, but also the high share of planted forest with introduced species and the low representativeness of forest areas for conservation of biodiversity and soil and water protection.

Table 2.5: Comparison of some major forest indicators

Indicators	World	Europe (Excl. Russia Federation)	Portugal
Forest area	<ul style="list-style-type: none"> ▪ 31% (~4 billion hectares) ▪ 0.6ha per capita 	<ul style="list-style-type: none"> ▪ 34% (~200 million hectares) ▪ 0.3ha per capita 	<ul style="list-style-type: none"> ▪ 35% (~3.2 million hectares) ▪ 0.3ha per capita
Evolution	<ul style="list-style-type: none"> ▪ -3.3% (1990-2010) 	<ul style="list-style-type: none"> ▪ +8.5% (1990-2010) 	<ul style="list-style-type: none"> ▪ -4,6% (1995-2010)
Regions contribution	<ul style="list-style-type: none"> ▪ Europe: 25% ▪ South America: 21% 	<ul style="list-style-type: none"> ▪ Sweden, Finland, Spain, France, Germany 	<ul style="list-style-type: none"> ▪ Alentejo region (cork oak) ▪ central and north regions (maritime pine, eucalyptus)
Types	<ul style="list-style-type: none"> ▪ Naturally regenerated type is the most frequent type 		
	<ul style="list-style-type: none"> ▪ Primary forest: 36% 	<ul style="list-style-type: none"> ▪ Planted forest: 27% 	<ul style="list-style-type: none"> ▪ Eucalyptus plantations: 25%
Functions	<ul style="list-style-type: none"> ▪ Production: 30% ▪ Multiple use: 24% ▪ Conservation biodiversity: 12% ▪ Protection soil & water: 8% 	<ul style="list-style-type: none"> ▪ Production: 52% ▪ Multiple use: 11% ▪ Conservation biodiversity: 10% ▪ Protection soil & water: 9% 	<ul style="list-style-type: none"> ▪ Production: 58% ▪ Multiple use: 30% ▪ Conservation biodiversity: 5% ▪ Protection soil & water: 7%
Fire hazard	<ul style="list-style-type: none"> ▪ 1% each year 	<ul style="list-style-type: none"> ▪ 0.1% in Europe ▪ 0.6% in south countries 	<ul style="list-style-type: none"> ▪ 3.4% each year
Employment (% of total labour force)	<ul style="list-style-type: none"> ▪ ~10 million people 	<ul style="list-style-type: none"> ▪ 1.1% 	<ul style="list-style-type: none"> ▪ 1.6%
Contribution to GDP	<ul style="list-style-type: none"> ▪ 1% 	<ul style="list-style-type: none"> ▪ 1% 	<ul style="list-style-type: none"> ▪ 1.7%
Forest ownership	<ul style="list-style-type: none"> ▪ 80% public 	<ul style="list-style-type: none"> ▪ 50% private 	<ul style="list-style-type: none"> ▪ 90% private

Sources: Compiled from FAO, 2010a; FAO, 2011; FOREST EUROPE, 2011; ICNF, 2013a



Portugal also differs from the global setting in terms of the dominance of private forest ownership and in the major contribution of forest sector to employment and to national GVA (Table 2.5). These indicators demonstrate the importance of the sector for the national economy, but also in terms of community livelihoods, as forests are mainly located in rural areas. However, there are negative trends in the EU Mediterranean countries and in Portugal, such as the intensive management with exotic trees, the fire hazard and the continuous rural abandonment (FOREST EUROPE, 2011).

Fire hazard is a central challenge at national context (Table 2.5). Since the 2003 and 2005 catastrophic fires, several guidelines, rules and legislation came out to prevent and mitigate fire hazard and a huge investment was made in structural measures to fire-fighting. Several prevention activities were implemented, such as fire breaks, watch towers, water points, fuel management techniques, among other activities. But ten years later, large forest fires continue to devastate extensive areas. This scenario shows that dealing with fire hazard by itself is clearly not enough, demanding innovative and integrated approaches, where forest management is a central element of fire hazard management.

Most of the Portuguese policy and planning tools were formulated within the last 10 years. The analysis of several documents, regulations and planning instruments showed that most of those documents already included the key issues under SFM (Table 2.6). This analysis focussed on the objectives of each tool and not its translation into practices. Both the productive role and the socio-environmental functions of forests are central elements in the national and regional forest planning tools (such as the ENF, the Forest Law and the PROF; Table 2.6). Multifunctionality, carbon sequestration and environmental functions are also common references in those documents. Fire hazard is a central aspect of the national policy and legal setting, expressed in the general tools for forest planning, but mainly in the specific tools for DFCI, at national, regional, municipal and operational levels.

Table 2.6: Inclusion of SFM key elements in the main legal and planning tools for forest sector

Main Legal and Planning Tools	Forest Fire Hazard	Productive role of forests	Socio-Environmental role of forests	Stakeholder participation
Forest Law	High importance	High importance	High importance	Low importance
ENF	High importance	High importance	High importance	Medium importance
PNDFCI	High importance	Medium importance	Medium importance	Low importance
PROF	High importance	High importance	High importance	Medium importance
PDDFCI	High importance	Low importance	Low importance	Low importance
PMDFCI	High importance	Low importance	Low importance	Low importance
PGF	Low importance	High importance	Medium importance	Medium importance
PEIF	High importance	Low importance	Medium importance	Medium importance

High importance
 Medium importance
 Low importance

ENF: National Forest Strategy; PNDFCI: National Plan for Forest Protection against Fires; PROF: Regional Forest Plan; PDDFCI: District Plan for Forest Protection against Fires; PMDFCI: Municipal Plan for Forest Protection against Fires; PGF: Forest Management Plan; PEIF: Specific Plan for Forest Intervention



Although identified as an important issue in the most recent documents, stakeholder participation in policy-making in forest decisions in Portugal has been very limited. In fact, the policies and tools for the forest sector were developed by the forestry administration, with inadequate involvement of forest partners, limited to discussion with specific agents and/or public consultation of legal and policy documents. This type of stakeholder engagement has been criticized for being reduced to power holders and to those who are more informed, excluding most of the small-scale forest owners.

The poor engagement of stakeholders was also visible in the recent evaluation report of the ENF implementation, which identified as weakness the low stakeholder participation in the ENF assessment and monitoring process and as threat the low formal articulation within the stakeholders to the implementation of the ENF (IESE, 2012).

The inclusion of the four key issues addressed in this research in the legal and policy framework does not necessarily lead to forestry practices including all these elements. The analysis of forest sector performance and of the legal and institutional setting demonstrated several opportunities and constraints to forest management, such as:

- **Forest fire hazard:** despite the existence of the national system for DFCI, wildfires have affected 3% of the national forest area on a yearly basis, for the last 30 years, and represent a major threat to forests. The fire hazard in Portugal is linked to land abandonment and to absence of forest management.
- **Productive role of forest:** there is a dominance of forest for production, especially maritime pine and eucalyptus plantations. The forest sector has three major industries – timber supplier, paper and pulp industry and cork industry – representing high contributions of the forest sector to national exports and GVA. The small forest holdings located in north and central Portugal represent a high share of forest area in Portugal, but with low economic return.
- **Socio-environmental role of forest:** low share of protected forest or of forest areas for conservation of biodiversity, when compared with the international and European levels. There is an increasingly inclusion of the multiple value of forests, where environmental and social roles are important, in the national policy and in the legal tools for the forest sector. There are signs indicating more concern with these aspects, such as the adoption of forest certification schemes in Portugal, ensuring that a forest product comes from a sustainable managed forest. This is a new national effort to improve forest practices among private forest owners and producers, but the economic valuation of the environmental services and ecosystems provided by forest is still not contemplated in most of the public funding mechanisms.
- **Stakeholder participation:** the historical analysis of the institutional and legal setting of the forest sector highlights the instability and ambiguity of the public services, compromising the consolidation of the policies and strategies for a long-term sector.



Although the increasing recognition of the importance of stakeholder cooperation in the forest sector, forest decisions have been made by forest public authority with consultation of some forest partners and no real inclusion of the stakeholders concerned.



CHAPTER 3

FOREST INTERVENTION AREA: A NEW APPROACH FOR NON-INDUSTRIAL PRIVATE FOREST MANAGEMENT IN PORTUGAL²⁰

- 3.1. Introduction
- 3.2. Cooperation of non-industrial private forest owners
- 3.3. Forest Intervention Area
 - 3.3.1. Origin and concept
 - 3.3.2. National overview
- 3.4. Research design
 - 3.4.1. Case study selection
 - 3.4.2. Methods and sampling
- 3.5. Results on the ZIF approach
 - 3.5.2. Knowledge on forest management policy
 - 3.5.3. ZIF origin, dissemination and acceptance
- 3.6. Discussion
- 3.7. Conclusion

²⁰ Data presented in this chapter were also published in:

Valente, S., Coelho, C., Ribeiro, C. and Soares, J., 2013. Forest Intervention Areas: A new approach for non-industrial private forest management in Portugal. *Silva Lusitana* **21**(2): *in press*.

Carreiras, M., Ferreira, A., Valente, S., Fleskens, L., Gonzales-Pelayo, O., Rubio, J., Stoof, C., Coelho, C., Ferreira, C., Palheiro, P. and Ritsema, C., *in press*. Comparative analysis of policies to deal with wildfire risk. *Land Degradation and Development*.



*«... Eu acredito que as ZIF serão, a nível local, um dos pilares para que a nossa floresta cresça...
... Não só a floresta, mas toda a comunidade...»²¹
Anonymous, 2010*

3.1. Introduction

Due to its strong presence in rural areas, forest is now central in the definition and implementation of rural development strategies and policies across Europe (Elands and Wiersum, 2001; Elands et al., 2004; Wiersum et al., 2005; Janota and Broussard, 2008; Ní Dhubháin et al., 2008). In Portugal, rural abandonment and mismanagement of forests, associated with wildfires, have been the touchstone of the national forest administration, which continuously develops new policies and tools to better address Sustainable Forest Management (SFM) and Forest Protection against Fires (DFCI).

The national forest sector is heterogeneous and fragmented in terms of species, market and forest owners and producers (Mendes, 2003). The smallness of forest holdings is a major bottleneck affecting SFM, limiting the management options of forest owners and diminishing their competitiveness in the national and global markets (Rickenbach et al., 2005; Kittredge, 2005). Forest owners' cooperation and organization is increasing since the 1990s, influenced by the national policy and by the work of FORESTIS – Forest Association of Portugal – which is a non-profitable organization, founded by forest owners and forest technicians, aiming to promote and support the constitution of Forest Producers Organization (OPF) at the local level (Feliciano, 2012). These organizations tend to fight against the excessive fragmentation of the land and, more recently, to reverse the absence, inaction, disinterest and financial incapacity of forest owners. Forest Intervention Areas (ZIF) emerged as a promising tool for dealing with these aspects, especially envisaged to plan and manage forests at larger spatial scales. ZIF implementation relies on the acceptance and cooperation among forest owners and producers as well as on the technical and financial support provided by Governmental Organizations (GO) and Non-Governmental Organisations (NGO).

The research presented in this chapter contributes to the debate about the challenges and opportunities of ZIF approach, aiming: i) to understand the ZIF concept; ii) to assess ZIF's evolution; and iii) to analyse the technical-institutional and social perspectives about ZIF's approach. Ultimately, it is aimed to discuss how ZIF can help to reduce fire hazard, to improve the

²¹ Quotation from a local inhabitant from Mação municipality; English translation: «...I believe that ZIF will be, at local level, one of the pillars to make our forest grow... Not only the forest, but all the community».



productive and socio-environmental role of forests and to increase stakeholder participation in forests.

The context and background of ZIF emergence, the legal concept and an up-to-date assessment of its development at national level is presented. After analysing ZIF national framework, the institutional and social perceptions over ZIF is assessed using results from a questionnaire and several interviews applied in a municipality located in central Portugal.

3.2. Cooperation of non-industrial private forest owners

Agriculture and forestry were for a long time the main economic activities of Portuguese rural areas (MADRP, 2007). These activities have suffered major changes during the last century, boosted by a continuous process of rural depopulation and ageing. Since the end of the 19th century, the area occupied by forest has increased from approximately 7 to 35%, occupying former agricultural lands (Coelho, 2006). There are three prevailing forest types in Portugal, i.e. maritime pine forests, eucalyptus plantations and evergreen oak woodlands (*montado*). Eucalyptus species were only introduced during the mid-1900s, but have become, at an ever-increasing rate, landscape dominating elements at the expense of maritime pine forests in particular (Coelho et al., 2010a). Pine natural regeneration and eucalyptus plantations are particularly dominant in central Portugal.

Wildfires are also a major hazard in Portugal, affecting large areas of forest almost every year. Rural depopulation and small ownership, together with the absence of individual interventions and lack of small-scale forest owners' cooperation, have been obstructing the implementation of an integrated strategy for DFCI. In fact, Portuguese rural areas are now characterized by: i) a decrease of human capacity to detect and participate in the fight against fires; ii) an abandonment of farmland and occupation by forest or shrubs leading to continuous fuel patches; iii) an abandonment of traditional forest management (ground clearance, selective cutting and resin tapping) which result in biomass accumulation (DGRF, 2007). This new rural paradigm is highly prone to wildfires, due to an unmanaged dense forest, abandoned fields and lack of spatial planning and management.

One significant characteristic of Portuguese forest is the dominance of Non-Industrial Private Forest (NIPF) owners, who are responsible for more than 85% of the forest. This represents more than two million people owning 3.5 million hectares of forest (Marques, 2011). The small size of forest holdings is one of the major constraints of forest management, especially in north and central Portugal. This situation is due to the continuous subdivision of relatively large properties into smaller ones, mostly by divided inheritance. Various authors have been arguing about the disadvantages of forest management at individual scale, while enhancing the role of cooperation of forest owners (Kittredge, 2003; Kittredge, 2005; Rickenbach et al., 2005; Martins and Borges, 2007). The main arguments supporting landowners' cooperation are related to the increase of competitiveness of small ownerships, the promotion of non-monetary benefits of forest



(aesthetics, biodiversity, soil protection, among others) and the sharing of information and equipment, etc.

The OPF is as an important vehicle for the implementation of forest policy in NIPF areas (Mendes, 2007a; Mendes 2007b, Silva et al., 2008; Feliciano, 2012). From 2000 to 2013, the number of OPF has increased more than 150% (see: Section 2.5.3.2.), being particularly relevant in the north and central Portugal, mainly occupied by small-scale holdings (Mendes, 2007a; Mendes, 2007b). In fact, Mendes (2007a) described the existence of generous European Commission (EC) subsidies for afforestation and reforestation and the increase of forest fire risk as the two main factors that triggered the growth of OPF in Portugal, as forest owners were in need of technical support for applying to those subsidies.

But there are still several constraints to cooperation, which in Portugal have been related with the fear of losing tenure rights, the landowners' absenteeism (Marques, 2011) and also the lack of successful previous experiences (Martins and Borges, 2007). However, by joining and acting together, potentially the NIPF owners will have a say in forestry matters and especially in what concerns the policy decision-making (Feliciano and Mendes, 2005). ZIF approach provides an excellent opportunity for small forest owners' cooperation and allows many forestry organizations and associations to fulfil their goals of supporting the planning and management of forests at spatial scales larger than an individual property.

3.3. Forest Intervention Area

3.3.1. Origin and concept

The ZIF approach is integrated in the restructuring of the Portuguese legal and institutional framework for forest management and DFCI after the 2003 catastrophic wildfires. At that time, a group of local stakeholders put forward the idea that assembling smallholdings and their owners into a joint management and exploitation would be the solution for forestry rural areas. This idea was presented to the former Ministry of Agriculture, Rural Development and Fisheries (MADRP) and was materialized as the ZIF approach in 2005. ZIF law was issued in 2005²² and amended in 2009²³. Each ZIF is a continuous and bounded area, where the main land use is forest. These areas can include private land, common land (*baldios*) and public land, but the two latter types of land were only included in the 2009 legislation. ZIF constitution in private areas has to fulfil three criteria: i) to include at least 750ha; ii) to include at minimum 50 forest owners or producers; and iii) to include at least 100 properties²⁷.

The main objectives of the ZIF approach are: i) to promote the efficient management of forest; ii) to mitigate the current constraints to forest intervention; iii) to develop structural measures to DFCI; iv) to give spatial coherence to the interventions; v) to apply rules and guidelines, provided

²² Decree-Law no.127/2005, August 5. Diário da República no.150, I Series A: 4521-4527.

²³ Decree-Law no.15/2009, January 14. Diário da República no.9, I Series A: 254-267.



by national, regional and municipal policy tools; and vi) to promote SFM. It was expected that ZIF implementation would provide major benefits concerning the intervention in larger spatial scales, ensures a better and more coherent strategic vision for rural areas (Deus, 2010).

The ZIF process comprises three major stages: the legal procedure; the planning stage; and the implementation stage. The first stage concerns all legal requirements needed to ZIF endorsement (Figure 3.1). The process can be initiated by a group of forest owners or producers, creating the founding group. This group has to own at least 5% of a continuous area inside the ZIF. The founding group promotes local meetings, aiming to disseminate ZIF's approach and to encourage other landowners to join, and prepares all the necessary elements to make a formal requirement to the Institute for the Conservation of Nature and Forests (ICNF).

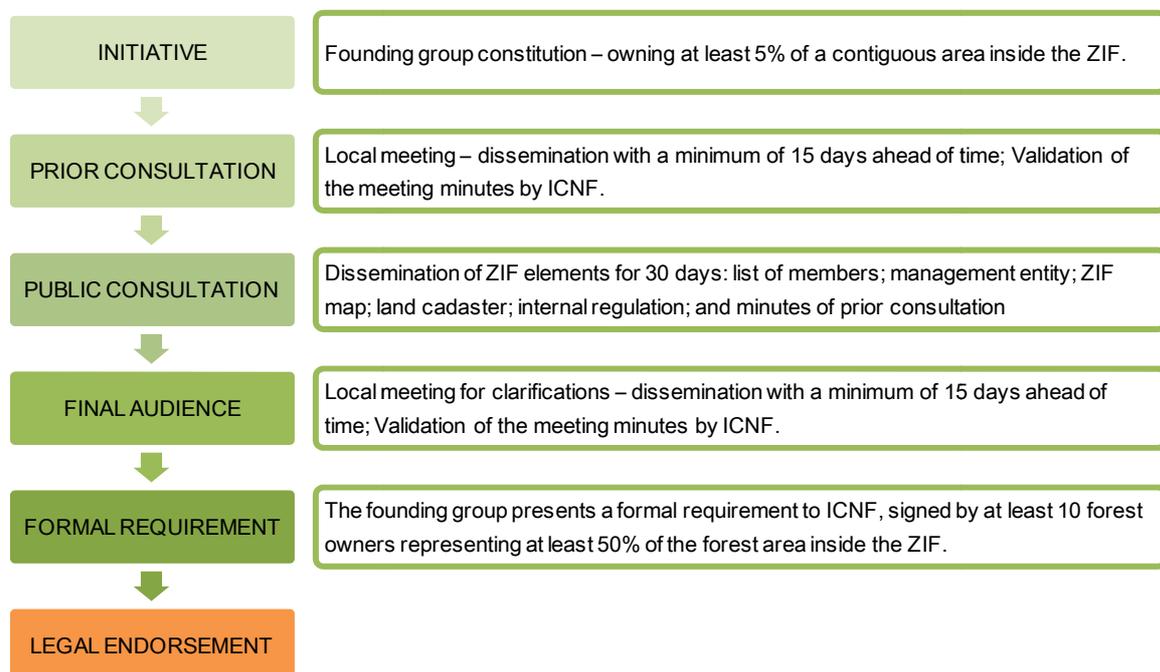


Figure 3.1: Steps for the legal endorsement of a ZIF

Each ZIF is managed by a single entity, which can be a non-profit-making and voluntary organization or a forest enterprise approved by the landowners and producers. The management entity will administer ZIF territory and is responsible for defining ZIF plans. The mandatory plans are: i) the Forest Management Plan (PGF), indicating the forestry operations and the activities within ZIF area, according to the guidelines of the Regional Forest Plan (PROF); and ii) the Specific Plan for Forest Intervention (PEIF), defining actions to protect forest against biotic and abiotic risks. The ICNF has to approve the plans and should support and monitor ZIF activities. PEIF term is five years and PGF term is 25 years.

The third stage is the implementation of the interventions and actions defined in the planning tools by forest owners and producers. The landowners can also decide to attribute full responsibility of ZIF administration to the management entity, becoming in charge of all ZIF



components (e.g. forestry, agriculture, grazing). ZIF costs should be supported by their members, through a common fund to implement actions for mutual benefits (e.g. financial contributions of forest owners, revenues, prizes), and by the national and European financial instruments. ZIF implementation has been facing some constraints, such as the high implementation costs²⁴, the difficulty to get funds, the complexity of assembling small-scale holdings and landowners and the social resistance to the approach, which is related with landowners' fear of losing their tenure rights. So far, ZIF constitution has been totally funded by the Forest Permanent Fund (FFP) and the implementation activities should be supported by the National Strategic Reference Framework (QREN) – 60% - and by the landowners – 40%.

The active involvement of landowners in all ZIF stages is a key factor for its success (Martins and Borges, 2007). Several informing sessions and public meetings have to take place to make landowners become ZIF members. The involvement in later phases is not clearly defined and could represent a major bottleneck to ZIF progress. Despite the major strengths of this approach, the complexity and bureaucratic process behind it represent weaknesses and limiting factors to the private investment, since each action inside the ZIF territory must be approved by their members.

The ZIF approach was disseminated internationally, either in the World Overview of Conservation Approaches and Technologies (WOCAT) database²⁵ since 2010, or in the book 'Desire for a Greener Land – Options for Sustainable Land Management in Drylands' (Schwilch et al., 2012b). This book is a final output of the DESIRE project¹ and presents approaches and technologies to Sustainable Land Management (SLM) in drylands, which were jointly identified and documented by scientists and local stakeholders. ZIF's approach was documented and assessed after being selected by local stakeholders in the Portuguese study sites of the DESIRE project as a good option to help reduce the area being burned. This evaluation included several steps, namely the collection and assessment of institutional and legal documents, the interviewing of national and local stakeholders involved in the definition of ZIF approach, the interviewing of supporter landowners, and the assessment of examples of ZIF constitution and implementation in the municipality of Mação²⁶ (ZIF's approach documentation is presented in Annex 1).

3.3.2. National overview

Concerning NIPF areas, the lack of land registry and the prevalence of small-scale holdings in north and central Portugal, emphasized that «...it is necessary to determine the minimal management areas and systems for joint management, but these depend on the attitudes of the owners» (DGRF, 2007: 35). As such, one of the major objectives of the national forest policy is to

²⁴ Overall budget for the implementation of 1 ZIF with 1,000ha in about 5 years: €1,000,000 (Schwilch et al., 2012c).

²⁵ See: <http://www.wocat.net>

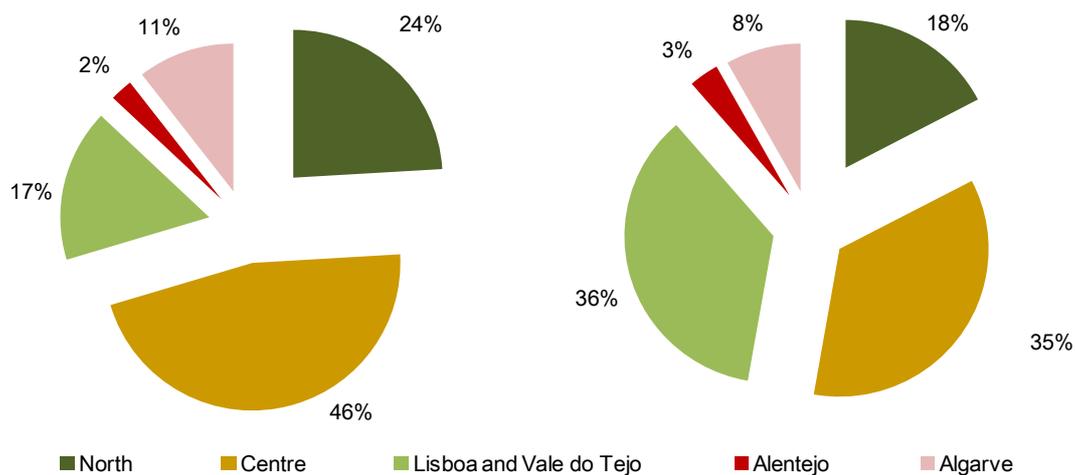
²⁶ Documentation of ZIF approach was compiled by Celeste Coelho, Sandra Valente and João Soares from University of Aveiro, Portugal, and was published in Schwilch et al. (2012c: 213-216).



promote small-scale forest owners' cooperation into a joint management of their forests (AFN, 2011b) and ZIF approach was especially conceived to fulfil this aim.

From 2005 till the end of 2012, 162 ZIF were endorsed, representing more than 845.000ha of land and corresponding to 24% of the national forest areas. Maritime pine, *Quercus suber* and eucalyptus areas are the main species in ZIF territories (AFN, 2011b)²⁷. These figures conceal the real numbers of ZIF social acceptance. The formal requirement for ZIF endorsement does not demand the involvement of all forest owners, and the membership rate has been around 50% (Deus, 2010). Forest owners with properties inside ZIF territory can maintain their individual management, but they have to implement the minimum silvicultural treatments and guidelines reported on the ZIF plans.

If we take the number of ZIF into consideration, the larger dynamism lies in the central region of Portugal, followed by the north region (Figure 3.2). However, the results were substantially different when the main variable of analysis is the land area covered by ZIF (Figure 3.2). This is related to the size of the ownerships, being much more difficult to obtain larger ZIF in areas occupied by small-scale holdings.



Source: Adapted from www.icnf.pt

Figure 3.2: Number of ZIF (left graph) and area covered by ZIF (right graph) by regions (2005-2012)

There are 299,000ha covered by 75 ZIF in the central region, which means that the mean size of each ZIF is less than 4,000ha. On the other hand, Lisboa and Vale do Tejo has 300,000ha covered by 27 ZIF and the medium size of a ZIF is above 11,000ha. The analysis of ZIF dimension also highlights the huge weight of ZIF with less than 1,500ha in central and north regions, representing 25% of the total. By comparison more than 33% of the ZIF in the Lisboa and Vale do Tejo region is larger than 10,000ha.

After legal endorsement of the first ZIF in November 2006, the progress has been very uneven (Figure 3.3). There was a continuous increase from 2006 to 2009 both in the number of ZIF and in

²⁷ AFN has published a report providing an assessment of ZIF process with data till February 2011.



the area covered by ZIF. In 2010, a huge downturn was felt, which was probably linked to the political changes and the internal economic crisis, affecting not only the organization of the sector but also the availability of public funds to ZIF constitution and implementation. In 2011, despite the low number of ZIF, the area covered exceeded 200,000ha. So far, 2012 was the worst year in terms of ZIF performance.

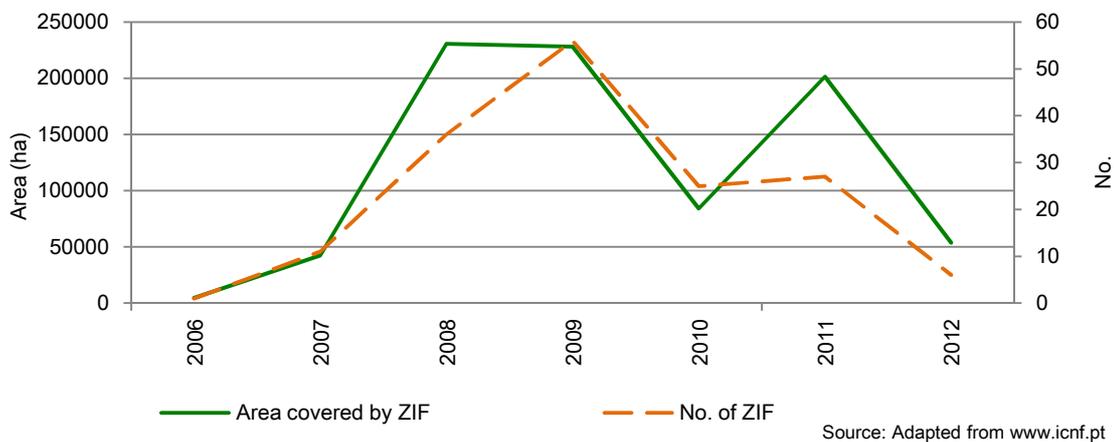


Figure 3.3: Evolution of ZIF constitution

The numbers of endorsed ZIF is evolving in an unorganized and confusing way, showing advances and regressions (Figure 3.3). Additionally, ZIF is also being constituted in areas with low fire hazard, mainly occupied by medium holdings and where a professional management is already in place (Deus, 2010). The presence of private industrial forest areas, especially conceived for economic purposes with rapid growth species, in the ZIF is also increasing (Deus, 2010). Both situations are favourable to the national figures, but can also move away from ZIF objectives.

The National Forest Authority (AFN) report has indicated the existence of 18,841 members in 143 ZIF. This figure shows that inside each ZIF, there are still many forest owners who did not join this initiative (AFN, 2011b). This goes along with the results from a survey²⁸ applied to ZIF management entities indicating that the main difficulties in ZIF constitution was to assemble a minimum number of forest owners and holdings (Deus, 2010). In 2012, there were 52 OPF, seven private enterprises and five Local Development Associations (LDA) as ZIF management entities. Almost 90% of the ZIF are managed by OPF, either existent or created for this purpose. Half of the ZIF management entities are only responsible for one ZIF and 36% is responsible for less than five ZIF.

Despite the existence of more than 150 ZIF already promulgated, ZIF further stages, such as the definition and approval of the PGF and the PEIF and their implementation, show the slowness and weaknesses of this process (AFN, 2011b). In fact, the majority of ZIF management entities have not elaborated the PEIF and the PGF, delaying implementation, which is also related with delays in public funds availability (Deus, 2010).

²⁸ The survey was implemented to 55% of ZIF management entities (N=24). Results are described in Deus (2010).



ZIF also emerged as a tool to increase landscape resilience to wildfires. Data from AFN (2011b), presenting fire incidence from 2007 till 2010 inside ZIF, showed that 25% of the ZIF already constituted were affected by fire. The most affected ZIF were located in the central region, where maritime pine, eucalyptus and shrubland areas are dominant.

3.4. Research design

To evaluate the social and technical perspectives over ZIF approach, empirical data were collected from different stakeholder groups: national decision-makers and technicians; local decision-makers and technicians; forest owners; and other citizens. The questions addressed in this chapter concern the policies and tools available for forest management, but the questionnaire addressed other topics that will be presented in Chapter 4.

3.4.1. Case study selection

The municipality of Mação is located in the centre of Portugal, more precisely within a transition zone between the densely populated coastal regions and the depopulated interior areas (Figure 3.4).

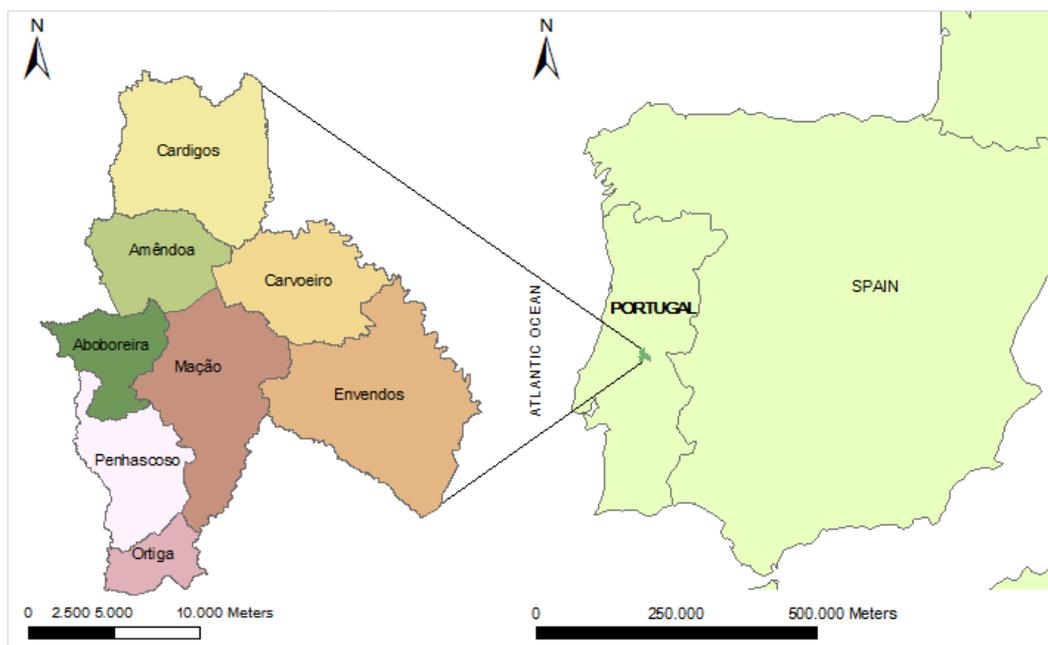


Figure 3.4: Location of the municipality of Mação

In the beginning of the 20th century, the municipality had a highly diversified landscape supporting a variety of activities, including subsistence farming (e.g. olive production), grazing of sheep and goats and other forestry practices (e.g. timber production and resin extraction). In the 1950s and 1960s, large-scale migration to Lisbon resulted in severe depopulation and a general abandonment of traditional activities. Rural abandonment together with the encroachment of former agricultural and grazing lands by maritime pine natural regeneration and eucalyptus

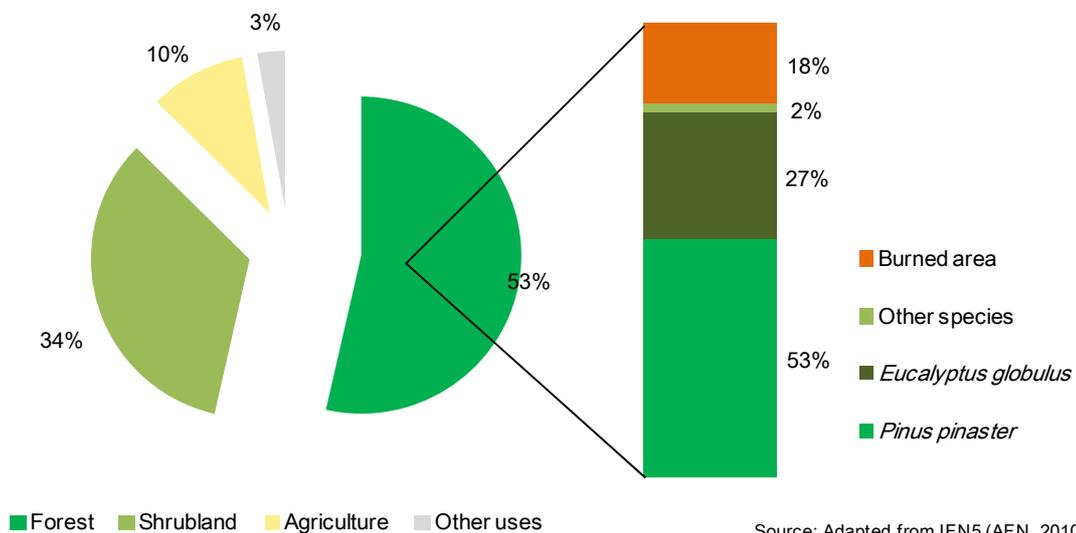


plantations, contributed to the increase in Mação vulnerability to forest fires and to desertification.

Mação was selected as a case study municipality because it: i) was severely affected by wildfires in the last decades; ii) is one of the Portuguese pilot areas to fight desertification; iii) several infrastructures and technologies to DFCI were implemented in the last decades; iv) has been involved in several research projects concerning desertification and forest management, with a strong component of stakeholder participation; v) was a precursor municipality in supporting and implementing the ZIF approach; vi) has five endorsed ZIF; and vii) represents an example of close collaboration between internal and external stakeholders.

In 2011, there were 7,338 inhabitants living in the Mação municipality, representing a decrease of more than 65% of the resident population since the 1950s. Nowadays, Mação represents a typical Portuguese rural area, with a low population density (18.4 inhabitants/km² in 2011) and an increasingly elderly population, where 39% of the inhabitants are more than 64 years old and the ageing index is 360²⁹. The education level is low, since only 6% have a university degree, 34% have the fourth grade and the illiteracy rate remains on 18%. Old age pensions represent the main living source, supporting 43% of the inhabitants, and the employed population represents 32%.

The socio-economic context in Mação is also responsible for some of the major land use changes which occurred in the last decades. Forest land, mainly composed by areas of *Pinus pinaster* and *Eucalyptus globulus*, occupies 21,419ha, which corresponds to more than 50% of the municipality territory. Shrubland is also quite important, occupying 34% of the land use in Mação (Figure 3.5). Burned area, with low or no vegetation, represents 18% of the forest land.



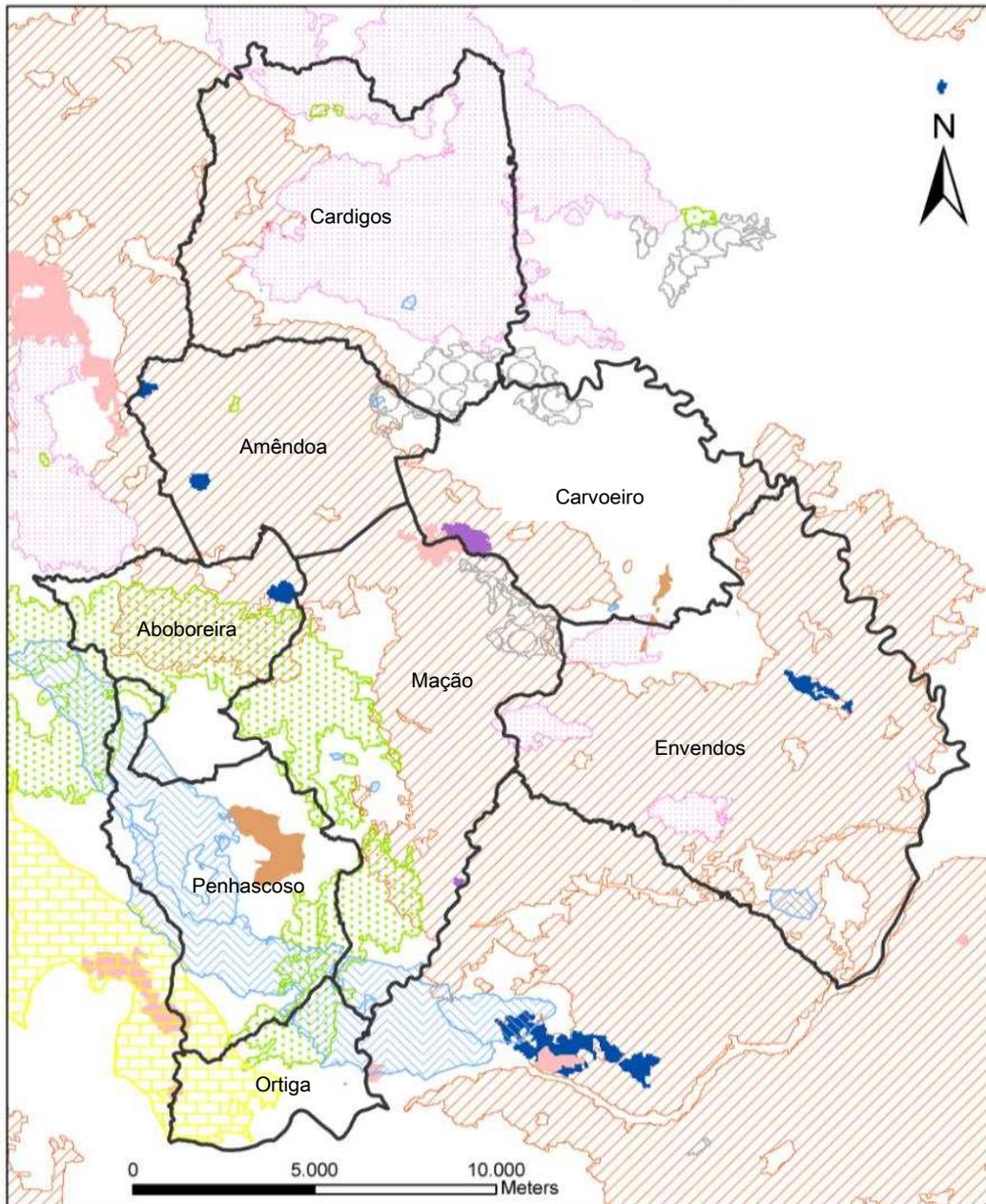
Source: Adapted from IFN5 (AFN, 2010)

Figure 3.5: Areas of Land Use Classes in the municipality of Mação

²⁹ Ageing index represents the ratio of the number of elderly persons of an age when they are generally economically inactive (aged 65 and over) to the number of young persons (from 0 to 14). See: <http://www.ine.pt>



The Mação region has undergone severe drought periods, associated with long, dry and hot summers, resulting in catastrophic fires, which destroyed large areas of forest and shrubland (Figure 3.6).



Legend

Mação Municipality

Administrative boundary

Year

1995	1999	2001	2003	2006
1998	2000	2002	2005	2007

Source: Data provided by AFLOMAÇÃO and presentation by Soares, 2010

Figure 3.6: Map of burned areas in the municipality of Mação (1995-2007)



In 2003, wildfires consumed 18,134ha of forest (around 85% of the municipal forest area) and also around 10% of the shrubland (AFN, 2010). Some areas have burned twice in a five year period, developing irreversible processes of vegetation and soil degradation (Valente et al., 2011a) as can be seen in Figure 3.7.



Figure 3.7: Degradation areas in the municipality of Mação

In 2013, wildfires were still an imminent hazard in Mação due to mismanagement, dense and dry vegetation together with an extremely dry climate and very strong winds. Fire hazards also led to huge investments made by the Municipal Council in terms of DFCI measures, equipment and infrastructures, such as water points, watch towers and a MACFIRE – System to monitor forest fires, a network of fire-breaks and paths and, more recently, implementing a network of strips for fuel management (Figure 3.8). The establishment of a forest association - AFLOMAÇÃO - and the implementation of a ZIF approach are also examples of strategies to encourage forest management.



Figure 3.8: Fire prevention and combat measures implemented in the municipality of Mação – water point (left); MACFIRE (middle); Primary Strip Network System of Fuel Management (right)

Since 2003, local organizations (e.g. Municipal Council, parishes, forest association and other NGO) have been supporting ZIF approach. The municipality was divided into 29 ZIF (Figure 3.9), but so far only five ZIF were endorsed (7,300ha).

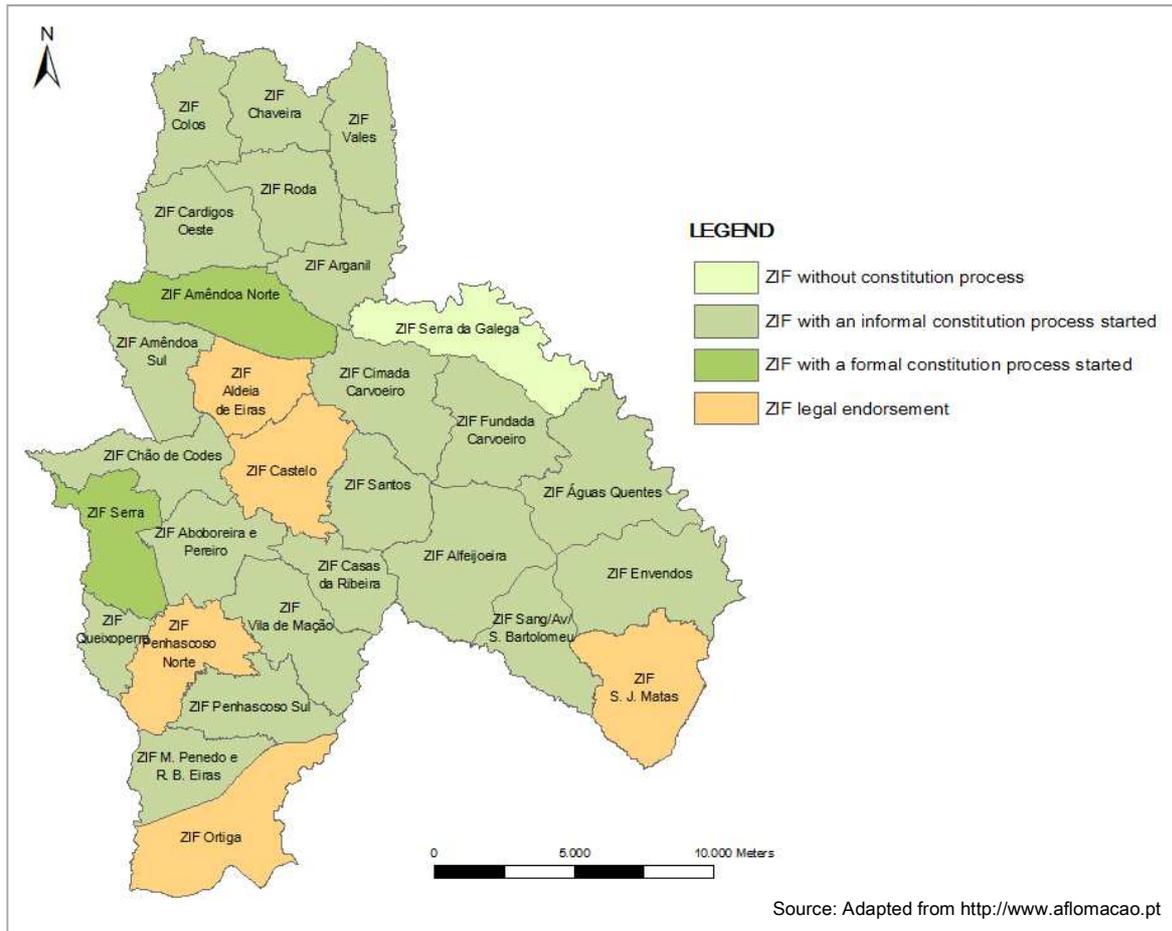


Figure 3.9: ZIF in the municipality of Mação by stage of development

In synthesis, the case study is a good depiction of the forestry setting of the central region of Portugal, which can be summed up as follows:

- i) **Small-scale forest holdings:** forest land is mostly private and very fragmented (the average size of forest plots is less than 0.5ha). The Mação municipality has a land registry, but forest owners are either elderly and with no economic capacity for long-term investments or are people living in urban areas with a lack of knowledge or interest in forestry investments;
- ii) **Rural abandonment and forest encroachment onto agricultural areas:** the very rapid rural depopulation that has occurred in Portugal since the 1950s and that has consequently left behind very depopulated and aged territories, has also led to the abandonment of agriculture, grazing and other rural activities and to forest plantations in former agricultural areas;
- iii) **Lack of forest management:** traditional forest management, complementary to agriculture, grazing and cattle breeding, have declined significantly. Additionally, many landowners have no capacity or interest in investing in their properties.



- iv) **Forest fires frequency and severity and land degradation:** affected by repetitive wildfires (Figure 3.6) associated with land degradation signs, such as reduction of vegetation cover, loss of the superficial layer of soil, reduction of the organic matter of the soil, increase of shrubland and *Cistus ladanifer* (Valente et al, 2011a).

3.4.2. Methods and sampling

In order to assess social, political and technical perceptions of the ZIF approach, some questions about: i) forest management policy, tools and measures; ii) knowledge about ZIF's approach; iii) agreement and acceptance of the ZIF approach, were included in the social perception survey carried out in the Mação municipality (see: Chapter 4; Annex 2).

The survey has integrated national and local technicians and a sample of the inhabitants living in Mação (the questionnaire and the survey process are described in Chapter 4, Section 4.3.1.; Questionnaire 1 template in Annex 2). The sample has included 353 respondents (Table 3.1), between 13 technicians from national and regional entities, 17 technicians and other stakeholders from local GO and NGO and 323 inhabitants of Mação. The inhabitants included in the sample (sampling process described in Chapter 4, Section 4.3.1.) represented 5% of Mação municipality inhabitants (N=323), and were proportionally distributed by residence area, age, gender, schooling and livelihood. The differences between forest owners (N=208) and other inhabitants (N=115) were also analysed. Data was analysed using PASW Statistics 18 software, through frequency and cross-tabulations and bivariate analysis, particularly the Chi-square test of independence.

Table 3.1: Number of respondents by type of stakeholder

Type of stakeholder		Number of respondents
Technical perceptions	National technicians	13
	Local technicians	17
	<i>Sub-Total</i>	<i>30</i>
Social perceptions	Forest owners	208
	Other citizens	115
	<i>Sub-Total</i>	<i>323</i>
TOTAL		353

Additionally, eight local key-stakeholders, representing the Municipal Council of Mação, the Forest Association of the municipality of Mação - AFLOMAÇÃO³⁰, three parish's councils and three ZIF founding groups were interviewed concerning their opinion and participation in ZIF process. The interviews were applied to each respondent individually and data was analysed qualitatively using quotations from the interviews.

³⁰ This association was constituted in January 2004, after the 2003 wildfires. AFLOMAÇÃO aims to implement a Management System for Sustainable Forestry. See: <http://www.aflomacao.pt>



3.5. Results on the ZIF approach

This section highlights the awareness about national and regional guidelines for forest management by analysing technicians and civil society knowledge on policy and legal tools. Particular emphasis was given to ZIF's approach and its development in the Mação municipality.

3.5.1. Knowledge on forest management policy

The knowledge about policies and planning tools differed substantially according to the type of stakeholder. While over 60% of the national technicians knew well the national guidelines to forest management; only less than 25% of the local technicians interviewed knew well these guidelines, but almost 60% have an idea about them. Above 80% of the respondents from local population (both forest owners and other citizens) were not aware of the national policies or guidelines for forest management (Figure 3.10).

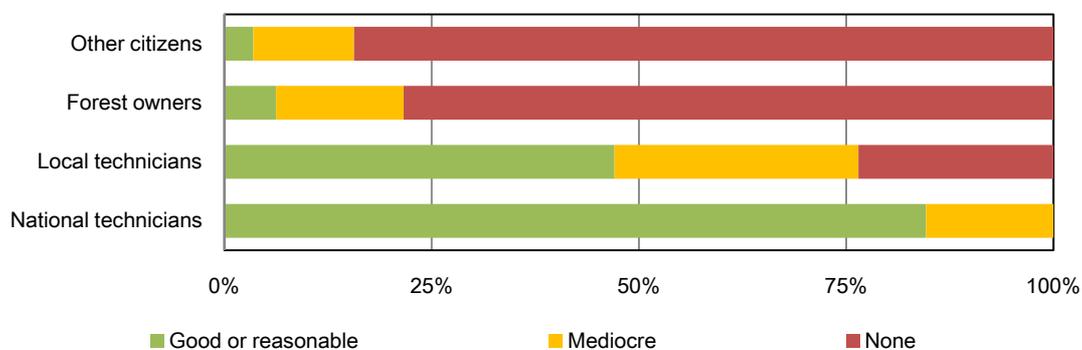
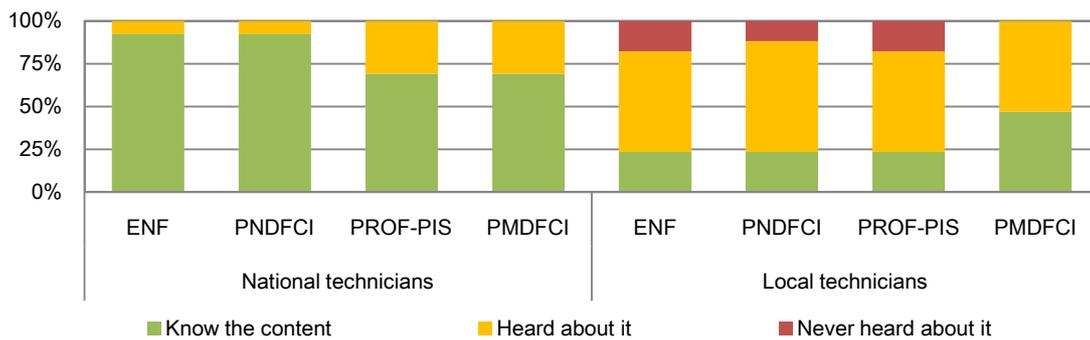


Figure 3.10: Level of knowledge on forest national guidelines as indicated by the different stakeholders

The standard chi-squared test of independence provided evidence to reject the null hypothesis of no association between the two major stakeholder groups - i) national and local technicians; and ii) civil society, including forest owners – and policy knowledge ($\chi^2(2) = 117.72, p \leq 0.05$). This was expected, as the background of many technicians and decision-makers is forest engineering or forest sciences and some of them have participated in or are responsible for national policy-making. Civil society was not aware or informed about policy issues. From the local population only three respondents were found to know quite well the national guidelines for forest management, corresponding to young women with a university degree.

National and local technicians were also asked to classify their knowledge about specific policy and planning tools. The results showed that the majority of the respondents from national entities were familiar with the content of all documents (Figure 3.11). Local technicians had heard about all documents, but only around 25% knew their content (Figure 3.11). The regional and municipal plans were less known by national technicians (Figure 3.11). The Municipal Plan for Forest Protection against Fires (PMDFCI) was the tool known most among local technicians, as it is a specific plan for the Mação municipality.



ENF: National Forest Strategy; PNDFCI: National Plan to Forest Protection Against Fire; PROF-PIS: Regional Forest Plan of Pinhal Interior Sul; PMDFCI: Municipal Plan to Forest Protection Against Fire

Figure 3.11: Knowledge about specific forest policy tools as indicated by the different stakeholders

3.5.2 ZIF origin, dissemination and acceptance

The type of forest in the municipality of Mação represents the target areas for using the ZIF approach. As stated by AFLOMAÇÃO, «to assemble properties into management units in a municipality shredded in 80,000 agricultural and forestry properties, distributed by more than 15,000 land owners (amongst which 50% are absentee) is essential». The rural depopulation together with the size of the holdings resulted in land abandonment, which will not be reversed unless a new model of management is implemented, as stated by some of the interviewees:

«It is not possible to make forestry with 200 square meters, with less than half hectare» [ZIF stakeholder].

«If we had here larger areas, the leap in terms of the type of exploitations might have been given, from familiar to business type, and settle some rural population. This did not happen because there was no dimension or scale for that» [Local GO stakeholder].

ZIF's approach is, though, an opportunity to constitute larger management units, as it is highly supported by local stakeholders.

«...the concept [of ZIF] was born in 2003, before the country even speak about it. After the discussion raised in 2003 (...) we started to make pressure, other persons started to make pressure and the former General-Directorate of Forests has created the ZIF law» [Local GO stakeholder].

«...the thought was focussed on the need of maintaining the territory alive and for that the territory has to be productive. To be productive, it has to address some criteria and to be effectively managed and that demands to find a tool to organize people to do that» [Local GO stakeholder].

The ZIF constitution process in Mação started right after the law publication in 2005 and was led jointly by the Municipal Council of Mação and by the AFLOMAÇÃO, through the organization of meetings in several villages, aiming to inform forest owners and making them to believe and



embrace this initiative. Several other local stakeholders (e.g. parish council president, members of the opposition political party and other key-stakeholders) joined this process.

«I became enthusiastic with the idea. We made a map of the parish and during Carnival holiday we have started to make the contacts. My role was to contact all forest owners, know who they are» [ZIF stakeholder].

The acceptance of ZIF's approach among local communities, and especially among forest owners, is an essential element. The first reaction of forest owners when approached with the idea was described as positive by the interviewees, confirmed by the fast endorsement of five ZIF. Even the most reluctant forest owners ended up adhering to ZIF.

«I remember some farmers saying 'only over my dead body'... but then after a second fire, they became receptive to all ideas» [Local GO stakeholder].

«...almost all people joined, we had just two or three more difficult cases. They were young people, which did not want to join and also did not want other to join» [ZIF stakeholder].

«From the approached forest owners, everyone accepted, became excited and even helped. They were on the meetings and some of them even came from Lisbon with only 0,5ha of land. The emotional value and the aim behind ZIF approach led to the participation» [ZIF stakeholder].

The standard chi-squared test of independence provided evidence of an association between the type of stakeholder and the knowledge about the ZIF approach ($\chi^2(3) = 30.78, \rho \leq 0.05$). The results from the survey highlighted the high awareness amongst national and local technicians about ZIF, where all technicians, except one, have recognized the ZIF approach. Half of the inhabitants surveyed also said that they had heard about the ZIF approach (Figure 3.12), but only 31% were able to define what is a ZIF, highlighting the following aspects: i) group of forest small-scale holdings; ii) assembling forest owners into a common management of land; iii) land management by a single entity. ZIF recognition was higher in forest owners' group than for the other citizens (Figure 3.12).

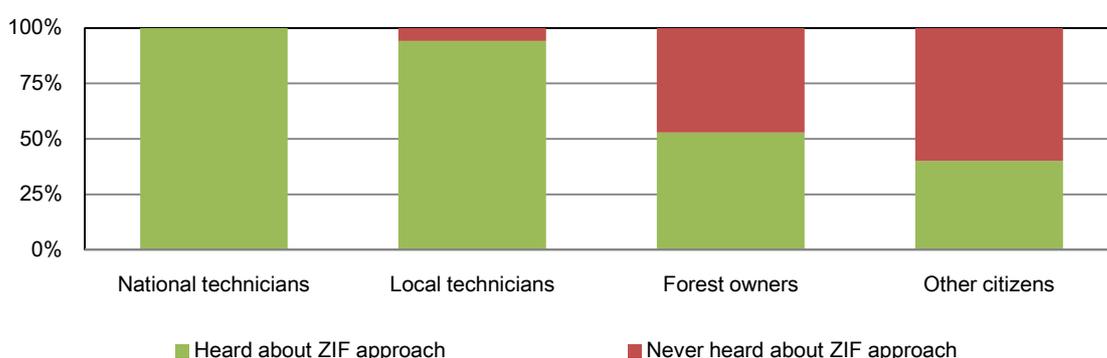


Figure 3.12: Answers to the question: *Have you ever heard about ZIF approach?*

Mação municipality is planned to be all divided in ZIF, but 47% of the respondents who are forest owners did not recognized the ZIF approach and only 14% said that they were a member of a ZIF



(Ortiga, Penhascoso Norte and São José das Matas). Five forest owners were not able to identify the name of the ZIF where they belong. Of the inhabitants who recognized ZIF's approach (156 respondents), 51% were informed by local technicians and 37% by their family, neighbours or friends.

The recognition of the ZIF approach was higher in the parishes where there are ZIF endorsed (Figure 3.9), such as Ortiga (ZIF Ortiga), Mação (ZIF Castelo), Penhascoso (ZIF Penhascoso Norte), Amêndoa (ZIF Aldeia de Eiras) and Envendos (ZIF São José das Matas). This was confirmed by the standard chi-squared test of independence providing evidence of an association between the residence of the forest owners and the other citizens and the knowledge about ZIF's approach ($\chi^2(7) = 26.31, p \leq 0.05$). The same was concluded between high levels of education and the knowledge about ZIF's approach ($\chi^2(5) = 51.36, p \leq 0.05$).

Concerning national and technical technicians, more than 60%, both from the national and local level, have participated in ZIF's approach. The national technicians have participated in the definition of the legislation and half of them have also participated in landowners' awareness (mainly through public presentations), in the definition of the ZIF plans and in the financial support of the process (Figure 3.13). The local technicians were mainly involved in awareness and dissemination, in organizing meetings for the ZIF constitution and in contacting landowners through door-to-door approaches.

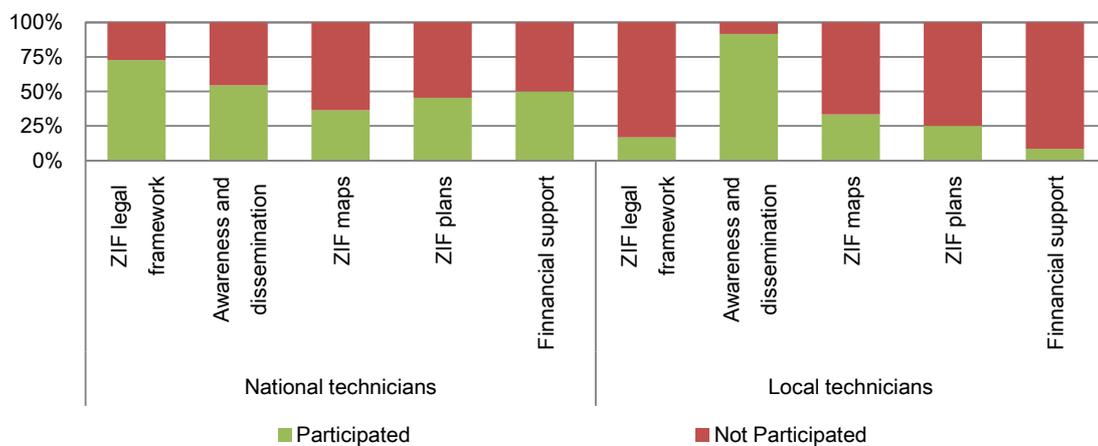


Figure 3.13: Type of participation in ZIF approach as indicated by the technicians

The level of agreement with ZIF's approach was very diverse according to the type of stakeholder, (Figure 3.14). Most of the national and local technicians agree with the approach. Eight technicians mentioned some elements that should be improved in ZIF's approach, such as the forest owners' participation and simplifying the bureaucratic and legal procedure of ZIF.

The answers of the forest owners and other citizens in terms of agreement with ZIF's approach were not as positive as the ones from the technicians (Figure 3.14). In fact, only 37% of the forest owners, who have recognized the ZIF, totally agreed with it and 25% agreed partially. This last group has identified as elements of disagreement the loss of tenure rights, the increase of social



imbalances between adherents and non-adherents and the economic constraints and bureaucracy. As previously mentioned, only 40% of the other citizens have recognized ZIF's approach, and most of them seem also to agree totally or partially with it. Almost 25% of the forest owners and other citizens did not answer this question and 13% of the forest owners mentioned to disagree with ZIF approach.

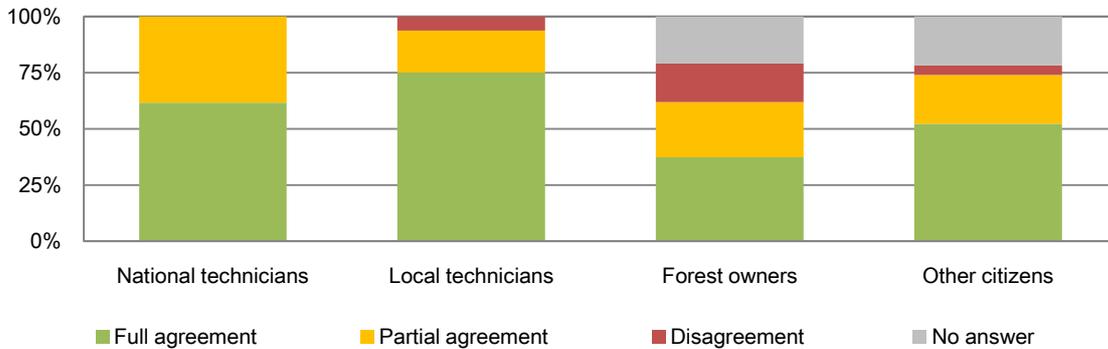


Figure 3.14: Level of agreement with ZIF's approach as indicated by the different stakeholders

The major level of unfamiliarity and disagreement with ZIF's approach was found amongst Carvoeiro parish respondents. In fact, Carvoeiro was the only parish in the Mação municipality which was not affected by forest fires in the last 20 years. In this sense, it is clear that forest owners still have a high economic interest in their properties and are probably not willing to join into a collective model of forest management. Moreover, Carvoeiro did not represent a priority area for ZIF constitution, and clearly had a lower social awareness amongst the citizens when compared with the other Mação villages.

ZIF advantages and disadvantages were also addressed in the questionnaire. It is important to note that around 40% of the inhabitants that have recognized ZIF's approach did not mention any advantage or disadvantage (Figure 3.15; Figure 3.16).

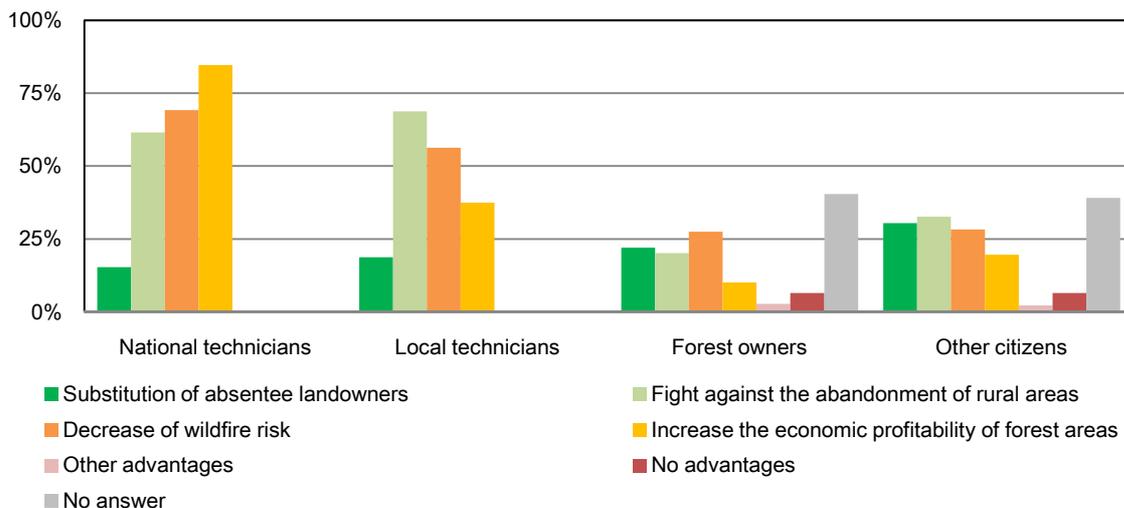


Figure 3.15: Advantages of ZIF's approach as indicated by different stakeholders



The main perceived advantages of ZIF were linked to the need to mitigate forest fires and to fight rural abandonment (Figure 3.15). The national and local technicians have also mentioned that forest management through the ZIF model has the potential to increase the profitability of the forest areas. Some stakeholders from all groups have also identified as an advantage the possibility of replacing the absentee landowners (Figure 3.15). This advantage was the main concern for the respondents who were members of a ZIF.

Social resistance and landowners' non-acceptance of ZIF's approach was considered a major disadvantage by the national technicians (identified by more than 75%) and by the local technicians (identified by 47%). Other disadvantages pointed out by the technicians interviewed were the high costs of implementation and maintenance of a ZIF and the complexity of the law (Figure 3.16). For the forest owners and other citizens, the disadvantages indicated were related with the loss of individual rights of management, identified by a quarter of these respondents (Figure 3.16). This aspect was even mentioned to by 23% of the respondents integrated in a ZIF. This result demonstrated that some aspects of ZIF's approach are still unclear, as the individual producers can adhere to a ZIF and still maintain the individual management of their properties, contributing only to the common activities, such as the DFCI measures.

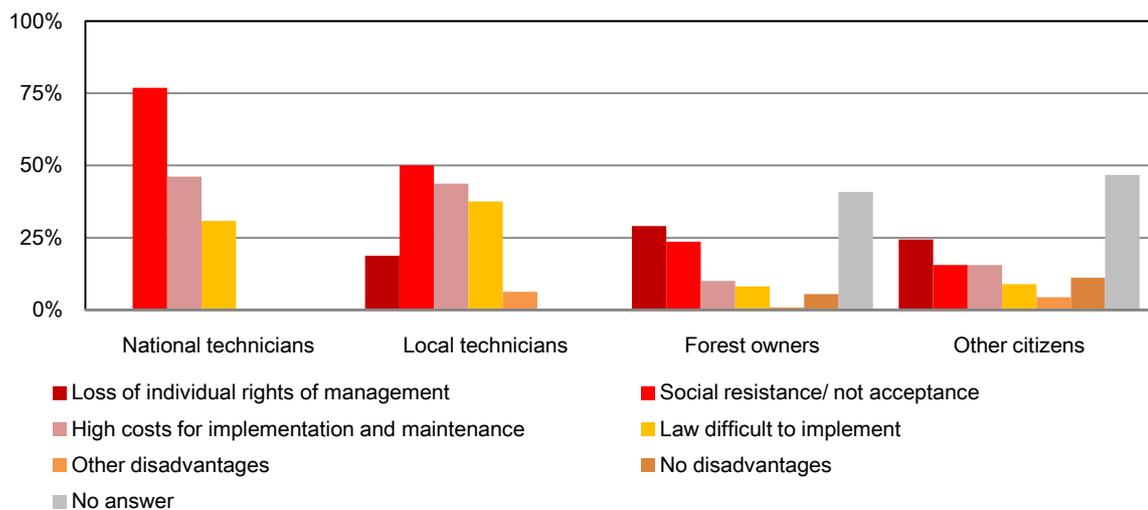


Figure 3.16: Disadvantages of ZIF's approach as indicated by different stakeholders

Since the publication of the first ZIF in the municipality of Mação in 2007, no major progress towards implementation has been made, mainly due to the absence of financial capacity of the forest owners, being very dependent upon the EU and/or from national incentives. The interviewees' discourses also emphasized the funding as a central cause for ZIF's approach failure.

«Almost all the ZIF we have here were made with people accepting the concept... and assuming that the government [national] would support around 80 to 90%, which was the political discourse since 2003» [Local GO stakeholder].

«... we are speaking of very high investments (...) because we know the people, in general forest owners do not have either the economic conditions or the willingness (...) and either the



process dies because there is no individual financing capacity or we find new ways of gathering this money...» [Local GO stakeholder].

«There is no chance of having forest owners investing their money. The persons said take my land (...) when this gives something in return, I will be here... » [ZIF stakeholder].

This situation is causing the first signs of distrust about the ZIF potential among local organizations and local communities. Additionally, local stakeholders stood up for the ZIF solution, convincing people to believe and accept this idea. Fearing to waste all the work done so far, if nothing happens in a near future, the idea of a ZIF pilot area seems to be on the way out.

«ZIF pilot area working. If people could see what is being done and what would be the profits... And it is quite likely that after seeing a good example, people will say that their contribution will be something more [more than the land], even work force. It could be a way of attracting people» [Local GO stakeholder].

3.6. Discussion

The Portuguese forest sector, mainly owned by NIPF owners, has been described as fragmented, dispersed and heterogeneous (Mendes, 2003). As such, a potential solution would be to embrace a collective learning process, both in the civil society and in their organizations (Mendes, 2003; 2008). This is already occurring in many parts of the world, materialized in joint efforts of the State and civil society to manage forests (e.g. Wollenberg et al., 2006; Janse and Konijnendijk, 2007; Nail, 2008).

Rural areas abandonment promoted a new rural landscape, stressing the need for forest owners' cooperation, guaranteeing the appropriated spatial scale to make rural interventions profitable, strategic and benefiting from the economies of scale (Kittredge, 2003; Kittredge, 2005; Rickenbach et al, 2005, Martins and Borges, 2007). In Portugal, and especially in the north and central regions, small-scale forest holdings are dominant and forests have been a result of individual interventions and actions performed by forest owners, who have diverse interests and capacities. In fact, many small-scale forest owners perceive that the only viable option is no intervention (Radich and Baptista, 2005). This was also demonstrated in a survey³¹ carried out in a small parish of central Portugal about forest owners' interventions after fire. However, since the 1990s many organizations are in place and are able to help, especially the small-scale forest owners, in adopting new forms of forest management.

This leads to the central topic of this study – ZIF's approach. Since the 1990s, several forest producers associations have emerged as a result from the State incentive to landowners' organization, but the State has not been able to differentiate the active and needed organizations, from the ones not able to promote forest management. After recurrent

³¹ The survey was developed under the framework of RECOVER project (PTDC/AGR-AAM/73350/2006) - Immediate soil management strategy for recovery after forest fires, funded by Science and Technology Foundation (FCT). It was implemented to 15% of forest owners living in the Pessegueiro do Vouga parish (N=28). Results were described in Ribeiro et al. (2010; 2011).



catastrophic forest fires, the ZIF emerged as a promising tool for SFM in small-scale forest areas in Portugal (Martins and Borges, 2007; Marques, 2011; Schwilch et al., 2012b; Valente and Coelho, 2012; Valente et al., 2012).

The movement ZIF started in 2005 and, since then, the number of ZIF has been evolving unevenly, probably according to the public funds for the ZIF constitution. The movement was quite visible in the Central region (46% of the ZIF are located in this region), where forest fires have been particularly intense and the smallholdings are dominant (see: Section 2.3.3.). But many ZIF were also created in secondary regions, which are characterized by medium land holdings, with professional or industrial management (Deus, 2010). Additionally, the landowners' adherence to ZIF approach is not enough, as demonstrated by the analysis of the ZIF national performance and in the survey carried in the Mação municipality. From the discourses of the interviewed local stakeholders, this low adherence together with no financial incentives or fiscal benefits for the adherent forest owners represent threats to the whole process. The premature stage of implementation also did not allow for the evaluating of the real potential of this approach towards SFM and DFCI.

Although knowledge about the national guidelines, laws and tools is extremely important to establish effective ground-actions and interventions, the findings presented in section 3.5.1. suggested that there is a generalized lack of knowledge about the forestry policies and tools among civil society, and particularly among forest owners. This can be probably compensated by the technical capacity already installed in the OPF or in the local GO, able to provide the appropriated support to forest owners (see: Section 2.5.3.2.). In fact, results from the survey demonstrated that some of the local technicians have already a good or reasonable knowledge of the strategic and national policy documents and planning tools for forest management and for DFCI. The ambiguous and instable features of the legal and institutional framework for forests (described in Chapter 2) difficult the increase of social awareness about the forest policy tools.

The ZIF approach was clearly supported by the national and local technicians in the survey (see: Section 3.5.2.), who recognized many advantages in implementing this type of management. A national-wide survey³² applied to the Forest Technical Offices (GTF) and to the OPF had confirmed these findings, where the majority of forest technicians agreed, totally or partially, with ZIF's approach. If ZIF represents for the local decision-makers and technicians the ultimate solution, for the local communities it is still an unfamiliar issue. In the municipality of Mação, almost half of the inhabitants included in the survey had heard about the ZIF, but not everyone was able to explain it. This represents also an important aspect to be addressed in the future.

The survey demonstrated that there was a reasonable acceptance of ZIF's approach, and that the approached forest owners reacted positively to the possibility of becoming ZIF members.

³² The survey was developed under the framework of ForeStake project (PTDC/AGR-CFL/099970/2008) - The role of local stakeholders to the success of forest policy in areas affected by fire in Portugal, funded by FCT. It was implemented to all GTF and OPF responsible by ZIF (N=339). Preliminary results were presented in Ribeiro et al. (2012).



However, the social resistance to the ZIF and the landowners' fear of losing tenure rights were frequently mentioned as constraints to the implementation. This goes in line with Deus (2010) findings²⁸, where the ZIF management entities identified finding forest owners and making them to embrace this initiative as the main difficulties of the ZIF process. Serbruyns and Luysaert (2006) found similar resistance in Flanders (Belgium), where the forest owners showed lack of interest in participating in the forest's groups, fearing to lose control over their land.

The definition of the ZIF plans and their implementation are taking a long time, not only in Mação but in the whole country. The major part of the management entities of ZIF has not elaborated the PEIF or the PGF (Deus, 2010). In Mação, some of the ZIF plans were elaborated, but there was a delay in submitting these plans to the ICNF because of the insecurity of funds available to implement the measures. The ZIF implementation and maintenance costs are quite high and were often mentioned by the GO and NGO stakeholders as a major constraint. The initial enthusiasm about this approach and its potential is starting to fade, due to the absence of an effective implementation of measures and actions. The ZIF law foresees the establishment of a common fund from the contributions of the ZIF members. However, the local stakeholders' discourses emphasized that forest owners do not have financial availability or the will to invest their money in the ZIF implementation. Several local stakeholders identified as a potential solution to this deadlock the implementation of a pilot ZIF to test, improve and disseminate the potential of this approach. This is related to the strong belief among local organizations about the potential of ZIF, and to the need to increase trust and support amongst forest owners.

The survey highlighted the low knowledge of civil society about legal tools and policies for forest management, where the ZIF law is included. The land users are sometimes compelled to cope with policies and measures which exclude their visions and know-how and this could develop constraints on the social acceptance and implementation of the policies. This was already concluded in a previous study³³ (Galante et al., 2009). But in this study forest owners have demonstrated availability to receive more information about forest issues. A similar behaviour was found in the forest owners in Flanders, Belgium, who were interested in receiving more information and education about their forests (Serbruyns and Luysaert, 2006). Better information and awareness will definitely contribute to a greater acceptance and trust in policy instruments as already demonstrated in some studies (Serbruyns and Luysaert, 2006; Deus, 2010). In the municipality of Mação, several meetings were held to inform forest owners about the ZIF, but the survey highlighted that the local communities only have a superficial knowledge of the ZIF approach. Even for the ZIF members, it was observed that ZIF plans were developed by forest technicians with low involvement of forest owners. This passive involvement of landowners denotes the wrong idea that ZIF's approach implementation only depends on the landowners' agreement in becoming members. NIPF owners have to be actively involved in all stages of ZIF's

³³ A national-wide survey was implemented to address social perceptions about forest fires (N=3108).



approach, sharing decision-making power. This idea was also previously supported by other authors (e.g. Martins and Borges, 2007; Deus, 2010; Marques, 2011).

3.7. Conclusion

The small size of forest land holdings and landowners' absenteeism are major constraints for forest management in Portugal, which need to be tackled by increasing cooperation between forest owners. Therefore, achieving sustainability in small-scale forest areas will only be possible by moving from an individual decision-making to a multiple decision-making framework (Martins and Borges, 2007). The ZIF approach apparently provides the legal setting needed to embrace that change and could represent the ultimate opportunity for small-scale forest areas in Portugal.

The technical and institutional perspectives over ZIF's approach have been changing into a greater support of this type of management and some ZIF have been constituted by the initiative of different local organizations. But the ZIF constitution and implementation need forest owners' acceptance and cooperation, technical support throughout the process and financial input at all stages. The social awareness about ZIF's approach is still little, and it seems that only the approached forest owners and those who have participated in the meetings are aware of ZIF concept. The information and dissemination can be particularly relevant to increase trust and cooperation. Although many individuals did not recognize ZIF's approach, the landowners' acceptance of the ZIF was described as positive by local stakeholders. Nevertheless, the social resistance to ZIF's approach is frequently mentioned as a constraint for moving forward. Most legally endorsed ZIFs have now stagnated. The reasons behind this situation are related to financial constraints, either coming from public funds or from landowners' contributions. Public funds are suffering adjustments and small forest owners lack the money and will to invest in their properties.

The NIPF owners have to be actively involved in all stages of the ZIF, namely discussing and negotiating the ZIF plans and contributing to the implementation of all activities. Transparency, trust and investment are the key ingredients and will only be possible if forest owners are engaged throughout the whole process. To get the ZIF out of this deadlock, interventions and actions foreseen on the ZIF plans need to be implemented. For that, the plans need to be submitted and approved, the public funds should reach on time to priority areas and forest owners need to be involved in the whole process, as a way of getting all type of support (financial, labour, know-how, etc.). If this does not work, ZIF's approach will be just another trick of public funds misused and discredit forest owners' cooperation (Mendes, 2008).

ZIF's approach is closely linked to the four key issues addressed in this research. In fact, the emergence of ZIF, as well as the previous models for forest owners' cooperation (e.g. OPF), were related with the need to find joint approaches to forest management in small-scale forest areas aiming to reduce the forest fire hazard and to maximize the productive, environmental and social role of forests. The findings on ZIF approach have demonstrated:



- **Forest fire hazard:** ZIF's approach was especially conceived for areas affected by forest fires, aiming to provide larger spatial scales for the implementation of the main actions for DFCI, such as a Strip Network System for Fuel Management, documented in WOCAT database (Schwilch et al., 2012b). The findings highlighted that stakeholders perceived the decrease of fire hazard as a major advantage of forest management through ZIF approach. However, there are no data proving that fire hazard is lower in ZIF areas, when compared with other forest areas. The results of the survey indicated that ZIF approach was more accepted by forest owners living in areas already affected by fire.
- **Productive role of forest:** the role of ZIF in increasing the economic profitability of forests was only recognized by the national and local technicians. This does not necessarily mean that forest owners have no economic interest in their land. The explanation is probably related to the stage of ZIF implementation, which is still lacking in on-ground activities. The small-scale NIPF is dominant in north and central regions of Portugal, and this type of forest has been described as a bottleneck to the management options of forest owners and to their competitiveness at national and global markets. The implementation of ZIF's approach aims to overcome these constraints, increasing the profitability of the forests.
- **Socio-environmental role of forest:** the integrated management proposed by ZIF's approach aims to enhance multiple functions of forests, increasing the resilience to fire hazard. The multifunctional role of forests was not identified in the stakeholder perception survey, but the local and national technicians indicated that the ZIF can contribute to fight against desertification, by increasing land management in the rural areas, both in terms of forest and other rural activities (e.g. agriculture, grazing, hunting). The implementation of a pilot ZIF, often mentioned in the interviews of local technicians, was also viewed as an opportunity to test all components of a ZIF (e.g. timber production areas; other non-timber products; conservation of biodiversity; leisure areas; grazing and agriculture activities; hunting; etc.).
- **Stakeholder participation:** the findings highlighted the low awareness of the local population about forest policies, where ZIF's approach is included. ZIF's approach was still unfamiliar to many forest owners, who recognized the ZIF term, but did not have a clear idea of its meaning. Social resistance to and non-acceptance of the ZIF approach, as well as the high costs of ZIF implementation and maintenance, were also identified as major constraints. Public funding was used as 'bait' in establishing ZIFs and many ZIFs were endorsed without long-term financial sustainability. In the case study, the approached forest owners accepted the ZIF idea, but no individual investment was foreseen. The way out of this deadlock lies in increasing the stakeholder interest and participation in the ZIF process and combining sources of public funding with private investment. The implementation of a pilot ZIF to test the approach and to increase individual and collective interest is also viewed as an opportunity to develop a 'snowball effect' among forest owners' cooperation and organization.



CHAPTER 4

STAKEHOLDER PERCEPTIONS OF FOREST MANAGEMENT AND FOREST FIRES IN CENTRAL PORTUGAL

- 4.1. Introduction
- 4.2. Theoretical assumptions
- 4.3. Research design
 - 4.3.1. Methodology
- 4.4. Results of stakeholder perceptions
 - 4.4.1. Who has a stake in forestry decision-making and intervention?
 - 4.4.1.1. National and local technicians
 - 4.4.1.2. Forest owners and other citizens
 - 4.4.1.3. The role of stakeholders in forestry intervention
 - 4.4.2. What is at stake in the Mação forest?
 - 4.4.2.1. Functions of forests
 - 4.4.2.2. Expected type of forests
 - 4.4.3. What is hindering Sustainable Forest Management?
 - 4.4.3.1. Main problems affecting forests and forest management
 - 4.4.3.2. Forest fire hazard
 - 4.4.4. What are the future perspectives regarding forests and rural development?
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- 4.6. Conclusion



*Fact is fact, but perception is reality*³⁴

4.1. Introduction

The international and national political agendas regarding forests are changing so that they can include a greater integration of both global challenges (such as climate change, carbon sequestration, forest governance) as well as local needs and interests. The concept of Sustainable Forest Management (SFM) brought new stakeholders onto the scene and consequently multiple perceptions, values, attitudes and interests regarding forests and the forest sector, now have to be taken into consideration (Fabra-Crespo, et al. 2012). SFM progress is now anchored within the recognition of the need to work together with the stakeholders, particularly in terms of their perceptions, preferences and behaviour.

«Whatever the actual state of Europe's forests, it is the public's view on issues that counts possibly as much in forest policy and business» (Rametsteiner and Kraxner, 2003). This statement embodies the importance of assessing social perception when it comes to understanding forest management views and practices and the importance of increasing public awareness about the socio-economic, environmental and cultural relevance of forests (Dolisca et al., 2007), as well as the need to identify areas of agreement and conflict between different stakeholders (Elands and Wiersum, 2001; Ní Dhubháin et al., 2008). Stakeholder consultation represents a key element for good governance of natural resources (Fabra-Crespo, et al. 2012), as it is an essential basis for the mutual understanding, co-decision and co-management of forests. In fact, when citizens perceive public policies as legitimate, there is not only a wider acceptance, but also the implementation of decisions become easier and cooperation between public and private actors improves (Valkepää and Karpinnen, 2013).

In this chapter, it is intended to establish the basis for a learning process in terms of SFM, by consulting multiple stakeholders (e.g. decision-makers, forest technicians, Non-Governmental Organizations (NGO), forest owners and other citizens) about forests and forest management. Before embracing a more complex process of stakeholder participation in environmental decision-making, it is important to address multiple views and to understand what problems are affecting people. These problems are the ones people want to discuss and work on. Finding potential areas of conflict or agreement as well as significant perceptions that enable improving the interplay among different stakeholder groups are also expected outcomes from a transverse public consultation process.

For assessing the social, political and technical perceptions of forests and forest management, a questionnaire was implemented to national, regional and local Governmental Organizations (GO) and NGO decision-makers and technicians related to forests, to forest owners and to other

³⁴ Proverb cited in Rametsteiner, and Kraxner (2003).



inhabitants from the study site – Mação municipality. The type of forests, representing small-scale private holdings of pine and eucalyptus forests, and their high vulnerability to fire hazard were the main criteria on the choice of this object of study. The survey gathered perceptions on: i) forest owners' profile and management practices; ii) role and value of forests and forestry; iii) main threats to forests; and iv) future of forests and rural areas.

The next section discusses the hypotheses from the literature concerning the topics addressed by the survey. After describing the research design in detail (Section 4.3), the results of the survey are presented (Section 4.4) and discussed in the light of the theoretical assumptions (Section 4.5).

4.2. Theoretical assumptions

The theoretical assumptions aim to provide insights on stakeholders' perceptions regarding central issues of forests and forestry. Based on public opinion surveys that have been carried out across EU countries in the last 20 years (e.g. O'Leary and Elands, 2002; Wiersum and Elands, 2002; EC, 2002; Rametsteiner and Kraxner, 2003; Elands et al., 2004; Wiersum et al., 2005; Rametsteiner et al., 2007; EC, 2009; Elands and Praestholm, 2008), the analysis is guided by four hypotheses: 1) a shift from *classic forest owners* to *hobby or indifferent owners* is occurring in private forest smallholdings; 2) forest and forestry are increasingly valued for their environmental amenities; 3) the absence of forest management is a major driving force in the central threat to forests – wildfires; 4) there is a pessimistic view about the future of forest. Data from Portugal were only included in a few of those studies (e.g. EC, 2002; Rametsteiner et al., 2007; EC, 2009).

Hypothesis 1: *A shift is occurring in private small-scale forest holdings, from classic owners to the emergence of hobby owners or indifferent owners.*

The shift in the societal view towards a major re-evaluation of the environmental role that forests play is leading to the emergence of different types of forest owners. In the past, small-scale forest owners were economically dependent on their forests, as a complementary activity to farming and for the provision of fodder for their animals and wood for fuel, etc. Nowadays, these owners (due to their age) or their heirs are demonstrating a relatively low interest when it comes to the economic role of their forests. The majority are either disinterested or environmentalist in their objectives (O'Leary and Elands, 2002). Economic dependence decreased drastically due to rural out-migration and a decline in the primary activity.

This decline is in line with changes within broader rural development strategies, where a transition is taking place from a rural modernization perspective to a rural restructuring position is occurring (Wiersum et al., 2005). From a rural restructuring perspective, small-scale forestry should be conceived as an integrated activity of multifunctional businesses and it therefore promotes the 'full value' of the forest (Buttoud, 2000; Cabbage et al., 2007). However, it must be said that forest management objectives can vary greatly depending on the individual objectives of the forest owners.



The presence of several types of forest owners with different objectives and multiple management visions of the same territory has been analysed in several studies, either in Europe (Bieling, 2004; Boon et al., 2004; Wiersum, et al., 2005; Elands and Praestholm, 2008) and elsewhere (Kline et al., 2000). Various factors have emerged from these studies, which are responsible by the logics behind forest ownership, which range from more tangible aspects, such as the conditions and the characteristics of forests, to intangible criteria, such as the societal value given to the forest, or the importance of the forest as a legacy or the future perspectives on forests. While the former factors can be analysed through quantitative data, the latter are better understood through the use of a more qualitative approach, namely through the assessment of the forest owners’ perceptions.

Academic literature shows that the current profile of small-scale forest owners is related to four main types of owners (Table 4.1). The first type – the *classic forest owner* - represents the owners that are mostly concerned with the financial return from their forests; however legacy can also be important (Boon et al., 2004). The forest owners may also value the environmental and recreational aspects of forests, evolving to type 2 - *multi-objective owner*. The third type is the *hobby or environmentalist owner*, mostly valuing the environmental and the aesthetic role of forests. Finally, the fourth type is the *indifferent or passive owner*, who has no further objective besides keeping the forest property within the family.

Table 4.1: Literature review on forest owner types

Small-scale forest owners				Source:
Type 1 Classic owners	Type 2 Multifunctional owners	Type 3 Hobby owners	Type 4 Indifferent owners	
Timber producers	Multi-objective owners	Recreationists	Passive owners	Kline et al., 2000 Survey among Non-Industrial Private Forest (NIPF) owners in western Oregon and western Washington, USA.
Classic forest owner		Hobby owner	Indifferent farmer	Boon et al., 2004 Country-wide survey among forest owners in Denmark.
Economically interested		Conceptually interested	Uninterested	Bieling et al., 2004 Survey among NIPF owners in the Black Forest region of Germany.
Self-interested	Multifunctional	Environmentalist	Indifferent	Wiersum et al., 2005 Survey among forest owners from nine European countries (AT, DK, FR, DE, GR, HU, IE, NL, ES).
Full-time farmers or part-time farmers		Hobby farmers	Retired farmers	Elands and Praestholm, 2008 Survey among forest owners from eight European countries (AT, DK, DE, GR, HU, IE, NL, ES).



Hobby owner and *indifferent owner* are becoming more and more important across Europe (Wiersum et al., 2005). While the presence of *hobby owners* can represent an opportunity to diversify forest uses and to promote the environmental role of forests, the emergence of *indifferent owners* constitutes a major risk to forests and the rural landscape. In Boon et al. (2004) study, the *indifferent owners* live closer to the forest than the *classic* and *hobby forest owners*. But, the category of *indifferent owners* also includes absentee owners who live in urban areas. The societal changes, related to migration into towns, and the intergenerational transfer of the land suggest a potential increase of this category in the future, replacing the more traditional category of *classic forest owners* (Heino and Harvonen, 2003; Wiersum et al., 2005). This situation may have important effects on forestry aims and management practices (Heino and Harvonen, 2003).

In Portugal, a study developed by Baptista and Santos (2005) identifies five profiles of forest owners depending on the type of management, the type of investment, the type of work and forest products. In three of the five profiles, the forest is viewed as an economic reserve for the family. The other two profiles are more focussed on the productive role of forest. The environmental and recreational functions are still undervalued by Portuguese forest owners (Baptista and Santos, 2005). The presence of *indifferent owners* is increasing, especially in the central and northern regions of Portugal, where small-scale forest holdings prevail and where forest owners perceived no intervention as the only viable option (Radich and Baptista, 2005). This scenario is responsible for a particularly high fire hazard, proven by intense wildfires which occur on a yearly-basis.

Hypothesis 2: *Forests and forestry are increasingly valued for their environmental amenities, especially regarding the role of forests in preserving biodiversity and in coping with climate change.*

Over the last decades, important changes have not only taken place in the functions of forests, but also in terms of social views and demands concerning forest resources (Rametsteiner and Kraxner, 2003). The productive function of the forest related to the production of timber and other tangible goods, is still a major role of the forests in fulfilling the increasing societal needs for raw materials and also in sustaining the rural economy. But forests are increasingly perceived as *green* and *nature* (Heino and Harvonen, 2003; Rametsteiner and Kraxner, 2003). This is in line with the emergence of the SFM concept, discussed in Chapter 2, where forest resources provide the traditional goods and services but they also need to meet global societal challenges, such as maximizing the contribution of the forest to carbon sequestration, to climate change mitigation and to biodiversity conservation (MCPFE, 1993a).

Several perception surveys that have been carried out in Europe, demonstrate that the ecological functions of forestry are receiving increasing public attention (Elands and Wiersum, 2001; Elands



et al., 2004; Wiersum et al., 2005; Ní Dhubháin et al., 2009). The European cross-study³⁵ *'Shaping forest communication in the European Union: public perceptions of forests and forestry'* has identified conservation and protection as the topics mentioned most when it comes to forests (EC, 2009). In fact, one of the main conclusions of the study was that European public opinion on forestry had *«shifted viewpoint from a traditional commodity-based and recreational management demand to a demand for greater protection and management for ecosystem services»* (EC, 2009: xix). This trend was also reported earlier in other studies, thus demonstrating that local society is increasingly seeing its forest within the perspective of nature and of landscape quality and less as an economic activity or carrier of services (O'Leary and Elands, 2002, Boon et al., 2004; Elands et al., 2004, Ní Dhubháin et al., 2008).

If on the one hand, the preservation of biodiversity represents a key concern of the EU public opinion regarding forests (Rametsteiner and Kraxner, 2003; EC, 2009; Forestry Commission, 2011), it has, on the other hand generated a more critical eye towards the exploitation of resources (EC, 2009). In this sense, people are demanding close-to-nature forest management practices, regarding stability, species, structural diversity and the health of forests (Bieling, 2004). These demands are also related to the response to the needs of a growing urban population, which expects to obtain both ecological and amenity services from forests. Although the recreational role of forests has not appeared as a major public concern (EC, 2009), rural forest areas are viewed as environmentally attractive living and leisure areas.

SFM has emerged as a dominant paradigm in forestry discourses (Kant and Lee, 2004; FAO, 2007a) as it is, together with the interplay between forests and climate change was the topic requested most for further information by the EU public (EC, 2009). Even though it has multiple understandings in different situations and to different people (Buttoud, 2000), the concept of SFM is already recognized and perceived positively in many EU countries, such as Finland, Germany and the UK (EC, 2009). But in some parts of Europe, this topic is still a bit unfamiliar to the general public; however people recognized their main principles as quite important. The role of forests in mitigating climate change is a rising societal concern. This was revealed through members of the EU public who seemed to be well informed about the role of the forest regarding climate change and carbon emissions. Protecting people from natural disasters and mitigating the effects of climate change were ranked as the second key concern about forests in the EU (EC, 2009). In southern Europe though, people are more concerned with deforestation and climate change than with economic use of forests.

The opinions in terms of forest management practices are also changing as people are increasingly against forestry measures that disregard nature (Rametsteiner and Kraxner, 2003; Flécharde et al., 2006) and are demanding a more active management to protect biodiversity or to

³⁵ This study included two main data sources: i) a survey applied to key-stakeholders from national GO, NGO and research institutes from the EU-27 countries and also representatives from EU and international organizations; and ii) a public opinion survey across the EU-27 countries (N=11106, randomly selected citizens).



fight climate change (EC, 2009). This was observed in major public opposition to forestry in afforestation areas, claiming that some afforestation practices do not respect local identity and landscape aesthetics (O'Leary et al., 2000; Flécharde et al., 2006).

Despite the centrality of the environmental functions of forests within EU public opinion, the significance that people give to those functions can be vary greatly. For example, social perceptions can be related to the history of the place, the history of forest cover and the geographical and socio-economic characteristics of the area (Ní Dhubháin et al., 2008). In fact, a public opinion study has concluded that people give more value to the productive function of the forests in typical forest countries, such as Norway, Sweden and Austria (Rametsteiner and Kraxner, 2003). Moreover, other study in Ireland showed that more positive social perceptions on the roles of forestry were found in traditional forest areas (Ní Dhubháin et al., 2008). Eland and Wiersum (2001) have also identified some differences between public opinions in diversified rural areas and in agricultural areas in decline. While recreation and productive functions emerged as the most important in diversified areas, in rural areas in decline the forests for production and for protection were classified as the most important types. Even within rural communities, many differences can be found in social perceptions (O'Leary et al., 2000; Ní Dhubháin et al., 2008).

Hypothesis 3: The absence of forest management is recognized as a main driver to forest fires, which are the central threat to forests in Portugal.

The world's forests are affected on a yearly basis by extreme climatic events, wildfires, storms, diseases, and other disturbances (FAO, 2010a). However, studies discussing public opinions on forest ecosystem health and vitality are almost non-existent (EC, 2009). This lack of information is more evident for certain risks, such as the diseases affecting forest health and storms, than to forest fires. Generally, forest health is regarded as fairly poor as the European public believes that the forest area, the forest biodiversity and the general health of the forest are reducing and storms and other damages to forests are increasing (Rametsteiner and Kraxner, 2003; EC, 2009). However, data provided by international and European reports reflect an increase of forest areas and an improvement in forest health (FAO, 2007a; FAO, 2011; Forest Europe, 2011) and thus contradict public opinion.

Wildfires are one of the most important threats affecting the Mediterranean region, and Portugal is in the top of the most affected EU countries (JRC/EU, 2010). In terms of public opinion in Europe, forest fires are also perceived as a major hazard, especially in southern countries (EC, 2009). Public opinion in Portugal is unanimous in pointing out forest fires as the central threat. This was observed in European surveys (EC, 2009), in nationwide surveys (Colaço, 2006, Galante et al., 2009; Ribeiro et al., 2012; Coelho et al., 2012) and in small case study surveys (Deus, 2010; Ribeiro et al., 2010).

Mediterranean fires are caused by people (FAO, 2007b). The official causes in Portugal are the negligent use of fire, especially in relation to farming practices and arson (Damasceno and Silva 2007; Colaço, 2006). When we take national public opinion surveys into consideration, the same



causes are highlighted, but arson represents the cause mentioned most (Colaço, 2006; Galante et al., 2009). In fact, throughout the world, arson is frequently reported as the main cause of forest fires, occurring as a form of protest, vengeance or entertainment (FAO, 2007b).

But the ignition causes are only part of the problem. Wildfires tend to be intense in Mediterranean areas and the catastrophic fires of 2003 in Portugal were also linked also to an extreme meteorological situation and excessive near-ground fuel loads associated with the abandoning of rural land (CNR, 2005; Pinho et al., 2005). Fires have been especially frequent in the maritime pine and eucalyptus forests in central-northern and southern-central regions of Portugal, which are the main afforestation and reforestation species of the Mediterranean basin and are particularly flammable (Conacher and Sala, 1998; Fernandes, 2007). Rural out-migration triggered the advance of forests and of shrubland in abandoned agricultural areas, promoting the development of extensive areas of forest monoculture (PNDFCI – Council Resolution no.65/2006, 26 May). Moreover, minimal forestry interventions needed for fire prevention are scarce at small-scale private forests, where, on many occasions, forest owners often intentionally choose not to intervene in their properties (Mendes, 2003; Radich and Baptista, 2005).

While it is consensual that the absence of forest management contributes to fire hazard, there is a widespread feeling that there is no control over fire hazard in Portugal (Galante et al., 2009). Public awareness campaigns have been oriented towards increasing citizens' responsibility (Damasceno and Silva, 2007); but people usually attribute responsibility to public authority and to other stakeholders, thus minimizing their own responsibilities. The same can be said for forest owners and forest or farmer associations (Galante et al., 2009).

Hypothesis 4: There is a pessimistic view about the future of forests and forestry.

In the past, the complementary nature of agriculture and forestry had performed an important role in the Portuguese rural economy. This complementarity had also contributed to develop a balanced landscape with lower fire risk (Mendes, 2008). But the rapid land use changes and the socio-economic transformations have placed the traditional rural activities in an economically marginal position. This was caused by the process of rural abandonment, by the tertiarization of the active population and by the increasing dependency of the rural families on the State, such as age pensions or jobs in the public services (MADRP, 2007). This occurred not only in Portugal, but also in other European rural areas (Elands and O'Leary, 2002).

Nowadays, forest is a very important activity not only because the increase of forestland to former agricultural lands but also because of its economic weight, expressed in the three main production ranks: pulp and paper, cork and timber supplier. However, especially due to the weight of the forest smallholdings and to fire hazard, the contribution of the sector to the income of the rural households is quite low.

There are also different opinions about how forestry can best serve the rural development (Elands and O'Leary, 2002). Some studies across Europe have demonstrated that forestry is not always perceived as positive, depending on the type of area and of forest cover (Elands and Wiersum,



2001; Elands et al., 2004; Elands and Praestholm, 2008). For instance, multifunctional forests seem to be more accepted by local communities than the production areas (Elands and Wiersum, 2001). The most negative aspects of forests were also perceived in afforestation areas when compared to traditional forest areas (Elands and O’Leary, 2002; Elands et al., 2004; Ní Dhubháin et al., 2008). These perceptions are probably related to forest species type, the type of management and the relationship to and familiarity with forests in traditional forest areas.

Social perception of forests are related to what people perceived in the past (EC, 2009) and it is difficult to build future scenarios, which will be different according to the local conditions and the problems of each European rural area (Elands and Praestholm, 2008). Generally, forestry is not seen by the public as a major rural development option for the future as public establishes a negative association of forestry with employment opportunities, industrial activities and relationships between neighbours (Elands et al., 2004). In this sense, it seems that landowners’ preferences for future development are strongly related to employment opportunities and that forest increase is not viewed as an option to fulfil this objective (Flécharde et al., 2006).

4.3. Research design

With the aim of understanding different views of forest and forest management, a stakeholder perception survey was carried out in the municipality of Mação. This municipality has suffered a massive process of large scale migration to Lisbon and rural abandonment. Forestland (either natural regeneration of maritime pine or eucalyptus plantations) and shrubland are the current dominant land uses. Forest wildfires affected 85% of the forest area in the municipality of Mação in 2003. The case study was already presented in Chapter 3, Section 3.4.1.

4.3.1. Methodology

The survey presented in this chapter aims to establish the basis for a social learning process on SFM, analysing different and potentially conflicting perceptions and views over forest management in the municipality of Mação. Two questionnaires were implemented during 2010 (first phase) and 2012 (second phase³⁶) by trained interviewers. National technicians were sent a survey by email. The main questionnaire (Q1 template in Annex 2) was applied to all respondents and the second questionnaire (Q2 template in Annex 3) was only applied to forest owners. The questions were prepared based on the input from several experts in the field, including international and national academics, as well as forest technicians. Q1 included 30 questions, the majority related to the forest in Mação, and this was divided into four sections:

- i) respondent’s socioeconomic characterization: age, gender, education level, residence and their role concerning forestry or other rural activities;

³⁶ Part of the data survey was collected under ForeStake project (PTDC/AGR-CFL/099970/2008) - The role of local stakeholders to the success of forest policy in areas affected by fire in Portugal - funded by FCT with co-funding FEDER, through COMPETE programme.



- ii) their opinion on forest values and problems affecting forest management: types of forest; role and functions of forest, problems and constraints of the sector, measures and solutions to improve forest management;
- iii) their perception of fire hazards: causes, impacts and existent and potential measures to fire prevention and mitigation; and
- iv) their views over the future of forest and other rural activities.

The second questionnaire (Q2) included 13 questions mainly related to a general characterization of the forest owner profile and the type of management performed by forest owners living in the municipality of Mação.

The survey was focussed on addressing differences and similarities between different types of stakeholders. The selected stakeholders included governmental and non-governmental decision-makers and technicians, private sector, forest owners and producers, farmers developing complementary activities (such as grazing, agriculture, hunting and apiculture) and other citizens. Besides integrating people with different relationships within the territory and forestry, the survey included both technical and social perspectives and national and local perceptions.

For data analysis, four stakeholder groups were created from a total of 353 complete questionnaires (see: Table 3.1 in page 59):

1. **National technicians** (N=13): 4% of the respondents, including stakeholders (both decision-makers and technicians) from national and regional entities (Institute for the Conservation of Nature and Forests - ICNF, National Institute of Biological Resources - INRB, Coordination Commission for Regional Development of the central region of Portugal - CCDR-C and Regional Department of Agriculture and Fisheries of the central region of Portugal - DRAP-C. The Water Institute (INAG) and the National Authority for Civil Protection (ANPC) were also contacted with no success;
2. **Local technicians** (N=17): 5% of the respondents, representing local stakeholders from local GO (Municipal Council, parishes' council, National Republican Guard - GNR) and NGO (forest association, Forest Intervention Area - ZIF - founding groups, fire brigade, hunting association and apiculture association). This group included local technicians and members of local associations;
3. **Forest owners** (N=208): 59% of the respondents, representing landowners living in the municipality of Mação above 18 years old;
4. **Other citizens** (N=115): 32% of the respondents, including inhabitants above 18 years old in the municipality of Mação. These respondents do not own forest properties.

The selection of the inhabitants (forest owners and other citizens) was based on quota sampling, using preliminary data from Census 2011, Statistics Portugal²⁸. In 2011, there were 6,497 inhabitants above 18 years old living in Mação and 5% of those inhabitants were randomly



approached by the interviewers in public areas, such as streets, gardens, public facilities, etc., to complete the questionnaires.

Table 4.2 indicates the distribution of the inhabitants and respondents selected in the municipality of Mação by sampling criteria: age, gender, schooling and livelihood. The sampling quotas were representative regarding the inhabitants' features. Respondents were evenly distributed by gender, but more than 40% of the respondents were older than 64 years old, with low education and were living from old age pensions.

Table 4.2: Inhabitants over the age of 18 and sample distribution per selected criteria

Sampling Criteria		Inhabitants ≥ 17 years old	Proportion (%)	Respondents ≥ 17 years old	Proportion (%)
Gender	Male	3040	47	153	47
	Female	3457	53	170	53
	Total	6497	100	323	100
Age	18-24 years old	411	6	19	6
	25-64 years old	3196	49	161	50
	More than 64 years old	2890	45	143	44
	Total	6497	100	323	100
Education	Illiterate	1349	21	55	17
	4th Grade	2384	37	128	40
	6th Grade	658	10	29	9
	9th Grade	1015	16	52	16
	High School	628	10	30	9
	Graduated	463	7	29	9
	Total	6497	100	323	100
Main living source	Work	2315	36	116	36
	Unemployment benefit	76	1	12	4
	Old age pension	3127	49	147	46
	Family care	817	13	46	14
	Other situation	109	2	2	1
	Total	6497	100	323	100

Data was analysed using PASW Statistics 18 software, through frequency and cross-tabulations and bivariate analysis, particularly non-parametric tests, such as the Chi-square test of independence and Cramer's V to measure variables association.



4.4. Results of stakeholder perceptions

This section presents results of the stakeholder perception survey, highlighting the differences between technical and social perspectives and between forest owners and other citizens.

4.4.1. Who has a stake in forestry decision-making and intervention?

4.4.1.1. National and local technicians

Decision-makers and forestry technicians have an important role in forest management and planning due to their contribution both in designing policies, regulations, planning and management tools as in supporting and monitoring the implementation of those instruments. The differences between the perceptions of local and national technicians were analysed.

Both national and local technicians (30 respondents) who were surveyed were mainly men (23 respondents), between 30 and 64 years old (19 respondents), with a university degree (18 respondents), mostly in forestry sciences or engineering, or high school degree (10 respondents). All local technicians live in the municipality of Mação. The national technicians were all employees within the entity they represented in the survey.

When asked to identify the major aims of their organizations related with forest and forestry, the answers differed according to the level of intervention (Table 4.3). On a local level, fire prevention and mitigation was the most important function (Table 4.3). From the 13 national technicians interviewed nine belonged to the public authority for forests (ICNF), indicating the exploitation of the forest, the support of the forest private sector, forest fire prevention and the restoration of burned areas as the main functions of that entity. The conservation of biodiversity and SFM promotion were also mentioned by national and regional technicians (Table 4.3).

Table 4.3: The major aims of the organizations as outlined by the respondents

Organization's aims	National technicians		Local technicians	
	Respondents	%	Respondents	%
Exploitation of the forest	6	46	2	12
Support of the forest industries	5	39	0	0
Forest fire prevention	5	39	11	65
Restoration of burned areas	5	39	1	6
Promotion of Sustainable Forest Management	4	31	4	24
Conservation of biodiversity	5	39	0	0
Constitution of Forest Intervention Areas (ZIF) and forest owners awareness	0	0	4	24
Other complementary activities (e.g. hunting, apiculture, fisheries, agriculture, etc.)	4	31	5	29
Other functions	3	23	3	18
Total	13	100	17	100



4.4.1.2. Forest owners and other citizens

The survey included 323 inhabitants (forest owners and other citizens) living in the Mação municipality. The characteristics of this group of respondents were presented in Table 4.2. In general, respondents were divided between men and women, over 40% were more than 64 years old, most of them had elementary school or were illiterate and almost 50% were retired (Table 4.2). The main former or current economic occupation of the respondents was as follows: suppliers, service providers and sale people (24%); farmers (21%); and industrial workers (19%). In the past, agriculture represented the main economic activity in the municipality. However, only 10% of the active respondents identified themselves as full-time farmers.

Forest owners were included in this group and were also evenly distributed between men and women and by all the Mação parishes. The main difference between forest owners and other citizens is age, as forest owners are usually older ($\chi^2(5) = 55.26, p \leq 0.05$). In fact, most forest holdings were inherited and for that reason the owners generally maintain the land registry until an advanced age. Some minor differences were also found in terms of education. Though the rate of illiteracy was similar for forest owners and other citizens (around 17% each), 50% of the forest owners interviewed only had elementary school. More than 50% of the forest owners were retired.

The questionnaire was first tested and applied in Amêndoa, Carvoeiro and Ortiga parishes. The first draft included a set of questions about complementary activities to forest. These questions were removed in the second questionnaire template due to the similarity of the results and also to reduce the time of questionnaire application. If we take only these three parishes into consideration, the findings suggested that subsistence agriculture was a frequent practice among the respondents, while grazing activities, hunting, apiculture and fishery were rarely identified. Concerning agriculture practices, these were much more common among forest owners than among other citizens (Figure 4.1). This finding confirms the existent complementary nature of forestry and agriculture.

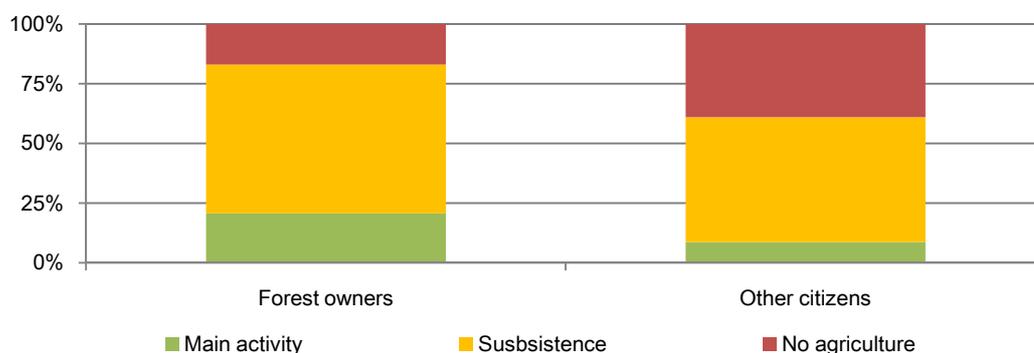


Figure 4.1: Practice of agriculture by forest owners and other citizens in Amêndoa, Carvoeiro and Ortiga parishes



The forest in the municipality of Mação is owned by small-scale private forest owners. The forest owners interviewed indicated the approximate number and size of their forest holdings. In terms of numbers, the answers were quite variable: 35% owned less than five plots, 34% owned between five and 10 and 28% owned more than 10 properties. Almost half of the forest owners indicated that the average size of their plots was below 0.5ha, and 34% mentioned plots of between 0.5 and 2ha, which are also rather small (Figure 4.2). Comparing the number of plots with the mean size of each plot, it was observed that 22% of the forest owners have less than 2.5ha of forest distributed by five different plots. In terms of forest management and planning, these scattered and fragmented holdings represent a huge constraint, increasing forestry intervention and operation costs, reducing market competitiveness and constraining potential multiple uses of forest or the implementation of integrated measures to prevent and mitigate forest fires.

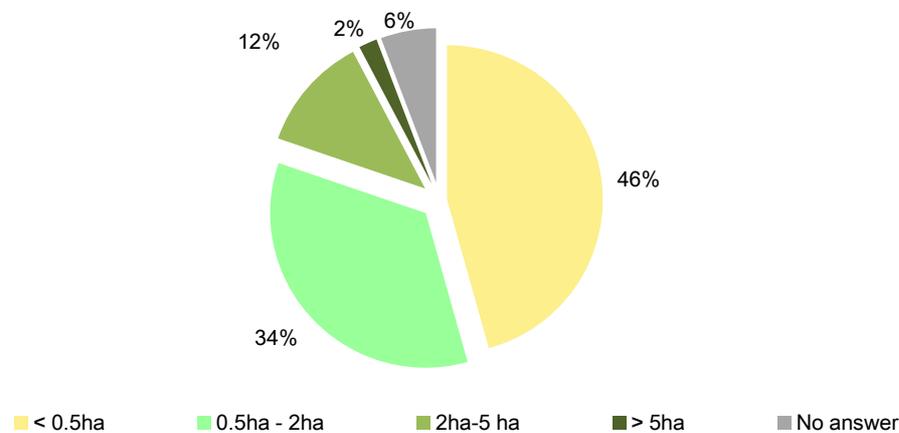


Figure 4.2: Size of forest holdings as indicated by forest owners in the municipality of Mação

4.4.1.3. The role of stakeholders in forestry intervention

Almost one quarter of the forest owners currently do not actively manage their properties while the majority (73%) manage their properties on their own (Figure 4.3). The standard chi-squared test of independence gave evidence of an association between the medium size of the plots and the type of management ($\chi^2(2) = 6.22, p \leq 0.05$), highlighting that forest owners with plots smaller than 0,5ha mentioned no intervention in their properties more frequently.

Concerning the type of forestry interventions, 93% of the 151 owners who manage individually, indicated the implementation of elementary actions to prevent fires, such as clearing the vegetal waste material, thinning and pruning (Figure 4.3). Many forest owners also mentioned logging (34%) and new plantations (29%). Despite the identification of forestry practices by most of the respondents, Mação's forest shows a high vulnerability to fire (Figure 4.4), due to the fast recover of vegetation and to the absence of balance in the landscape (extensive areas of monoculture, absence of buffer areas, etc.), which could be improved through the adoption of integrated management solutions.

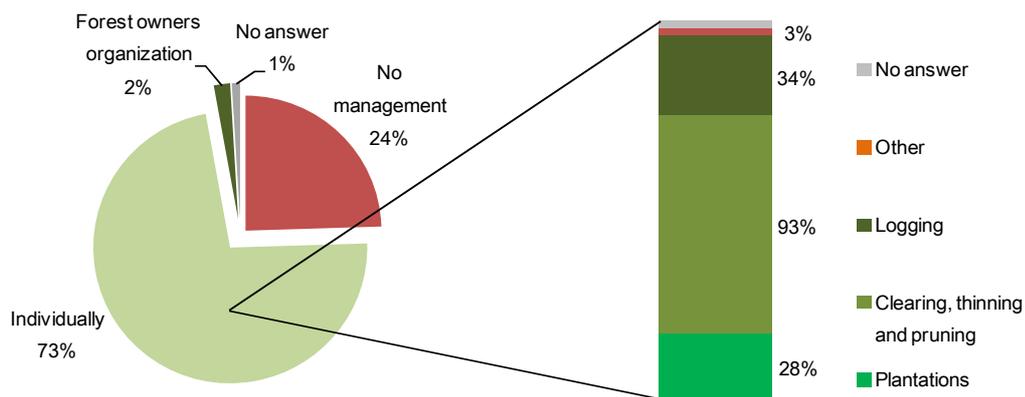


Figure 4.3: Types of forest management (left graph) and management activities as indicated by individual forest owners (right graph) in the municipality of Mação



Figure 4.4: Pine natural regeneration after fire (left); Pine area with no intervention (right) in the municipality of Mação

Although 14% of the forest owners questioned, identified themselves as members of a ZIF, only 2% were actually managing their properties within a management organization (Figure 4.3). This situation is linked to the stagnation of the ZIF process, already discussed in Chapter 3. The ZIF members included in the study believed that forest management would only be possible through forest owners' organizations. The forest owners who did not belong to any organizations were also asked to give their reasons for not adhering to this process and the answers were mainly linked to the lack of knowledge about ZIF (41%) and to the absence of ZIF in their area (12%), but also with some disagreement with ZIF principles (12%).

The answers to the question 'who should be responsible for defining forestry interventions' were evenly distributed by the Municipal Council, the forest owners' organizations and individual forest owners (Figure 4.5). The responsibility for the implementation of forest interventions was attributed to the same stakeholder groups, but the individual forest owners were mentioned more frequently than the Municipal Council and the forest owners' organizations (Figure 4.6). The differences in the perceptions amongst local inhabitants (either forest owners or not) were mainly



related to their area of residence. In Carvoeiro parish (which was not affected by fire and with no ZIF constituted), 80% of the respondents identified individual forest owners as being those responsible for defining and implementing forestry actions. The respondents from Ortiga parish (which has a ZIF and tradition of landowners' cooperation) highlighted the role of forest owners' organizations (referred to by half of the respondents). In both parishes, the role of the Municipal Council was less important than for the respondents living in the other parishes. ZIF members included in the survey have also attributed more value to the role of forest owners' organizations.

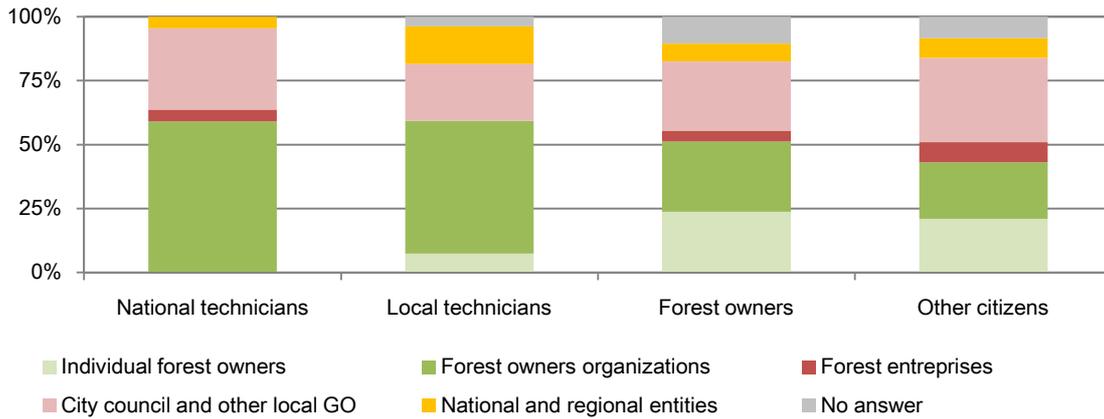


Figure 4.5: Answers to the question: 'Who should be responsible for defining forestry actions?'

If we take the national and local technicians into consideration, the major responsibility was attributed to forest owners' organizations, either in defining or in implementing forestry actions (Figure 4.5; Figure 4.6). These respondents downplayed the role of individual forest owners in the definition of forestry actions (Figure 4.5).

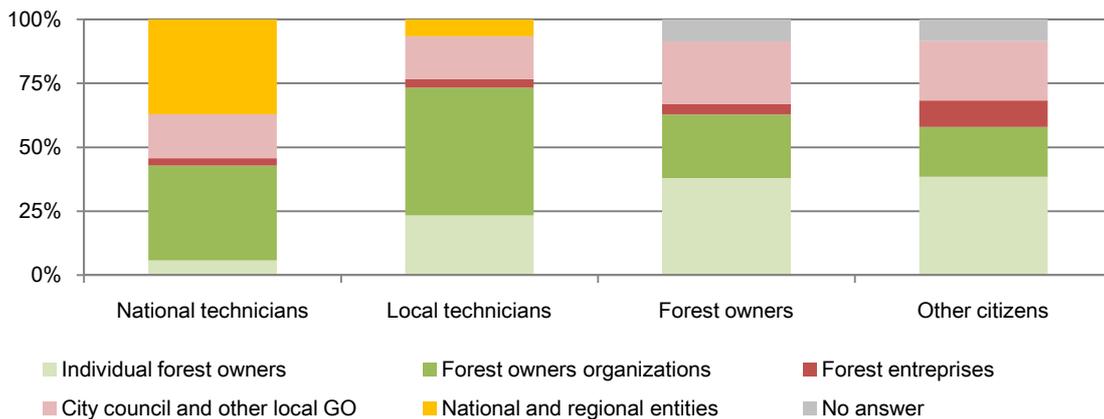


Figure 4.6: Answers to the question: 'Who should be responsible for implementing forestry actions?'



4.4.2. What is at stake in the Mação forest?

4.4.2.1. Functions of forests

Respondents were asked to identify the three most important functions of forest in the Mação municipality. A list with 12 functions was provided, varying from economic functions (timber production, employment), to environmental conservation and protection functions (biodiversity, soil and water, carbon sequestration) and to cultural and social services (aesthetics, leisure, etc.).

Timber production was the by far the function identified most in the survey by 92% of the national technicians, by all local technicians and by more than 70% of the forest owners and other citizens surveyed (Figure 4.7). In fact, the economic role of forest was prominent in both technical and social perceptions, where around 60% of the answers referred to the productive function of forests (timber and non-timber products) and forest's role in local employment. This economic vision of forests was even stronger in the technicians' opinions, as the three functions that were mentioned most by local and national technicians were economic functions. No major differences were found between the identification of this function and the characteristics of the respondents, such as age, gender or education. The production of timber and the other economic functions were considered as important for forest owners as for other citizens. This can represent a hidden contradiction between forest owners' perception and action, as even though they perceive the economic role of their forest, they are not willing to perform major investments, probably linked to the size of the land.

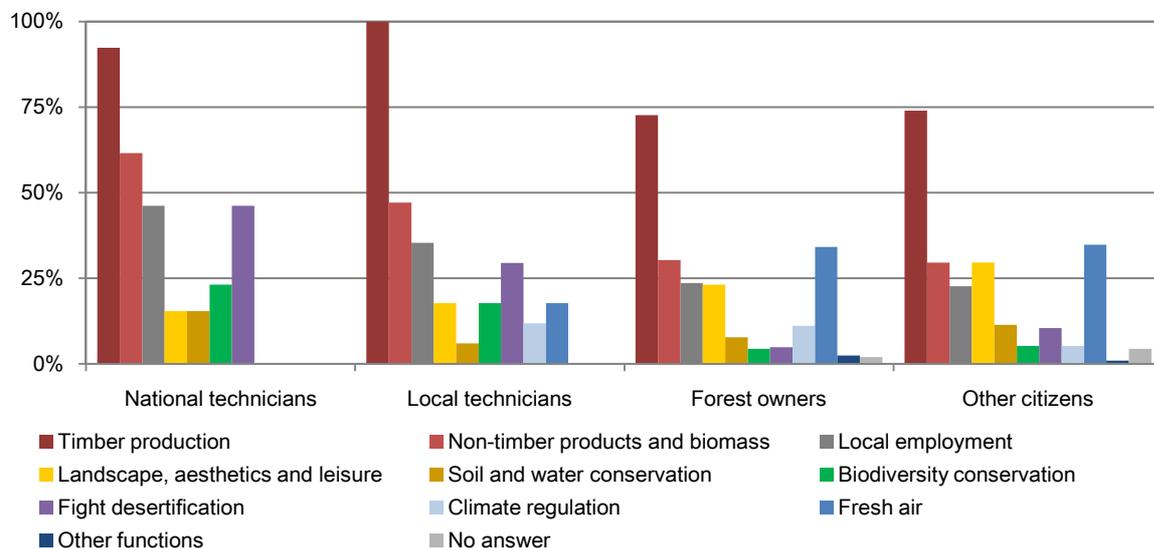


Figure 4.7: Main functions of forest in the Mação municipality as identified by the different stakeholders

The second most mentioned topic by forest owners and by other citizens was the role of forest as a source of fresh air (Figure 4.7), more frequently mentioned by female respondents (41% of the women compared to 28% of the men included in the survey). This issue reinforces the idea that



local inhabitants perceived their residence area as being more healthy and pleasant to live in than urban areas. For 46% of the national technicians and 29% of the local technicians, Mação forest has an important role to play in fighting desertification. Biodiversity conservation was also identified by 20% of the technicians. Both the role in fighting desertification and the role in conservation were hardly mentioned by forest owners or by other citizens. Around 25% of forest owners and other citizens surveyed identified the forests as an important contribution to aesthetics and to the promotion of leisure activities within the municipality (Figure 4.7), especially by younger respondents.

4.4.2.2. Expected type of forests

Forests and shrubland represent more than 85% of the Mação municipality. In order to assess whether stakeholders were satisfied with the type of forests, it was asked what kind of forests they would prefer to see in Mação. The results showed that the preferred type were the maritime pine production areas, mentioned by all respondents (Figure 4.8). National and local technicians were more in favour of eucalyptus areas than the forest owners and the other citizens (Figure 4.8). Cork areas as well as areas with multiple uses were also mentioned most by national and local technicians (Figure 4.8). These results highlight the importance of the maintenance of already present species, both in technical and social perceptions. The importance of seeing the multiple uses of the forest, such as grazing, hunting, apiculture and conservation, alongside the expansion of native species (e.g. *Quercus*) only emerged within technical perceptions (Figure 4.8). The conservation of biodiversity was however mentioned by 30% of the other citizens and recreation areas were pointed out by 18% of the forest owners and 17% of the other citizens (Figure 4.8).

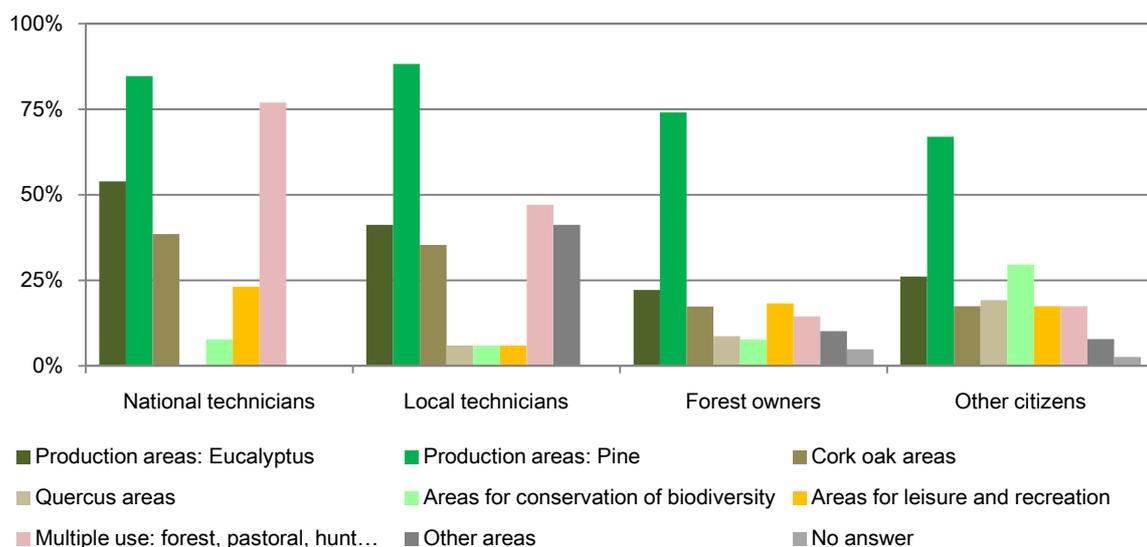


Figure 4.8: Type of forest preferred to the municipality of Mação as indicated by the different stakeholders



Analysing only the preferences of the forest owners and the other citizens at a significance level of 0,05, correlation was found between the preference for eucalyptus areas and the respondents living in two parishes with larger forest areas: Carvoeiro (not affected by last fires) and Amêndoa parishes (severely affected by fire in 2003). Forest areas for conservation, for leisure activities, for multiple uses and cork areas were the types of areas chosen most by younger and more educated respondents, who were probably more aware of the multifunctionality of forests.

4.4.3. What is hindering Sustainable Forest Management?

4.4.3.1. Main problems affecting forests and forest management

Respondents were asked to identify three or four major problems affecting forests and forest management in the municipality of Mação. The findings showed that there was a consensus concerning the major problems. Forest fires were the problem that concerned respondents (both technicians and citizens) the most, followed by ageing and depopulation and the abandonment of rural activities (Figure 4.9). However, while national and local technicians have identified other problems as important as the fire hazard, forest fires were the major problem for more than 80% of the forest owners and other citizens (Figure 4.10). All the main problems identified were related either with fire hazard or with socio-economic drivers of fire hazard.

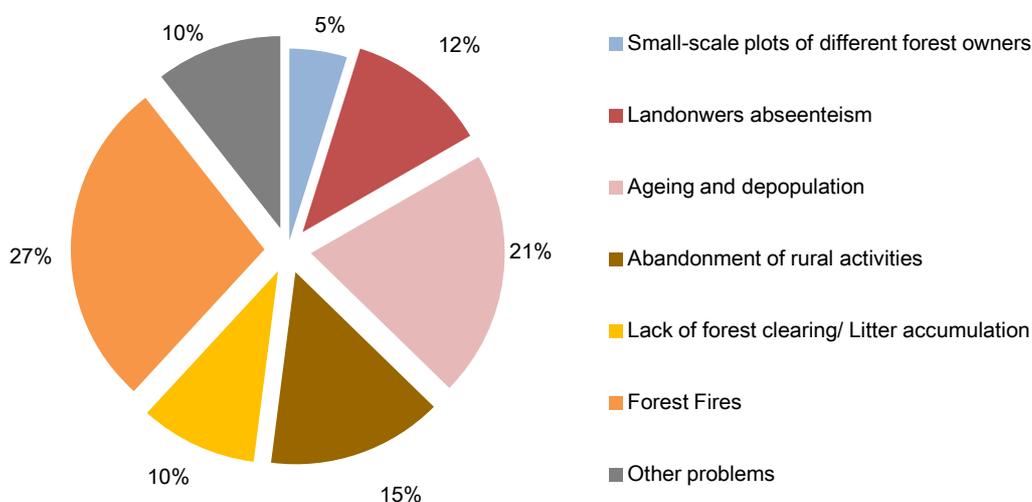


Figure 4.9: Problems affecting forest management in Mação indicated by the respondents

In terms of the differences between the different stakeholders, while national and local technicians have identified other problems as important as the fire hazard, forest fires were the major problem for more than 80% of the forest owners and other citizens (Figure 4.10). All the main problems identified were related either to fire hazard or to socio-economic drivers of fire hazard.

The ageing and depopulation and the abandonment of rural activities were also mentioned quite often by all type of respondents (Figure 4.10). These problems, which are related with rural



abandonment scenario, were mentioned less in Carvoeiro's parish (not affected by fire) when compared to other Mação parishes (affected by fire). The major difference between technical and social perspectives was the opinion about the small-scale forest holdings, which represented the major problem for national technicians (identified by more than 75%) and for more than 60% of the local technicians consulted. The small scale of forest holdings was not considered as a problem for forest owners or for other citizens (Figure 4.10), because they received the land by inheritance as it was.

The forest owners' absenteeism and lack of interest was the third most relevant perceived problem for local technicians (by more than 50%). This aspect was also mentioned by more than 30% of both forest owners and other citizens. Not clearing the vegetal waste material was also a problem mentioned by 34% of the forest owners and 27% of other citizens (Figure 4.10).

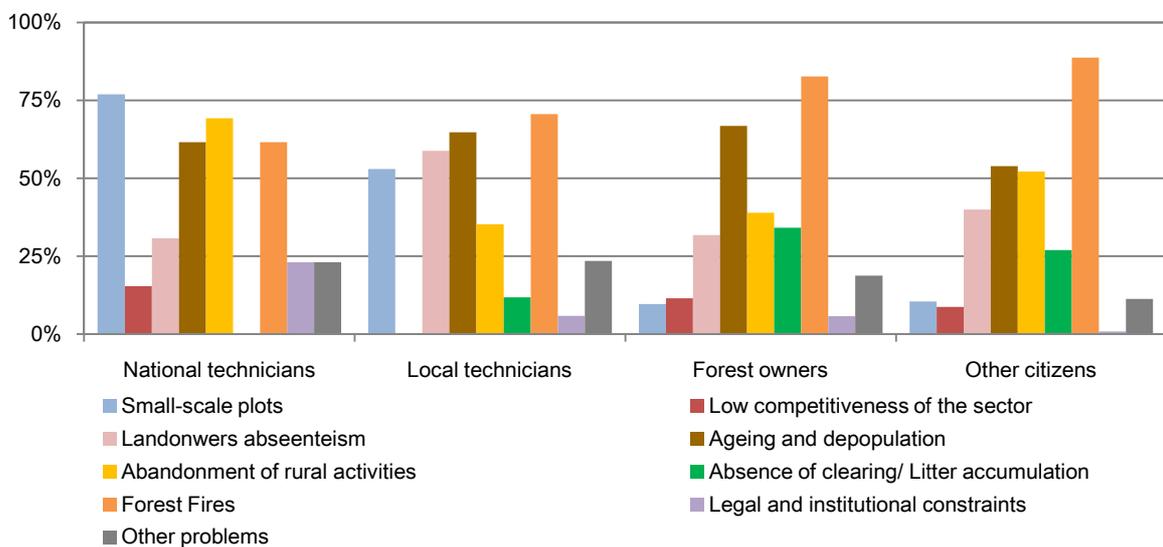


Figure 4.10: Problems affecting forest management in the municipality of Mação as indicated by the different stakeholders

Finding solutions to complex problems is not an easy task and 20% of the surveyed inhabitants (either forest owners or other citizens) were not able to identify existent or potential solutions to deal with the problems identified. Forest owners and other citizens identified 10 different measures for 12 problems. The solutions identified were the same for both forest owners and other citizens and were mainly related with incentives or penalties to compel and promote active forest management (33% of the inhabitants included in the survey). The definition and implementation of a rural development strategy was also identified by a quarter of the inhabitants.

The national technicians have proposed broad and generic solutions, such as: to develop a rural development strategy, invest in planning and rational exploitation of forests and to promote and support forest owners' organizations. Almost 60% of the local technicians surveyed have identified as a solution the implementation of a pilot ZIF in Mação or in similar areas. This aspect



was already presented in Chapter 3, discussing the ZIF approach and the stakeholder perceptions over the potential of this solution. It was concluded that the ZIF approach received considerable support from local technicians, but is not completely known by forest owners.

4.4.3.2. Forest fire hazard

Fire hazard has been particularly frequent and intense over the last 20 years, not only in the municipality of Mação, but in the whole of Portugal. The worst wildfire event (in terms of burnt area) occurred in 2003, being identified as the most relevant incident by 42% of the respondents (including all national and local technicians have indicated 2003). Almost half of the respondents did not indicate a specific year, referring to events 10 or 15 years ago. 2005 and 1991 were also indicated by more than 10% of the respondents.

Fire hazard was the central problem in the survey, not only because of the huge amount of damage it causes, but also because it represents a major constraint in future forestry interventions. Respondents were asked to identify the causes of forest fires in Mação, distinguishing between ignition causes and causes for spread. Three possibilities of ignition were considered: negligence, arsonists or natural causes. Two main causes of ignition were identified, but the answers were weighted different among the various stakeholder groups (Figure 4.11). While forest owners and other citizens clearly identified the arsonists as the major cause (identified by more than 75% of these respondents), local technicians were divided between arsonists and negligence (above 40% each). The indication of arson was however quite low among national technicians when compared with the other groups. Fire caused by negligence was also recognized by 22% of the inhabitants.

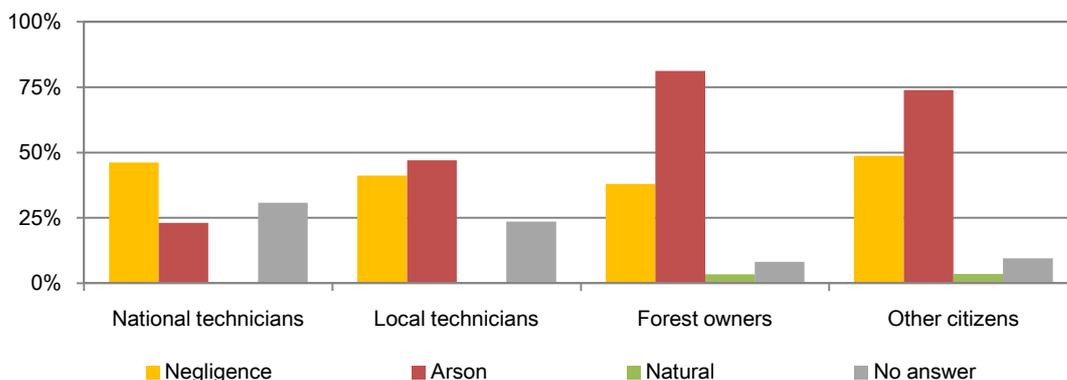


Figure 4.11: Causes of fire ignition in the municipality of Mação as indicated by the different stakeholders

The perception of the main causes for fire spreading varied according to the relationship people had with the Mação territory. Local technicians, forest owners and other citizens shared a similar opinion, attributing a major responsibility to the absence of forestry clearing and thinning and also to the climatic conditions in the area, namely high temperatures, low rainfall and strong winds (Figure 4.12).

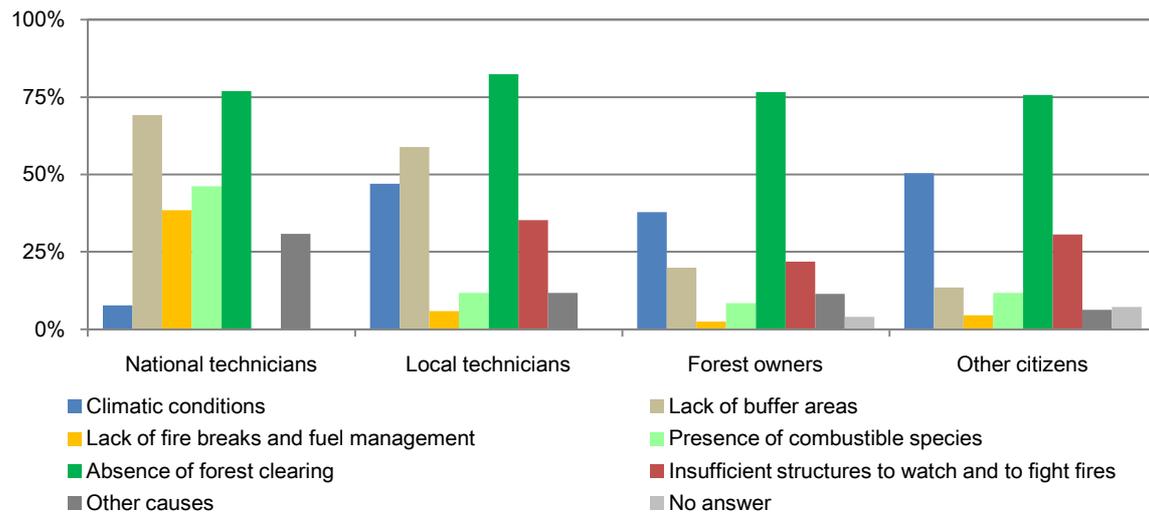


Figure 4.12: Causes for fire spreading in the municipality of Mação as indicated by the different stakeholders

The absence of forestry clearing and thinning was also mentioned by 70% of the national technicians (Figure 4.12). The absence of buffer areas, which were traditionally agricultural valleys or grazing areas, was also mentioned by national and local technicians. Half of national technicians also indicated the presence of combustible species and the lack of fire breaks and strips for fuel management (Figure 4.12). Finally, 35% of the local technicians and 24% of the local inhabitants identified the watch towers and the infrastructures to combat fire as insufficient or badly coordinated.

Analysing only the results from public opinions (forest owners and other citizens), a major difference was found related to the respondents of Amêndoa parish, who identified the insufficient and inadequate fire fighting structures. This parish was severely affected by 2003 and 2005 fires.

As far as the impacts of fires themselves are concerned, there were also differences between technical and social views (Figure 4.13). The answers of national and local technicians were divided between economic damages (48% of the answers) and environmental damages (42%), while the answers of forest owners and other citizens were mainly focussed on the economic damage caused (70% of the answers). The economic damage included timber losses and damage to houses and goods. The inhabitants who were surveyed mentioned the destruction of the local economic activities (referred to by 39% of inhabitants). The environmental damage was related to biodiversity losses and an increase in soil erosion and run-off. Around 20% of the forest owners and other citizens in the survey also indicated the various environmental impacts, but their main concern was related to air pollution. The health and the moral damages represented 10% of the answers mentioned by all the respondents.

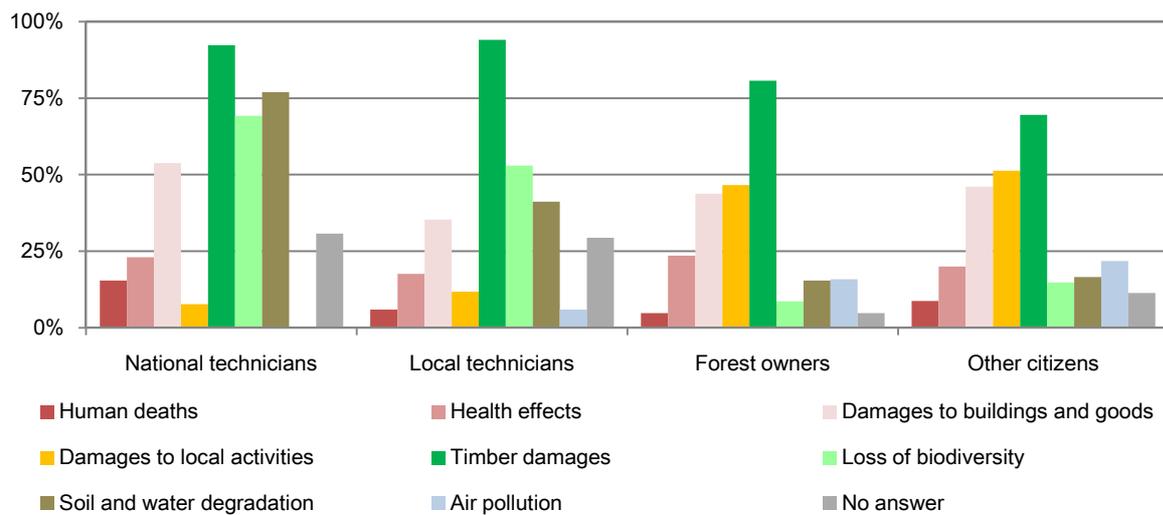


Figure 4.13: Impacts of fire in the municipality of Mação as indicated by the different stakeholders

Concerning the direct impacts of the fires on the forest owners themselves, it was observed that 92% of the forest owners included in the survey reported that their properties had already been affected by fires (once or twice). The standard chi-squared test of independence gave no evidence of an association between the size of forest plots and the incidence of fire ($\chi^2(2) = 0.56$, $p = 0.76$).

If we consider the forest owners who have been affected by fire, 89% referred to losses in economic value of their timber. Other less mentioned impacts were: the loss of other non-commercial goods, the decrease of land value, the destruction of water pipes and electric cables and the deterioration of soil quality.

The ideas of the respondents on the measures and actions needed to be enforced to deal with the hazard varied depending on the type of respondent questioned. While the views of the inhabitants and of the local key-stakeholders were focussed on the need to clear the forest and on the punishment of absentee forest owners and of arsonists, the national key-stakeholders identified the need for forest planning and forest owners' organizations. The issue of forest planning was also considered to be important by local key-stakeholders.

4.4.4. What are the future perspectives regarding forests and rural development?

Respondents were challenged to predict what will be the future changes in the main land uses and in forestry activities in the municipality of Mação. Overall, no major differences were found between technical and social perspectives. If we take the three main land uses of Mação – forest; shrubland and agriculture - into consideration, the majority of the respondents reported a potential increase in forest and shrubland and a decrease of agriculture (Figure 4.14). National technicians were more consensual in terms of this trend when compared to the results at local level, for local technicians, forest owners and other citizens. In fact, one quarter of these local respondents maintained that a potential increase on agriculture because of the current economic situation of the country and the trend in the population return to the countryside (Figure 4.14).



Forest owners and other citizens included in the survey were also divided in terms of what will happen to forest in the forthcoming decade, between an increase and maintenance of the current forest area.

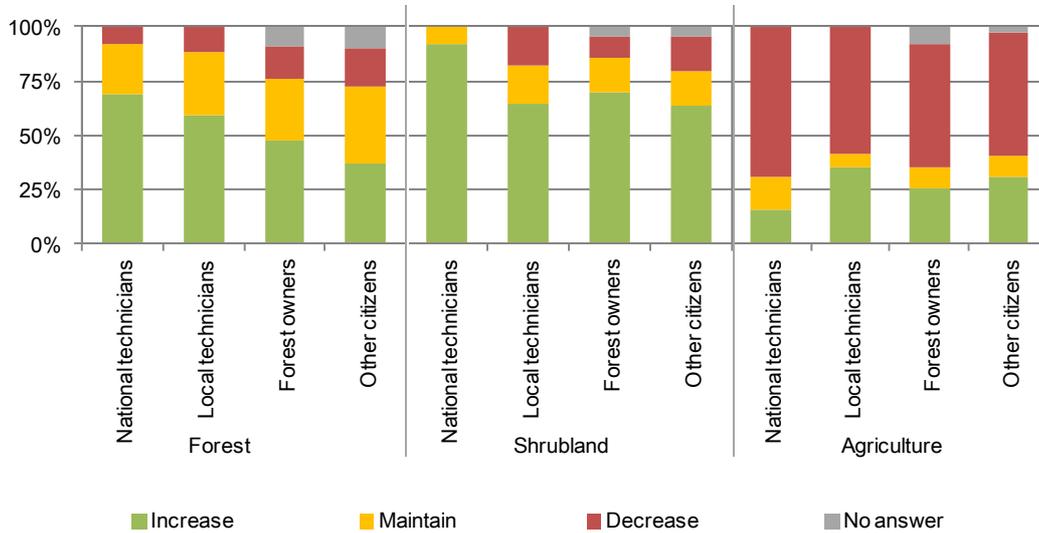


Figure 4.14: Perspectives over future land uses as indicated by the different stakeholders

Concerning the evolution of timber production areas, the respondents at local level were evenly divided between an increase, maintenance and decrease, but the majority of national technicians pointed out a decrease (Figure 4.15). It was also identified a negative trend in terms of future financial investments on forestry, where almost 70% of the respondents indicated that the investments will decrease or be maintained in the future (Figure 4.15). Regarding forest contribution to leisure and recreation amenities, more than 60% of the national technicians and almost 50% of the local technicians mentioned a potential increase in the future (Figure 4.15). Forest owners and other citizens were less optimistic in this topic.

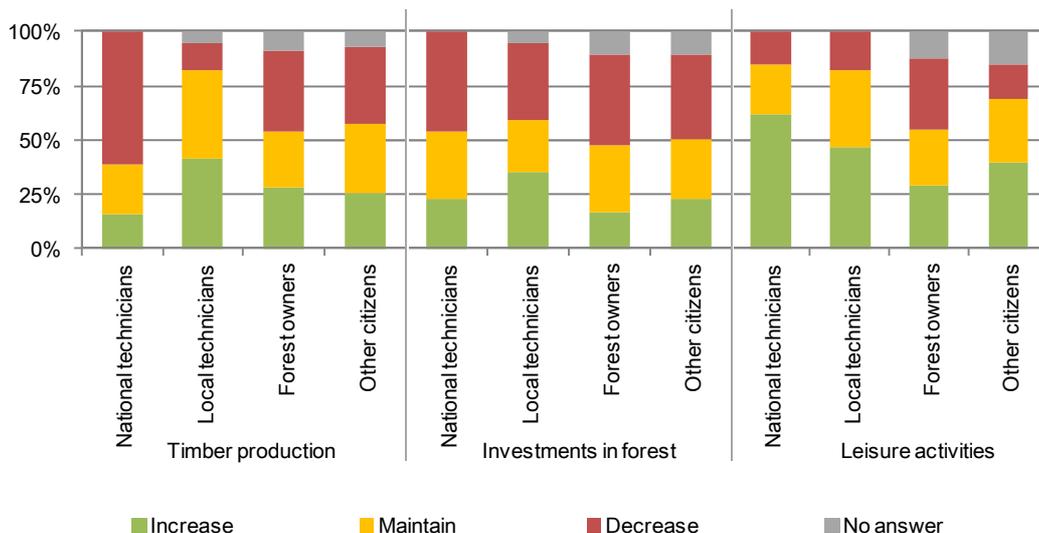


Figure 4.15: Perspectives over future investments as indicated by the different stakeholders



In terms of the forest species, respondents are consensual in saying that the areas occupied by *Pinus Pinaster Ait.* will not increase and the areas occupied with *Eucalyptus globulus* will increase in the future in the municipality of Mação (Figure 4.16). The analysis of Figure 4.14, Figure 4.15 and Figure 4.16 shows that forest owners presented the most pessimistic views in terms of the future of forest in the municipality of Mação.

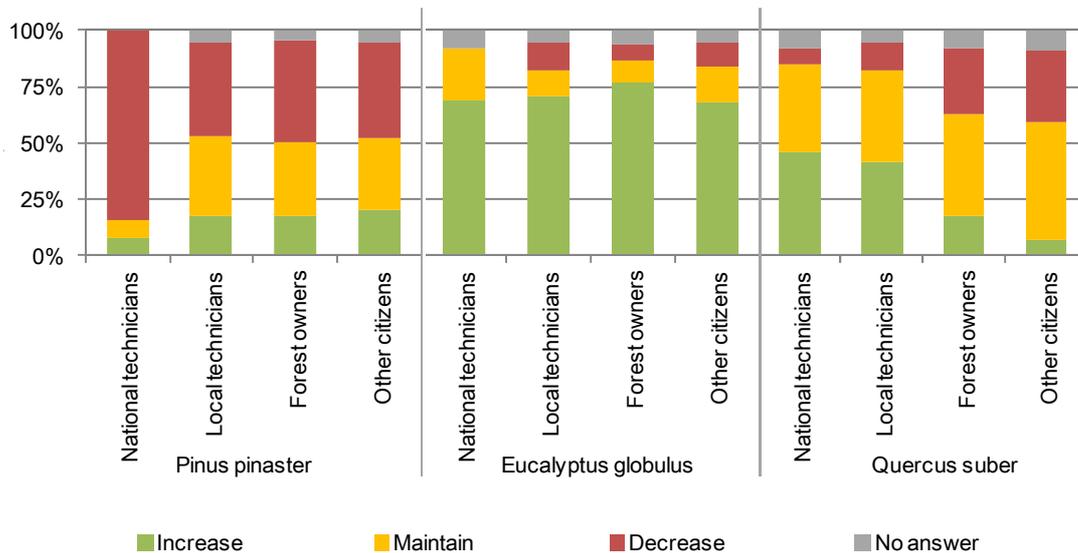


Figure 4.16: Perspectives over the changes in forest species as indicated by the different stakeholders

The perceptions of future fire hazard in Mação were also divided between maintenance and increase (Figure 4.17). The most positive vision came from the national technicians, where only 23% indicated a potential increase of forest fires in the municipality of Mação. In the remaining stakeholder’s groups around 30% pointed out a possible increase and around 40% perceived a maintenance.

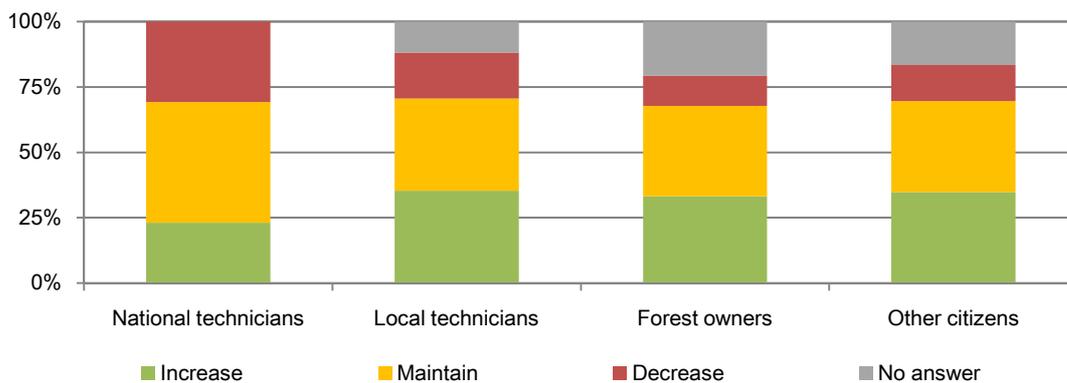


Figure 4.17: Perspectives over the future of forest fire occurrence in the forthcoming decade in the municipality of Mação as indicated by the different stakeholders



Three scenarios concerning the future of forest areas in Mação were proposed, asking respondents to indicate which one would be most likely to occur in the future. The scenarios were:

- i) Scenario 1: Forest areas will be combined with agricultural areas, grazing areas, areas for environmental conservation, leisure areas, among others.
- ii) Scenario 2: Forest areas will be mainly occupied by eucalyptus and maritime pine for timber production.
- iii) Scenario 3: Forest will burn continuously and will be progressively substituted by shrubland.

National and local technicians were more positive towards the future of Mação, as more than 30% of both national and local technicians have chosen Scenario 1 (Figure 4.18). This scenario was chosen only by 14% of the forest owners included in the survey and by 19% of the other citizens (Figure 4.18). Forest owners and other citizens were divided between a scenario where forest fires will continue to occur and forest area will be progressively substituted by shrubland (Scenario 3) and a productivist scenario, where timber production is the main function of forest (Scenario 2). Scenario 3 was also the response of 43% of local technicians and 31% of the national key-technicians. A potential contradiction emerged here, as Scenario 2 was selected by more than 30% of the inhabitants questioned, but the increase of timber production was less identified by the same respondents (Figure 4.15).

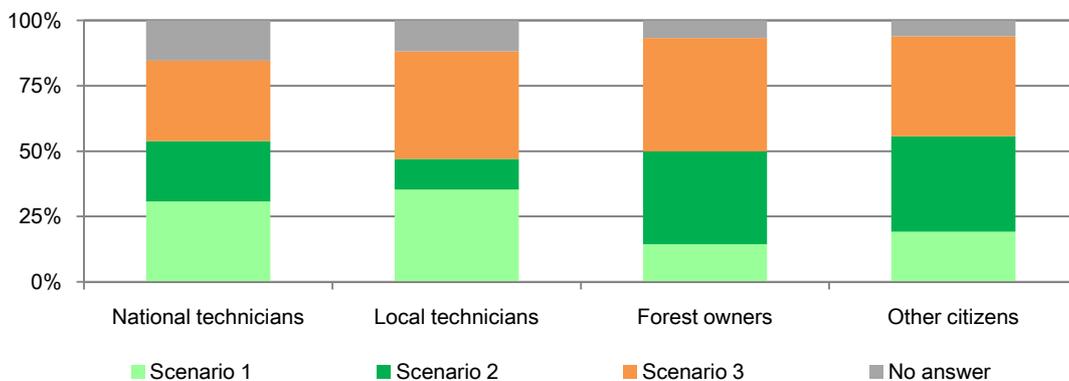


Figure 4.18: Perspectives over the future scenarios for Mação municipality as indicated by the different stakeholders

The standard chi-squared test of independence provided evidence of an association between forest owners and other citizens' residence and the selected scenario ($\chi^2(14) = 44.02$, $p \leq 0.05$). Thus, half of the respondents from Ortiga parish indicated scenario 1, illustrating a reality already existent, as this parish already combines different types of land uses and activities. Scenario 1 was also more chosen by inhabitants that agree with ZIF approach.



4.5. Discussion

This section discusses the theoretical assumptions in the light of the findings of this study. It aims to describe the type of forest owners and their management practices and to assess multiple views about forests and forest sector, identifying key areas underlying SFM.

4.5.1. The role of forest owners in forest management

The findings in the survey have shown evidence to confirm part of the first theoretical assumption: *a shift from classic owners to hobby owners or indifferent owners is occurring in private small-scale forest holdings*. Thus, it was observed in the municipality of Mação a transition from *classic and economic-oriented forest owners* (where forest owners lived from agriculture and forestry) to the emergence of *indifferent owners* with no interest in the forest besides owning it and keeping it within the family or as a reserve for the future, as they are elderly people and only own small forest holdings. This idea was also supported in other studies where the *classic forest owner* is giving way to new types of forest owners, described as *hobby owners*, who only have a modest interest in forestry and a recognition of the environmental role of forestry (Boon, et al., 2004), or *indifferent owners*, with even less interest in the forest due to the low economic importance of the forest to the household income (O’Leary and Elands, 2002; Wiersum et al., 2005).

This idea is also supported by the forest owners’ typology described by Baptista and Santos (2005), where similarities with Mação forest owners were found in three of the types proposed:

- i) Ownership-stock: characterized by properties with no investment or intervention and kept as a reserve for an emergency situation. This type of owner received the land by inheritance, usually lives outside the countryside and owns small properties with maritime pine natural regeneration.
- ii) Work-stock: characterized by no investment with only small interventions performed by the owners. Small-scale properties with maritime pine, seen as a reserve to get some income.
- iii) Exploitation-stock: Forest owners still make some investments and interventions, but they use the forest as an occasional source of income and as a reserve to meet unplanned expenses. These are also small-scale owners with eucalyptus plantations.

The findings about the profile of forest owners has shown that besides the absentee owners who live in the city, forest owners living in Mação are old and retired people with small properties of maritime pine and eucalyptus. They do not depend economically upon the forest and usually make no or little investment in their properties. Nevertheless, these owners are quite attached to the idea of the forest as a legacy. Mação forest owners used to combine agriculture, grazing and forestry activities as full time activities. However, due to the migration of people from rural to urban areas in search of new opportunities and due to the intense wildfires, the forest owners has



changed into a more indifferent kind of owner, who owns smaller forest plots and does not have economic or others objectives as far as the forest themselves are concerned.

Most forest owners surveyed said that they make small interventions in the forest, such as clearing the vegetal waste material, thinning, pruning and logging. This has also been observed in other studies in Portugal, in which most forest owners likewise mention 'managing' their properties (Galante et al., 2009; Ribeiro et al., 2010). However, in the municipality of Mação, it has become increasingly hard to find forest areas with proper management. The type of forest owners described as *hobby owners*, who emphasized the multifunctional role of forestry, were not identified as a group in the survey. In fact, the forest owners surveyed did not give any relevant value to the environmental role of forests.

Small scale forest holdings in Portugal are mostly seen as a family inheritance and an economic reserve, which along with fire hazard, leads to the idea which is supported by many small-scale forest owners, namely that no intervention is the only viable solution for their properties (Radich and Baptista, 2005). The findings also demonstrated this sense of ownership, where the landowners' organizations were not recognized by most of the forest owners and other inhabitants as a solution and the small scale forest itself was not mentioned as a problem. Another study about Portuguese forest owners also showed that only a residual part of private forest owners participated in forest owners associations, and they thought that these organizations should perform tasks according to their individual interests (Baptista and Santos, 2005). In the municipality of Mação, forest owners' organizations have made the first step with the creation of the forest association of Mação - AFLOMAÇÃO - and the ZIF approach development.

There is widespread awareness that there is a need for the joint intervention of forest owners, both for national key-stakeholders, as well as for local key-stakeholders. This was evident in the findings, where great support was found concerning ZIF implementation both at local as national levels. If the landowners' organizations do not work in small-scale private forest areas, the only possibility left will be to let the State take care of forest areas owned by absentee forest owners (Borges e Amaral, 2009). In both cases knowing who the forest owners are and knowing their values, preferences, interests and behaviours is very important.

4.5.2. The role of forests and forestry

Contrary to the initial assumption, where it was stated that forests and forestry are increasingly valued for their environmental amenities, the survey's findings have highlighted the importance of the productive function of forest in the municipality of Mação, not only from the point of view of the public, but also from a key-stakeholder's perspective. This can be explained by the factors underlying perceptions about forestry presented by Ní Dhubháin et al (2009), such as the history of the place, the history of forest cover and the geographical and socio-economic characteristics of the area. Portuguese forest areas have increased either through State intervention or in most cases through the intervention of private forest owners, especially when it comes to market and



production logic, rather than from an environmental dimension (Coelho, 2002; Coelho, 2003; Baptista and Santos, 2005). This was reflected in the central region of Portugal which is made up mainly of afforestation or reafforestation areas with *Pinus pinaster* and *Eucalyptus globulus*.

The low levels of mention of environmental functions by the public, as seen in this study, could well be linked to the existent type of forest species, which are mainly oriented towards timber production and to pulp industries. This is in line with some studies which found more negative perceptions about forests and forestry in Atlantic countries and afforestation areas, when compared to central and Mediterranean Europe countries and traditional forest areas (Elands et al., 2004; Ní Dhubháin et al., 2009). The EC (2009) survey, however, which included data from Portugal, went in a different direction showing that 60% of the Portuguese respondents (N=353) ranked forest protection as their first choice in terms of key concern regarding forest. But this finding is probably related with Forest Protection against Fires (DFCI) and less with biodiversity conservation and climate change mitigation, as wildfires were also identified in this study as the major global concern for the forest in Mação.

In fact, the environmental awareness of the value of forests is still not really an issue from the perspectives of both farmers and forest owners. Environmental awareness mainly springs from external pressure (Baptista and Santos, 2005). This was also observed in the current study, where the preferences of forest owners and of other local inhabitants concerning the suitable type of forest for Mação were quite similar to the existing forest – maritime pine and eucalyptus. However, some resistance to the eucalyptus specie was found on local perspectives because these areas were seen as suitable to less than a quarter of the inhabitants. The technicians indicated also the importance of production areas; however in this group the multiple uses of forests, the cork areas, the role of forest in fighting desertification and for soil and water conservation were important aspects.

A neglected aspect within the European surveys (EC, 2009) was the recreational role of forests. This aspect and the role of the forest to local aesthetics were valued issues in the municipality of Mação, especially among the local population. This might be related to public and private investments in leisure areas and infrastructures within the municipality (Figure 4.19).



Figure 4.19: River beach in Carvoeiro, Mação (left); Windmill for rural accommodation in Vale do Grou, Mação (middle); Picnic area in Chão do Brejo, Mação (right)



4.5.3. Forest fires

The survey's findings have confirmed that forest fires are a major perceived constraint to forest management in the Mação municipality. In fact, all the respondents had experienced several forest fires and more than 90% of the surveyed forest owners had been directly affected. This was not only observed in Mação case study but also in other areas of central Portugal (e.g. Ribeiro et al., 2010). In fact, official data and social perceptions are the same when it comes to the issue of fire as being the main problem affecting forests in Mediterranean Europe and in Portugal. Portuguese public opinion indicate wildfires as a major threat to forests' health and vitality (EC, 2009; Galante et al., 2009), and a major environmental problems in Portugal (Almeida, 2001; Delicado and Gonçalves, 2007). This could be linked to the succession of forest fires on a yearly basis and also to the attention that the media gives to this topic during summer season.

The social risk perception relies on an intuitive evaluation of the risk, integrating qualitative reflections like fear, catastrophic potential, trust in management, familiarity with the source of risk and acceptance or degree of control over the risk (Slovic, 1987; Flynn and Slovic, 2000; Figueiredo et al., 2009). In this sense, experiencing an event can sometimes help people reduce the perceived risk and even cope with it (e.g. Figueiredo, et al., 2009; Valente et al., 2011b). This is not the case of fire hazard, where its catastrophic potential and the widespread public feeling of having no control over it (Galante et al., 2009), have made forest fires the key concern regarding forests.

The findings of the current study show that the social perception of the causes of fire in Mação are related to arson or negligence and are aggravated by climatic conditions and by rural and land abandonment. This is confirmed by the European and national institutional reports (FAO, 2007b; MADRP, 2007) and by other studies (Piussi and Farrell, 2000; Colaço, 2006; Damasceno and Silva, 2007; Galante et al., 2009; Coelho et al., 2012; Ribeiro et al., 2013).

Some public opinion studies on social perceptions regarding forest fires showed that many forest owners claimed to manage their forests and to invest some money in their properties (Galante et al., 2009; Ribeiro et al., 2010). European experts also considered that the public usually see their forest management practices as positive (EC, 2009). The present study identified some controversial findings on this topic. On the one hand, more than 70% of the forest owners included in the survey indicated some management activities in their properties (such as clearing, thinning and pruning); on the other hand the abandonment of rural activities, the lack of forest clearing and the landowners' absenteeism were identified by all stakeholder's groups as important problems in the municipality of Mação.

The assumption that the *absence of forest management is recognized as a main driver to forest fires* - which are the central threat to forests in Portugal - can be confirmed by the Mação study case. However, forest owners and inhabitants in Mação did not recognize their direct responsibility towards the problem, which is line with the Galante et al. (2009) findings. In Mação, the fast natural regeneration of the vegetation and the absence of forestry intervention have



been leading to a cycle of repetitive and successive wildfire events. In this sense, many times small-scale forest owners often believed that no intervention is the most reasonable decision (Radich and Baptista, 2005) because they do not believe that the investment will be compensated for in the future. This problem is of huge significance, especially when you consider that just one individual decision concerning 0,5ha of forest can affect other contiguous forest owners' decisions, starting a snowball effect. The influences of social surroundings were also pointed out as being an important factor for forest management practices in the Bieling (2004) study. Additionally, land structure, which is identified as a huge problem by key-stakeholders was not recognized at all by local inhabitants as an issue for forest management.

Concerning the impacts of forest fires, usually economic damages are valued over environmental damages, such as timber losses and other economic losses. This was confirmed in the present study both by forest owners, directly affected, as by other citizens. In Mação, the subordination of environmental impacts could be related with the great natural regeneration capacity of the vegetation. However, the increasing frequency of fires and their repeated incidence accelerate soil degradation (Campo et al., 2006; Ferreira et al., 2008; Ferreira et al., 2009) and these aspects were recognized by technicians, more informed about the potential impacts of fire on land degradation.

The solutions to forest fires have been mainly focussed on suppression, neglecting the other components. This has been happening both in Portugal and elsewhere (FAO, 2007b; Fabra-Crespo et al., 2012). In Mação municipality, many efforts for improving fire suppression and first intervention activities have been made. These investments were recognized by the respondents and the future proposed solutions are related with increasing forest management by penalizing defaulters and encouraging active forest owners.

4.5.4. The future of forests and rural areas

In Mação case study, although people no longer see forests as an important economic activity, forest is mainly valued by its productive function and its potential role on job opportunities, by both the public and forest technicians. This is opposite to the findings of the EU/FAIR funded research project 'Multifor.RD'³⁷, which aimed at a better understanding of the European public opinion on the role of forestry to rural development, concluding that forests are increasingly recognized by their environmental amenities and nature values and not as a rural development opportunity (Wiersum and Elands, 2002).

The rise of the environmental dimension concerning forest policies, discourses and practices and the decline in their economic role developed a negative association by the public between forests and jobs and economic opportunities and people now have difficulty in viewing forestry as an economic activity (EC, 2002). This is a very influential aspect concerning public views on the

³⁷ Multifor.RD - Multifunctional forestry as a means to rural development, establishing criteria for region-specific strategies for balancing public demands and forest owners' objectives



role of forest to rural development, where job opportunities are quite important. For that reason, although valued by its ecological value and opportunities for leisure and recreation, some studies have verified that forests are not seen as a major future development option (Elands et al., 2004; Flécharde et al., 2006).

Forest environmental functions in Mação were not highly valued by the public. This could be potentially linked to the findings of other studies, assuming that forests and forestry are perceived more negatively in production areas and afforestation areas, (Elands and O’Leary, 2002; Elands et al., 2004; Ní Dhubháin et al., 2008). Mação forest mainly comprises afforestation and reforestation areas with *Pinus pinaster* or *Eucalyptus globulus*, and this is probably contributing to minimizing perception of their biodiversity conservation and environmental values. Anyway, the findings highlighted that local inhabitants attributed some value to leisure and recreation activities in the forest of Mação.

Concerning future perspectives about forests and other rural activities, some negative perspectives were addressed in the survey (increase or maintenance of fire hazard, increase of shrubland, decrease of agriculture, etc.). Although national technicians were more positive towards some aspects, half of them still indicated the maintenance of fire hazard and the increase of shrubland as trends. In this sense, there was some evidence to claim that *the perspectives over the future of forests and forestry is pessimistic*. As concluded by Fabra-Crespo et al. (2012) for the region of Valencia in Spain, the lack of confidence in the future could be related with people not being included in decision-making. This is also a possibility to the municipality of Mação, where findings presented in previous chapters also highlighted the public unawareness about forest policies and management tools in Mação.

4.6. Conclusion

The survey and findings presented in this chapter aimed to provide the basis for developing a multi-stakeholder participatory approach for discussing SFM in fire-prone areas. This basis is grounded on assessing the diverse views across multiple stakeholders and general public in order to understand their perceptions over forests and the forest sector. In fact, this process of consulting all parts concerning a specific subject can be already considered as a part of the participatory approach contributing to develop some potential gains of stakeholder participation, discussed in chapters 5 and 6 (e.g. inclusion of all stakeholders, systemic view of the subject, locally-adapted solutions, mitigate conflicts, etc).

Four main lessons have arisen from this survey, concerning the theoretical assumptions purposed in this chapter (see: Section 4.2) and also the four SFM key issues addressed in this research:

- The **first key lesson** is linked to the type of forest owners and their current views over their forest management practices. The emergence of *indifferent forest owners*, recognized in the stakeholder perception survey, is not identified by the forest owners included in the survey concerning their own practices, as most of them said that they



maintained some management activities on their properties. This shows a contradiction between forest owner's perceptions and actions. It is very important to understand the reasons behind the increasing disinterest and absenteeism and to find the best ways of promoting active forest management, while also meeting the individual interests and values. For areas such as the one in Mação case study, where small-scale forest ownership prevails, the organization of forest owners into a system of joint management is imperious.

- The **second key lesson** is the focus on production, which was demonstrated in several questions of the survey, both in terms of social perspectives and also technical perspectives. The global discourses towards the multiple use of forests was not central in the stakeholder survey.
- The **third important lesson** from the survey is the centrality of forest fires, while discussing the future of forests and forest sector. This threat was associated with land abandonment. Under Mediterranean conditions, in fact the lack of forest management leads to an increased risk of forest fires (a phenomenon with serious consequences for all the forest functions and the stakeholders).
- In Portugal, fire hazard dominates over all other issues concerning forests and this probably contributes to the **fourth key lesson**, related to the social pessimistic view over the future of forests.



CHAPTER 5

APPROACHES, METHODOLOGIES AND BEST PRACTICES REGARDING STAKEHOLDER PARTICIPATION

- 5.1. Introduction
- 5.2. Stakeholder participation – processes and approaches
 - 5.2.1. Concept, drivers and benefits of stakeholder participation
 - 4.2.1.1. Benefits and constraints of participation
 - 5.2.2. Participation levels: not all participation is alike
 - 5.2.3. Participation methods and techniques
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«So where is public involvement? Alive, resting, and awaiting our call to public service.»
Priscoli, 1998

5.1. Introduction

Since the last decades, lay visions, knowledge acquired from experience and involvement of local communities and stakeholders in decision-making processes have gained a central role in the political and scientific sphere. Arguments sustaining that there is no reason to overestimate scientific knowledge over other forms of knowledge, identified a pluralistic way of thinking and acting to change (Santos, 1987; Pretty, 1995). This notion is being expressed in community-based participatory experiences and in integration of social perceptions in technical decisions, intending to increase the quality, the legitimacy and the effectiveness of those decisions (Glicken, 2000; Figueiredo et al., 2009).

This chapter discusses the theoretical framework of stakeholder participation, stressing outcomes, bottlenecks, benefits and challenges, and explores the potential of participatory approaches in improving decision-making processes. Since the 1980s, a trend towards the use of community-oriented approaches is growing, and several authors are describing positive outcomes of those experiences in producing social learning and communities' empowerment (Rist et al., 2006; Stringer et al., 2006; Blackstock et al., 2007, Reed, 2008). Participation is being used in all parts of the world, by decision-makers, researchers, non-governmental stakeholders, in several fields of public life. The boom of participatory initiatives and experiences throughout the world triggered an opportunity for theoretical and empirical progress in the field of stakeholder participation. The development of the participation ladder and the growth of an assorted list of methods and techniques are presented and discussed under this section.

'Who should participate' has been the touchstone of many disillusionments and failures underlying participation. This is often linked to representativeness shortage or with overestimation of power in the selection of participants or even with misuse of participation to meet promoter interests. Frameworks to stakeholder analysis and selection are described in this chapter, highlighting key factors for raising motivation and interest to participate. Proper facilitation is advocated as a strong requirement for successful participatory approaches as well as the need of learning from previous experiences, emphasizing the role of evaluation and monitoring stakeholder involvement.

In the second part of this chapter, three experiences of stakeholder involvement in natural resources management are presented. These international experiences are used as examples of success in contributing to the implementation of Sustainable Land Management (SLM) practices,



but also in raising social learning, building social capital and empowering local communities to deal, more independently, with their problems.

5.2. Stakeholder participation – processes and approaches

5.2.1. Concept, drivers and benefits of stakeholder participation

Since 1990s, involving the public in decision-making processes has emerged in several sectors of public life, such as urban planning (e.g. Forester, 1987; Healey, 1992; Innes, 1996), rural development (e.g. Warburton, 1997), risk management (e.g. Lynn, 1987; Petts, 1992; Pellizzoni and Ungaro, 2000; Gamper and Turcanu, 2009; Figueiredo et al., 2009), community planning (Wates, 2000), and health sector (e.g. Abelson et al., 1995; 2007; Mitton et al., 2009). Participation has become a democratic right and new relationships between citizens and their Governmental Organizations (GO) and Non-Governmental Organizations (NGO) are now required (Richards et al., 2004). Stakeholder involvement increased in the fields of environmental management, engaging citizens in planning decisions, but also promoting interdisciplinarity and collaboration between stakeholders at all levels in those decisions (Beierle and Konisky, 2000; Glicken, 2000; Carr and Halvorsen, 2001; Beierle, 2002; Hjortsø, 2004; Güneş and Coşkun, 2005; Prell et al., 2006; Reed, 2008). The large number of stakeholders and inherent value systems included in environmental management is also responsible for the appearance of conflicts, and traditional negotiation seems not to be enough to mediate those conflicts (Rousseau and Martel, 1996).

The intense use of participatory approaches came from failures of top-down approaches, which many times led to unpopular policies and a widespread protest and mistrust in GO (Rowe and Frewer, 2000; Fraser et al, 2006). Public organizations also started to perceive a better performance of policies and projects which includes participatory methods rather than decisions based on traditional centralized and institutional processes (Beierle and Konisky, 2000; Involve, 2005). This idea is confirmed in environmental or risk management, traditionally in the domain of trained experts, lacking detailed local knowledge and support from the communities (Fraser et al., 2006). Drivers for increasing stakeholder participation have been both top-down, driven by international and national legislation, such as Brundtland report (UN, 1987)³⁸, Agenda 21 (UN, 1992)³⁹, Aarhus Convention (ECE/CEP, 1998)⁴⁰ and bottom-up, started by citizens demand, mainly through societal groups (Richards et al., 2004).

³⁸ The Brundtland or 'Our Common Future' report was published in 1983, by the World Commission on Environment and Development, presenting the first definition of sustainable development.

³⁹ Agenda 21 represents the action plan of the UN to sustainable development, which came out in 1992 under the United Nations Conference on Environment and Development.

⁴⁰ Convention on access to information, public participation in decision-making and access to justice in environmental matters, signed in 1998.



The range for using the term participation is quite broad and difficult to summarize into a single definition. Participation means different things to different people (Richards et al. 2004). This diversity has been driven by several factors, namely the origin and evolution of the participation concept. Reed (2008) describes six phases on that evolution: i) from raising awareness in the late 1960s; ii) to incorporating local perspectives in data collection and planning in the 1970s; iii) to recognizing local knowledge as valuable knowledge in the 1980s; iv) to using participation as a rule for sustainable development in the 1990s; v) to recognizing participation failures and weaknesses; and vi) to a growing of a post-participation framework. Glicken (2000) also mentions the progress from a paternalistic model, where government ask some individuals to participate (e.g. meetings with expert groups), to a consensus building model, where all affected groups are called on to participation. Additionally, similar or complementary concepts and approaches came out, contributing to this diversity, such as deliberation (e.g. Fearon., 1998; Abelson et al., 2003), capacity building (e.g. Innes, 1996; Evely et al., 2011), participatory research (e.g. Cornwall and Jewkes, 1995; Blackstock et al., 2007; Cerf, 2011) empowerment, social learning (e.g. Rist et al., 2006; Reed et al., 2010; Evely et al., 2011), among many others.

The aims of stakeholder participation processes can also be quite diverse and represent different interests, such as to develop governance, to strengthen democratic legitimacy and accountability, to stimulate active citizenship, to develop social cohesion and social justice, to improve the quality of decisions and to promote capacity building and social learning, among other aspects (Carr and Halverson, 2001; Abelson et al., 2003; Involve, 2005).

5.2.1.1. Benefits and constraints of participation

In theory, *«participatory approaches can improve policy-making processes by providing a role for reasoned dialogue between interested parties. In turn, successful participation promotes active citizenship, greater social capital and increased trust in political decisions»* (Richards et al., 2004: 21). So, a common benefit of a 'good' participatory process is to improve decisions and to foster their implementation.

Participation is undoubtedly not the answer for all the problems and despite the existent literature, which discusses successes and failures of participation, the knowledge about real benefits of stakeholder involvement in decision-making is often lacking. Another important aspect is the diversity of participation outcomes, which cover multiple issues, such as the aims of participation, the type of participants, the level of commitment by all parties, the approach and methods as well as previous participatory experiences.

Several authors have been describing the potential gains of stakeholder participation in several fields. An attempt to systematize the theoretical insights about those gains is presented below. In general, stakeholder participation in decision-making process can contribute to:

- i) **Systemic view of the matter at hand:** this benefit is related to exchanging perspectives over the same issue, joining people with different backgrounds and from diverse



disciplines in knowledge production (Rist et al., 2006). A systemic view of problems and a bigger range of options can be provided by stakeholder dialogue and will hopefully reduce uncertainty about the decision (e.g. Fearon, 1998; Involve, 2005; Stringer et al., 2006; Blackstock et al, 2007).

- ii) **Locally-adapted decisions:** this issue raises the value of locally appropriated solutions, adapted to local context and to local communities. This gain is also closely related with the increase of acceptance and implementation of decisions (e.g. Cornwall and Jewkes, 1995; Beierle and Konisky, 2000; Carr and Halvorsen, 2001; Wandersman, 2009).
- iii) **Social equity:** participation represents an excellent opportunity to give voice to the disadvantaged groups or to the powerless, raising their self-esteem and confidence in individual and collective skills (e.g. Arnstein, 1969; Stringer et al., 2006; Reed, 2008).
- iv) **Increase trust and mitigate conflicts:** using participation as a transparent process may reduce some conflicts of interest and increase trust in institutional structures and amongst the public (e.g. Beierle and Konisky, 2000; NEA/OECD, 2004; Reed, 2008)
- v) **Decision legitimacy and implementation:** to promote legitimacy should not be the aim of participation, but an off-site gain. Integrative and participatory decisions could help to increase social acceptance and the rate of implementation (e.g. Pretty, 1995; Fearon, 1998; NEA/OECD, 2004; Richards et al., 2004; Güneş and Coşkun, 2005; Involve, 2005; Stringer et al., 2006; Reed, 2008).
- vi) **Social learning:** participatory approaches can create social capital and develop mutual learning among the participants, bridging scientific, technical and traditional knowledge (e.g. Pretty, 1995; Fearon, 1998; Carr and Halvorsen, 2001; Involve, 2005; Fraser et al, 2006; Rist et al., 2006; Stringer et al., 2006; Blackstock et al, 2007).
- vii) **Empower communities:** people will cooperate on implementation and will become more independent from GO (Pretty, 1995; Blackstock et al, 2007; Reed, 2008).

Despite the major attention on the advantages of incorporating lay and technical perspectives (e.g. Reed et al., 2006⁴¹; Figueiredo et al., 2009⁴²; Valente et al., 2011b⁴³), there are still voices claiming that the development of policies cannot be driven by the crisis of the day, as they probably would if people decide what are the important issues (e.g. Cross, 1992; Perhac, 1998⁴³). Additionally, some participatory past experiences failed and reached dead-ends, which resulted in disillusionment amongst stakeholders involved, whether related to a specific participatory experience, or to participation in general (Wilcox, 1994; Richards et al., 2004).

Stakeholder consultation fatigue caused by the increasing calls for participation is also mentioned by several authors, especially when the quality of the processes is poor or the impact of

⁴¹ About integrating bottom-up and top-down approaches in sustainability indicators selection and application.

⁴² Discussing the need for integrating social perceptions in measures to prevent and to cope with flood risk.

⁴³ These arguments are presented concerning risk management.



participation on actual policy decisions is perceived as low (Richards et al., 2004). Some experiences showed that people were involved in decisions already taken, resulting in mistrust of such approaches. «*Participatory processes should only be considered when there is a commitment to listening to, and acting on the issues raised*» (Richards et al., 2004: 13).

Another important aspect is the difficulty of proving that stakeholder-based decisions are better decisions. This idea is contradicted by Beierle's (2002) study⁴⁴, who concludes that stakeholder processes, especially the most intensive ones, are linked to better decision-making. The growth of participatory practice and theory highlighted some failures and disagreements about the potential of these approaches, namely that they are costly and time consuming. In this sense, bad participatory practices can also create mistrust, waste people's time and money and can undermine future attempts of public engagement (e.g. Wilcox, 1994; Involve, 2005; Reed, 2008).

One major argument against participation is based on the goals beneath a participatory approach. Decision-makers sometimes use participation to fulfil their needs or just avoid these processes for fear of losing control (Pretty, 1995). In participatory research the funding priorities or the researcher biases can also be bottlenecks of a truthful participation (Cornwall and Jewkes, 1995). Other constraints are what Timotijevic and Raats (2007) call 'hard-to-reach' citizens and the communities' heterogeneity.

5.2.2. Participation levels: not all participation is alike

There are multiple levels and more than 100 rungs of participation, depending on the degree to which stakeholders are involved, the nature of participation, the theoretical basis and the objectives of participation (Reed, 2008). This diversity provides the basis for selecting the participatory process and the methodology most suitable to the aims and context of participation (Reed, 2008).

The most known participation ladder, developed by Arnstein (1969), divides participation levels, according to the degree to which power is devolved to participants, into eight levels of participation belonging to three different groups (Figure 5.1). The first group is considered as a *non-participation* level. The second group, designated as *tokenism*⁴⁵, allows citizens to hear and to have a voice but decision-making remains with the power holders. Finally, the third group called *citizen power* places the majority of the decision-making and implementation in the hands of the citizens. More than 40 years later, it is still a highly up-to-date typology. The *non-participation* group includes what Arnstein defines as *manipulation* level, which represents a distortion of participation, and a *therapy* level, where public misunderstandings are 'corrected'. Citizens are now more critical about the ways they are involved in and demand more genuine participation. However, there are still attempts of therapy in current practices.

⁴⁴ The author analysed 239 cases of public participation in environmental decision-making in the USA.

⁴⁵ *Tokenism* refers to a policy or practice of limited inclusion of members of a minority group, usually creating a false appearance of inclusive practices, intentional or not.



Figure 5.1: Arnstein's participation typology (1969)

At the *tokenism* level, participation can include information, consultation, asking advice, but there is no guarantee of inclusion of these inputs in the decisions (Arnstein, 1969; Ananda, 2007). In this sense, «*what citizens achieve in all this activity is that they have "participated in participation."* And what powerholders achieve is the evidence that they have gone through the required motions of involving "those people"» (Arnstein, 1969: 6). Many current participatory experiences can be included in this group, since power is not really devolved to citizens. The third group of Arnstein's typology refers to delivering power to citizens, building partnerships or delegating power, where citizens achieve dominant decision-making authority, or are even given control to manage a programme or an institution.

Several authors developed variations of Arnstein's typology. James Creighton analysed the evolution of public involvement, using his experience as coordinator of the consortium for alternative dispute resolution of the USA Army Corps of Engineers. The typology provided in Figure 5.2 is based on the impact that participation has on the decision (Creighton, 1998; Creighton 1986 in Buchy and Hoverman, 2000). Information is the lowest level, where there is no real impact on the decision. The second level involves consultation (surveys, public hearings, etc), having an impact before the decision and the third and fourth categories involve discussion, building consensus and forming a decision.

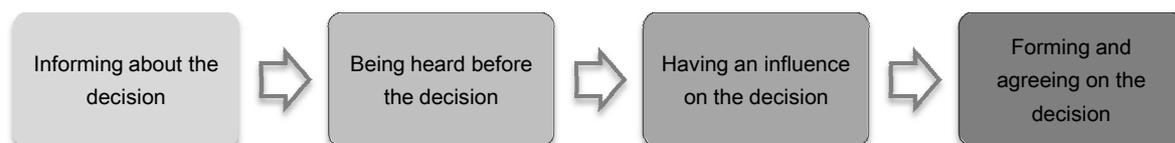


Figure 5.2: Participation typology (Creighton, 1986 in Buchy and Hoverman, 2000)

Using experiences of farmers' involvement in research, Biggs (1989) presented four types of participation depending on the objectives, to the organizational arrangements and to the relationship established between local people and researchers (Figure 5.2). On the first type, researchers contract farmers to provide a service or even the land. The emphasis is placed in the scientific side and farmers are not included. The *consultive* type is related with farmers being consulted about their problems and scientists providing solutions for them. Both *collaborative* and *collegiate* types involves joint work between farmers and scientists, but in *collegiate* type researchers encourage farmers to embrace their own research projects.

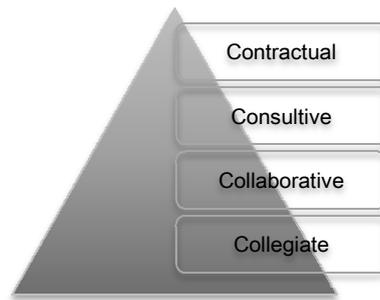


Figure 5.3: Participation typology (Biggs, 1989)

Pretty (1995) identified seven levels of participation depending on the nature of people's participation in development programmes and projects (Figure 5.4). This participation could range from types of *non-participation*, where people's action is conducted by project facilitators, till *self-mobilization*, where people take the initiatives independently of external agents.

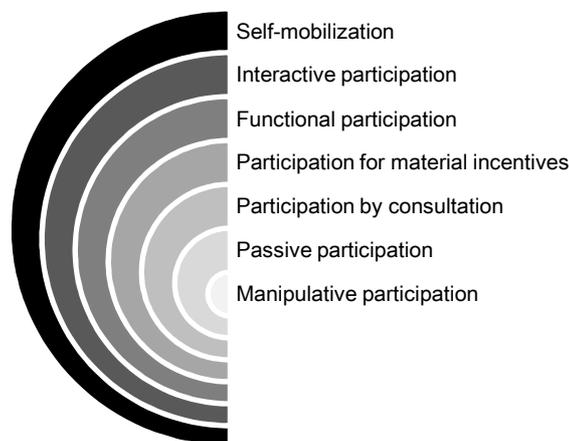


Figure 5.4: Participation typology (Pretty, 1995)

Cornwall and Jewkes (1995) distinguish participatory research from conventional research. Participatory research is centred in local people, who define, understand and implement solutions; it is close to the collegiate type proposed by Biggs (1989). Conventional research is more oriented to researchers and fulfilment of institutional and funding interests.

Figure 5.5 presents an adaptation of the typology proposed by Wilcox (1994), considering five stages of participation, according to the level of public impact. The first one is *public information* where people are provided with balanced and objective information about the issues. The second one is the *consultation* of people, in order to obtain a feedback on analysis, options or decisions. The *deciding together* level concerns the work with the public throughout the process, while the *acting together* level goes further aiming to share with the public each aspect of the decision. The final level is the *empowerment* and aims to place final decision-making in the hands of the public.

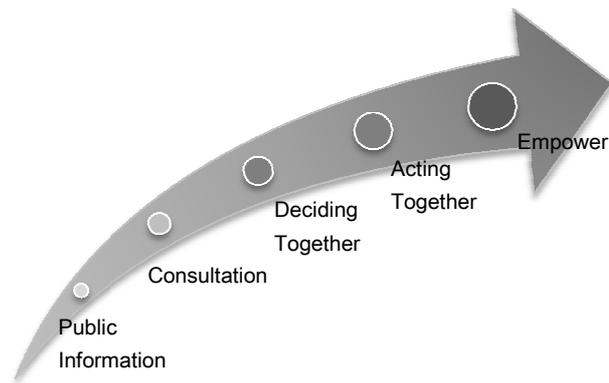


Figure 5.5: Participation typology (Wilcox, 1994 in Involve, 2005)

Public participation has been widely used «...to justify the extension of control of the state as well as to build local capacity and self-reliance; it has been used to justify external decisions as well as to devolve power and decision making away from external agencies; it has been used for data collection as well as for interactive analysis» (Pretty, 1995: 1251). The processes and approaches can vary from top-down communication and one-way flow of information to dialogue and two-way information exchange and bottom-up participation.

Having in mind different interpretations and uses of stakeholder participation, Figure 5.6 presents a possible interpretation of the participation ladder, used in this research, which is divided in five levels and focussed on what is really wanted from stakeholder participation.

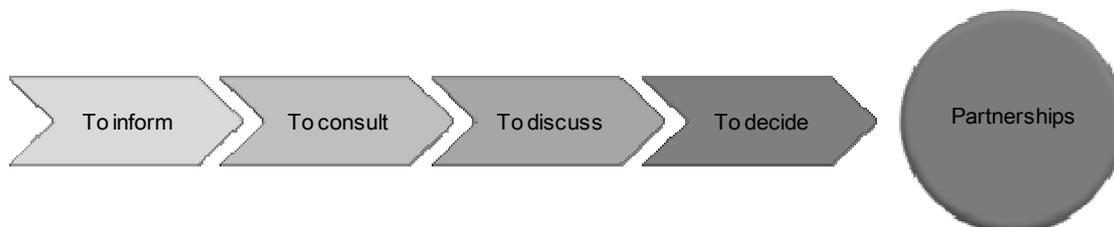


Figure 5.6: 'What do you really want to achieve with stakeholder participation?'

When the aim of stakeholder involvement is only to report a decision or to raise public awareness about an issue, it is quite important to provide 'good' quality and clear information. But if the decision is not taken yet and it is important to know what are the needs and priorities before deciding, a survey or a public hearing should be implemented to consult social perceptions and perspectives. Although not reflecting a real and an effective engagement of stakeholders in a decision, these two levels are crucial to the success of stakeholder involvement in further stages of participation. The importance of good information about the issue at stake and about the stakeholders' role, before participating in a decision-making process, is already recognized (Leroux et al., 1998). Another important issue is to make an inclusive diagnosis, incorporating not only the technical data but also the perceptions, visions and potential conflicts of interests over a subject.



The willingness to share power over a decision is a mandatory precondition, before going further on the participation ladder. The cooperation between stakeholders and decision-makers can reach several stages, from discussing a specific problem and finding consensual solutions for it, to working together in the implementation stage. Partnerships between governmental agencies and non-governmental agencies and civil society can also be developed within a participatory process.

The analysis of public participation typologies highlighted that stakeholder and public involvement should not be defined within limited categories or levels and should be faced as a continuous and progressive process. In fact, an effective participatory approach may be to complement one level or mechanism to another (Fiorino, 1990 in Rowe and Frewer, 2000).

5.2.3. Participation methods and techniques

The effectiveness of a stakeholder participation process depends upon trust and transparency, flexibility, adequate resources, appropriate participants and suitable methods (Bertrand and Martel, 2002; Involve, 2005; Timotijevic and Raats, 2007; Reed, 2008). There is a countless multiplicity of participatory approaches, methodologies and techniques experienced all over the world. An attempt to summarize some of the most common techniques is proposed in Table 5.1 (based on: Wilcox, 1994; Health Canada, 2000; Rowe and Frewer, 2000; Abelson et al., 2001; Involve, 2005). Table 5.1 does not intend to be an exhaustive list of all available tools, showing instead examples of techniques and processes within several participatory levels and aiming to reach distinct objectives.

Table 5.1: Description of participatory methods and techniques

Methods	Description	Target	Source
<i>Notification, distribution of information</i>	Sending out information: fact sheets, reports, leaflets, newsletters, etc.	General public	Abelson et al., 2001; Health Canada, 2000
<i>Advertising and Social Marketing</i>	Generate discussion and promote information and behaviours using marketing techniques.	General public	Health Canada, 2000; Wilcox, 1994
<i>Media events</i>	Used to explain initiatives to journalists in order to communicate to the broad public.	General public	Health Canada, 2000; Wilcox, 1994
<i>Press releases</i>			
<i>Open houses</i>	People drop by at a specific location to obtain information about an issue.	General public	Abelson et al., 2001
<i>Info fairs or exhibits</i>	Presentations by governmental bodies to inform people.	General public or invited stakeholders	Health Canada, 2000; Wilcox, 1994
<i>Public hearings</i>	Meetings to inform citizens about an issue and/ or to gather community input about that issue.	Citizens	Abelson et al., 2001; Health Canada, 2000; Rowe and Frewer, 2000
<i>Public meetings</i>			
<i>Deliberative Polling</i>	Used to gather insights into public opinions, attitudes and values about several issues.	Large, random sample of citizens	Abelson et al. 2001; Health Canada, 2000; Involve, 2005
<i>Referenda</i>	Popular vote about a specific issue. Results can be binding or not.	General public	Abelson et al. 2001; Rowe and Frewer, 2000
<i>Surveys</i>	Methods of data collection with simple and straightforward questions: telephone, face-to-face, self-administered through the mail.	Representative sample of citizens	Abelson et al. 2001; Health Canada, 2000; Rowe and Frewer, 2000
<i>Questionnaires</i>			
<i>Interviews</i>			
<i>Citizens' panels</i>	Panel to provide information about public needs and preferences.	Large panels of a representative sample of citizens	Abelson et al. 2001; Health Canada, 2000; Involve, 2005; Rowe and Frewer, 2000
<i>User's panels</i>			

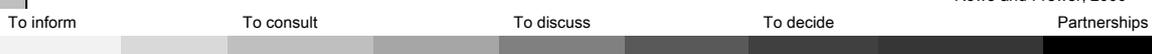




Table 5.1 (Cont.): Description of participatory methods and techniques

Methods	Description	Target	Source
<i>Deliberative mapping</i>	Used to assess how citizens and experts rate different policy options against a set of defined criteria.	Citizens and experts	Involve, 2005
<i>Focus group</i>	One-time informal brainstorm meeting to discuss a particular issue.	Small group of selected individuals with a strong interest in an issue	Abelson et al. 2001; Health Canada, 2000; Rowe and Frewer, 2000; Wilcox, 1994
<i>Study Circle</i>	Several discussions that take place over a period of time to share ideas and opinions about several issues.	Group of people who agree to meet	Health Canada, 2000
<i>Study Groups</i>			
<i>Democs (Deliberative Meetings of Citizens)</i>	Conversation game (with cards) enabling small groups to discuss public policy issues.	Group of people who agree to meet	Involve, 2005
<i>Think tanks</i>	Bring together creative thinkers to develop innovative solutions to current issues and problems.	Group of people chosen by their expertise and creativity	Health Canada, 2000
<i>Creative thinking</i>			Wilcox, 1994
<i>Consensus conference</i>	Small meeting to discuss ideas. Conclusions on key questions presented to the media and general public.	Group of experts	Abelson et al. 2001; Health Canada, 2000
			Involve, 2005
			Rowe and Frewer, 2000
<i>Search conference</i>	Brings together people to discover values, purposes and projects they hold in common.	Large groups at community level	Health Canada, 2000
<i>Advisory committees, board or council</i>	Group that participates in public meetings to provide recommendations and advices which should influence decision-making.	Group of representatives of a community selected by governmental bodies	Abelson et al. 2001
			Health Canada, 2000
			Rowe and Frewer, 2000
<i>Workshops</i>			
<i>Consensus building</i>			Abelson et al., 2001
<i>Dialogue</i>	Helping people to reach a consensus over an issue, to identify common ground and beneficial solutions to a problem.	Stakeholder groups	Health Canada, 2000
<i>Participatory Strategic Planning</i>			Involve, 2005
<i>Future Search conference</i>	Helping people to create a shared a vision for their future.	Stakeholder groups	Involve, 2005
<i>Open Space Technology</i>	Meeting framework with a central theme allowing participants to form their own discussions around that theme.	Citizens	Involve, 2005
<i>Appreciative Inquiry</i>			
<i>Community planning</i>	Participatory process to set policy agenda and to discuss citizens' vision for the future, and eventually to define an action plan.	Citizens	Abelson et al., 2001
<i>Visioning</i>			Health Canada, 2000
<i>Community mapping</i>			Involve, 2005
<i>Planning for real</i>			
<i>Citizens Juries</i>			Abelson et al. 2001;
<i>Planning Cells</i>	Panel of non-specialists to discuss issues and make decisions.	Small group representing the profile of a community	Health Canada, 2000
			Involve, 2005
			Rowe and Frewer, 2000
<i>Participatory Appraisal</i>	Broad empowerment approach striving to build community knowledge and encouraging grassroots action. People identify their own priorities and make their own decisions about the future. This process should be an ongoing cycle of research, learning and collective action.	Large or small groups at community level	Involve, 2005
<i>Community Empowerment networks</i>	Structures set up by the government to enable civil society to play an equal role with the public and private sector in local strategic partnerships.	Large or small groups at community level	Involve, 2005

To inform To consult To discuss To decide Partnerships

New and innovative approaches are emerging showing that former participation methods are no longer appropriate for current issues and decisions (Abelson et al., 2003; Involve, 2005). Participatory methods should be tailored to the specific context, to the aims of the process, to the available resources (Richards et al., 2004) and should facilitate multidirectional information flows and mutual learning (Abelson et al., 2003; Stringer, et al., 2006). It is quite important to join individuals with different backgrounds, interests and values and influence them to listen, to



understand, to potentially persuade and ultimately to come to more reasoned, informed and community-based decisions (Abelson et al., 2003).

Although public participation is more than selecting and implementing specific methods or techniques, their identification should be considered as part of the process (Reed, 2008). In a time-poor world, designing participation processes must consider time as a very limited and expensive resource (Involve, 2005).

5.2.3.1. Role of facilitators

This literature review is discussing issues and factors that can contribute to a better understanding of the potential of stakeholder participation. So far, many aspects have been pointed out as crucial for achieving better decisions. One aspect which is sometimes neglected is the role of facilitators or mediators.

Top-down participatory approaches conducted by technicians, politicians or scientists, who are still questioning the potential of stakeholder participation, will probably fail on the issues of equity, transparency and trust. In this sense, the inclusion of professional facilitators, external to the project, can be a good option for a real participatory decision-making process, basing the decisions on a mutual understanding and an agreed way forward (Bachmann, 2003; Schwilch et al., 2009). The facilitator's success will rely on the use of certain methods for certain stakeholders, but as mentioned by Richards et al. (2004:11), *«a successful facilitator needs to be perceived as being open to multiple perspectives, approachable and flexible, while also being capable of maintaining positive group dynamics, tactfully handling participants inclined to dominate a discussion, and encouraging more reticent people to have their say.»*

Facilitators have to combine certain skills to their specific role during the process, such as technical expertise, but also some personal features, such as intuition and empathy (Richards et al., 2004). The main function of the mediator in a process is to guide the group, structure the work and facilitate the sessions. For that, facilitators must be able to create a working environment, characterised by trust, friendship and respect, and where the dialogue, knowledge exchange and mutual learning are fostered. The facilitator should also be able to guarantee equal opportunities to participants and to control dominant individual persons, avoiding mistrust, competition and even exclusion of some of the participants (Gabathuler et al., 2011).

Sometimes facilitators go out of their boundaries and fall in dangerous pitfalls, which can undermine the results of participation and be reflected in future participatory challenges. Lecturing, dominating the process, giving opinions, judging or underestimating the contributions of participants are examples of common mistakes made by project managers or even external facilitators. Mediators should not be a stakeholder himself and having a professional facilitator in the process can help to deal with these traps and contribute to a better perception about participation (e.g. Glicken, 2000; Bachmann, 2003).



5.2.4. Stakeholder analysis and selection

'One size-fits all' does not work and policies should be flexible on how to reach communities (NEA/OECD, 2004; Fraser et al., 2006). The selection of the scale in which stakeholder participation should take place is one of the most challenging issues of the participatory approaches.

There is no clear definition of what a stakeholder is (Glicken, 2000; Reed et al., 2009; Prell et al., 2009). Who should be involved is a caveat of participation, it being only consensual that it should be individuals or groups connected to the issue at stake (Glicken, 2000). In theory, participation should involve people affected, directly or indirectly, by decisions in making, implementing and monitoring those decisions (Oakley et al., 1991; Warburton, 1997; Richards et al., 2004; Involve, 2005). As mentioned by Pretty (1995), the full involvement of all stakeholders and the adequate representation of their views are essential aspects in any participatory and learning process. However, this full involvement is not always possible, either because people are not willing to cooperate, or because it is hard to maintain an inclusive process if the participatory dynamics provided by some methods have been designed for smaller groups.

Stakeholder analysis for selecting those to be involved is a growing topic on participatory literature, aiming to understand the roles that different groups play in a community and also the interactions between them (Prell et al., 2006; Reed et al., 2006; Elsasser, 2007; Reed et al., 2009; Prell et al., 2009). This is even more important if one is dealing with conflict management or if one wants to include marginalised stakeholder groups. As mentioned by Richards et al. (2004: 13), *«participation will be impaired if there are imbalances or omissions in the representation of stakeholders»*.

Literature on participation and citizens' involvement proposes a variety of methodologies for stakeholder analysis, between representative, normative, descriptive and instrumental (e.g. Involve, 2005; Reed et al., 2009). This selection should attempt representativeness concerning a wider stakeholder community, their willingness to engage constructively in dialogue and their need to be known and respected to diffuse the ideas to a wide social network (Prell et al., 2006). Reed et al. (2009) identified three important steps under stakeholder analysis: i) identifying stakeholders and their stakes; ii) differentiating between and categorising stakeholders; and iii) investigating relationships between stakeholders. This three-step process will help to shape power, influence and interest about an issue and can yield the results of participation.

There are methods more open or inclusive, where everyone can participate, or selective methods, where the numbers, types and actual individual participants may be chosen as part of the process. Additionally, communities are not homogeneous entities, so a rigorous process of sampling is needed if you want to represent a community (Pretty, 1995). The limitations of statistically representative surveys with large sample populations are recognised, but a participatory process can only be legitimate and effective if it represents all sides of the debate (Prell et al., 2006).



«Resolving the issue of representation of all interests and concerns is critical to achieving the goals of democratic, community-oriented participatory techniques» (Day, 1997 in Carr and Halvorsen, 2001: 121). In addition, sometimes it is hard to guarantee that those representing all interests are willing to participate. Several experiences of stakeholder participation highlighted the difficulties in guarantying participants' representativeness. Using an example in the USA, where three techniques were applied (mail survey, focus group and a community dinner), the evaluation of stakeholder representativeness showed that there were no substantial differences between techniques, however participants were mainly men, older, and with high income and education level, which deviated from the general community characteristics (Carr and Halvorsen, 2001). Despite the influence on results, those biases should be prevented from the very beginning, avoiding unfairness and mistrust under the participation process.

Having this in mind, the promoters of participation should be aware that stakeholders may desire, expect or be entitled to a particular level of involvement (NEA/OECD, 2004), but they can also be reluctant to participate, especially the 'hard-to-reach' citizens, which are not only excluded from the process but also from the wider social structures (Timotijevic and Raats, 2007).

5.2.5. Monitoring and evaluating participation

Evaluating a participatory process and its outcomes is a crucial step for contributing to the success and effectiveness of future processes. However, there is little information on the evaluation criteria to assess the performance of participatory methods and approaches (Rowe and Frewer, 2000; Carr and Halvorsen, 2001, Beierle, 2002; Abelson et al., 2003) or previous assessments that focussed on the process rather than on the outcomes of participation (Beierle and Konisky, 2000; Blackstock et al., 2007; Reed, 2008).

The representativeness of participants is one of the most important criteria to assess participation success (Rowe and Frewer, 2000; Carr and Halvorsen, 2001; Abelson et al., 2003). The lack of representativeness and the reasons behind it (e.g. absence of people's interest; lack of time; the lack of knowledge; and previous bad experiences) should be disentangled (Carr and Halvorsen, 2001). Other important criteria are the early involvement of participants, the impact of the participation outcomes on decision-making and the issue of transparency (Rowe and Frewer, 2000; Abelson et al., 2003).

The focus on participation outcomes when evaluating participation process effectiveness is crucial (Pretty, 1995; Abelson et al., 2003). Pretty (1995) identified four criteria for assessing the trustworthiness of the results, namely the reliability of the results, their applicability in other contexts, the occurrence of the same results in other similar situations and to make sure that the results were not driven by interests and biases of the participation promoter.

Beierle and Konisky (2000) evaluated several public participation cases in the Great Lake Region (Canada), assessing how the cases contributed to achieve social goals (conflict mitigation, trust in entities, incorporating public values in decision-making). The results have confirmed that, in



general, public participation can perform well in achieving social goals and that the process design was more important than both the context where participation takes place and the degree of control by the public over the process.

5.3. Key lessons from best practices

Small participatory initiatives can achieve great global impacts. This section tries to sum-up best practices from three different initiatives and methodologies tackling SLM. All the approaches included knowledge exchange with stakeholders, land-users and scientists and, although based at grassroots level, achieved global acknowledgement, expressed in their long life as projects and in their extension to other areas or subjects. Using concrete experiences, underpinning different levels of stakeholder participation, enables to draw-up some key lessons to improve multi-level and multi-stakeholder participation, aiming ultimately to increase SLM practices all over the world.

5.3.1. Learning for Sustainability (LforS) extension approach

5.3.1.1. Sustainable development in rural areas: from teaching to learning

The role of social learning in development cooperation is increasingly recognized, by its role in fostering and strengthening local capacities in sustainable resource management (e.g. Rist et al., 2006; Gabathuler et al., 2011). Social learning demands a systemic vision of the issues, incorporating communication and moderation skills in the training sessions. Autodidactic Learning for Sustainability (ALS)⁴⁶ came out to respond to these challenges as a training tool «...to deepen understanding of the complexity of sustainable resource management, its connection to sustainable development, as well as to clarify roles, responsibilities, and room for manoeuvre for different actors» (Bachmann, 2003: 16). This tool, initially used for agricultural extension service in developing countries, is being developed since 1995 at the Centre for Development and Environment (CDE) from University of Berne in Switzerland and tested with collaboration from several countries from Africa, central Asia and South America. ALS progressed to LforS approach.

The knowledge and lessons provided by the use of LforS approach in several contexts, attaining different themes and stakeholders, are difficult to summarize. The extension themes are based on a continuous and systemic dialogue between different stakeholder groups, mediated by an extensionist, who facilitates the learning process. Gabathuler et al. (2011) mentioned some principles which should be included in extension themes definition, namely the focus on improving livelihood, the inclusion of different points of view, especially the ones usually not acknowledged, the needs and requirements (labour, knowledge, technology) to the extension themes, the balance between productive (increase yield) and reproductive (sustainability and

⁴⁶ See: http://www.cde.unibe.ch/Tools/ALS_Ts.asp



security) aims of the extension themes, considering direct, indirect and also innovative solutions to problems, and the synergies between extension themes.

Subsistence agriculture, neglected by market-oriented policies, gained new foci under the attainment of the Millennium Development Goals (MDG), especially under the ‘eradicate extreme poverty & hunger’ goal (UN, 2008). However, the current challenges are much more complex and agriculture extension can no longer rely on the straightforward transfer of technology (Gabathuler et al., 2011). Extension activities have also changed a lot and now *«must simultaneously help boost production while also being environmentally friendly, market-oriented, participatory, and gender-relevant»* (Gabathuler et al., 2011: 8).

LforS is an integrative and learning-oriented approach to agricultural extension, grounded on the idea that this service can only be successful if a broad initiative for training and further education takes place (Gabathuler et al., 2011). In this sense, this approach starts on promoting a deep understanding of the local context, through participants’ encouragement to share knowledge with each other, to discover common interests and goals and to develop their own visions. The beneficiaries of extension are then empowered to develop and implement their solutions based in that common and in-depth understanding of the issues. The approach is quite innovative by its characteristics, as recently described in Schwilch et al. (2009): i) learning in local context, focus in small communities and villages and local setting; ii) learning in a group, representing learning from each other, by integrating local and external knowledge, different perspectives and professional background; iii) multi-stakeholder and multi-level approach, where besides exploring relations between different levels of decision-making and different stakeholders, there is a systemic vision of the problems; iv) interactive, process-oriented pedagogy, including a methodological diversity, between group work and plenary sessions.

5.3.1.2. Components and activities of LforS extension approach

LforS approach is supported by three important components: i) knowledge management; ii) organizational development; and iii) stakeholder dialogue (Figure 5.7).

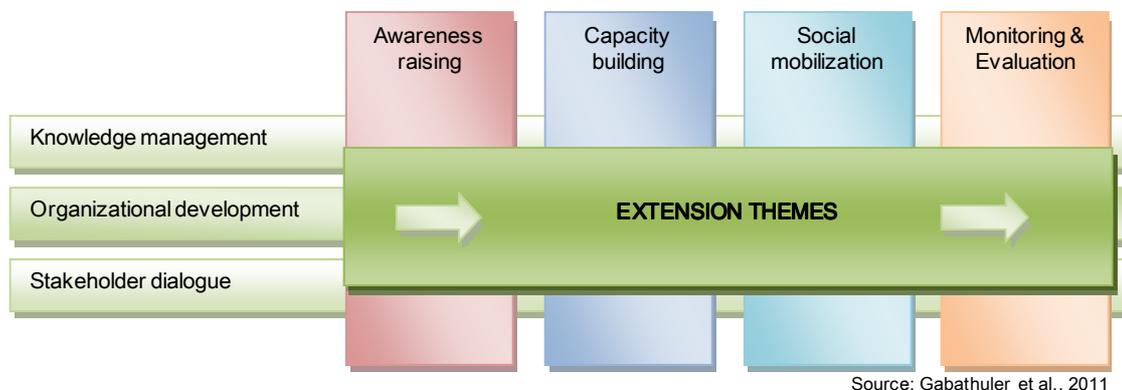


Figure 5.7: Components and activities of LforS learning extension approach



These components are common to all extension themes and are implemented through a sequence of activities under awareness raising, capacity building, social mobilization and monitoring and evaluation aims (Figure 5.7). The first basic component is the stakeholder dialogue, which is materialized at least in an annual workshop, where all stakeholder groups are invited, from different areas and levels. The main aim of this component is to define a common understanding of the problems, views and opportunities facing the same reality. The workshop also provides the identification of several extension themes, which can vary from the implementation of a specific technology to a broader approach. In this first step, some recommendations are also made and delivered to decisions-makers in order to improve the conditions for implementation. Gabathuler et al. (2011) highlight the flexibility of the methods used within the approach, which can be complemented by exhibitions, working groups, broadcasts, public hearings, among other methods.

The activities are organized in four steps, as described by Gabathuler et al. (2011), but not necessarily following the order presented in Figure 5.7. The **awareness raising** activities are built from the stakeholder workshops and aims to establish the linkage with the village communities. After the stakeholder workshop, the extension themes are presented to the communities and after clarifying the working steps and criteria for success, the community is invited to select three to five extension themes to be implemented. Depending on the available resources and their interest, farmers can choose a theme, being then required to participate in the training sessions, in implementing the extension theme and in monitoring. The **capacity building** workshops are then held to address and practise the extension themes implementation.

Social mobilization activities are linked to strategies of convincing and motivating farmers to implement extension themes. Gabathuler et al. (2011) consider soft incentives to be preferable, such as contests, training opportunities, media, but there is also a possibility of including material incentives, such as subsidies, grants or even purchasing guarantees. Finally, a **participatory monitoring** takes place aiming to evaluate the implementation of the extension themes, which can also be an opportunity for joint learning from practical experience.

The second basic component of LforS approach is the *organisational development*, demanding the creation of structures and institutions (e.g. agreements, procedures, etc.) for efficient cooperation between farmers and households as well as between communities (Gabathuler et al., 2011). This is extremely important for an effective implementation of the extension themes.

Knowledge management involves managing all the information generated throughout the process (Gabathuler et al., 2011). This includes not only information related on economic, social and ecological conditions, and technical and methodological problem-solving approaches, but also the communication, extension and learning methods and skills.



5.3.1.3. *Learning on the job, in the context, and with other people*⁴⁷

The LForS approach mainly focuses on promoting a continuous learning process among the farmers and researchers involved. The main goals of this process are: to create transparency under different points of view and interests; to develop mutual learning and to foster trust; to promote common understanding of problems and common problem solving approaches; to learn from mistakes; to anchor ownership and accountability for implemented measures among the actors involved and to empower local communities (Gabathuler et al., 2011). The approach provides an assorted list of lessons to improve stakeholder empowerment, such as the benefits of generating a common and systemic vision over the same problem, but also how to motivate and to bind citizens to participation. LforS also raises the importance of locally-adapted solutions, easily accepted and implemented by citizens.

5.3.2. **World Overview of Conservation Approaches and Technologies (WOCAT) and DESIRE participatory methodology**



5.3.2.1. *It is time for solutions against land degradation*

«All over the world there are examples of winners in the struggle against land degradation» (WOCAT, 2007: 9). These examples are local practices which performed positively on land conservation, on production increase and on rural livelihoods improvement. However, these lessons are poorly documented and not sufficiently shared around the world. The World Overview of Conservation Approaches and Technologies (WOCAT)²⁴ is a global network trying to bridge this gap, by documenting, evaluating and sharing SLM experiences (Liniger and Schwilch, 2002; WOCAT, 2007; Schwilch et al., 2009). WOCAT grounds on the idea that traditional focus of science on knowing more about land degradation should be widening to the assessment of how land users and specialists deal with land management and SLM (WOCAT, 2007).

WOCAT was launched 20 years ago, by the World Association of Soil and Water Conservation (WASWC), as an attempt to create a global map on soil and water conservation (Schwilch et al., 2004). The WOCAT initiative has evolved from a small project idea to a global network, becoming an international programme in 1997. It is jointly coordinated by the CDE, the World Soil Information (ISRIC) and the Food and Agricultural Organization (FAO), and funded by these organizations together with the Swiss Agency for Development and Cooperation (SDC). Currently, the network includes SLM experts, technicians, planners and decision-makers from more than 60 institutions worldwide, within universities, governmental and non-governmental agencies, and UN organisations, among others. Additionally, several partnerships were developed with the Land

⁴⁷ From Bachmann (2003).



Degradation Assessment (LADA) project, the DESIRE project, the TerrAfrica, the Green Water Credits and the UNCCD.

The DESIRE project (Desertification Mitigation and Remediation of Land: a global approach for local solutions; www.desire-his-eu)¹ aimed to mitigate desertification and remediate land degradation through the establishment of promising alternative land use and management strategies in 17 study sites affected by desertification around the world (e.g. droughts, water erosion, wind erosion, overgrazing, salinization, forest fires). Under this project, a three-step methodology for participatory SLM appraisal and selection was developed and applied in 14 study sites. The methodology was developed in collaboration with the WOCAT network and was described in several publications (Schwilch et al., 2009; Schwilch et al., 2012a; Schwilch et al., 2012b; Schwilch et al., 2012c). Based on a close collaboration between researchers, technicians, decision-makers and land users, the methodology aims to find multiple perspectives and make use of a systemic and structured learning processes (Figure 5.8). The methodology was developed in three main steps: i) stakeholder workshop 1, enabling a collective learning process about land degradation and conservation and the identification of already applied and potential strategies to mitigate desertification; ii) WOCAT questionnaires, evaluating and documenting, already implemented and potential, local solutions; and iii) stakeholder workshop 2, to select and negotiate options for implementation, using WOCAT database and a decision support tool based on Multi-Criteria Analysis (Figure 5.8).

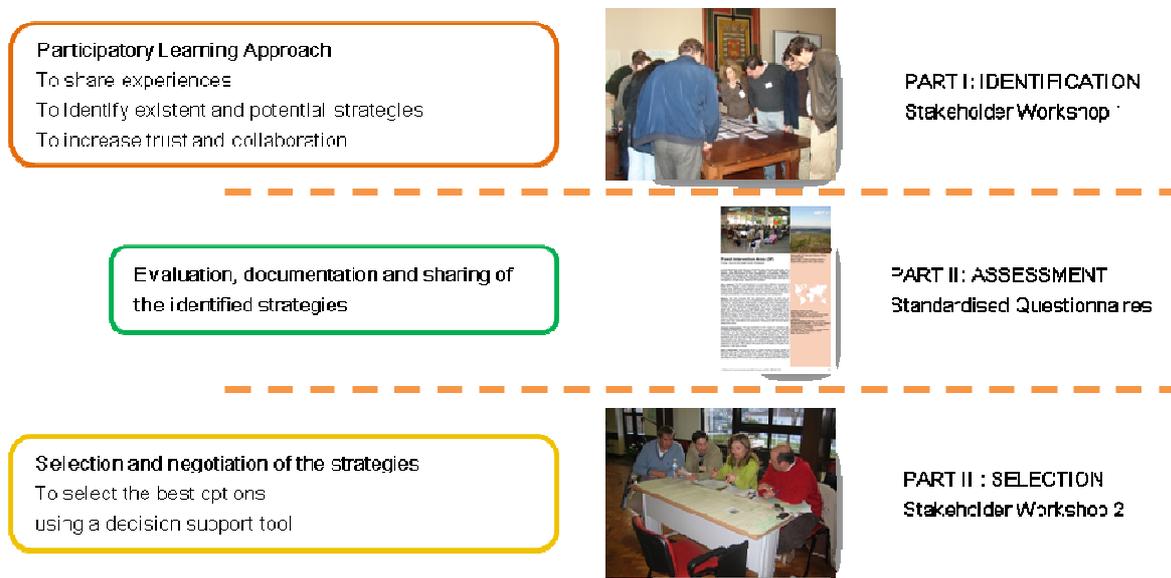


Figure 5.8: DESIRE participatory methodology for SLM appraisal and selection

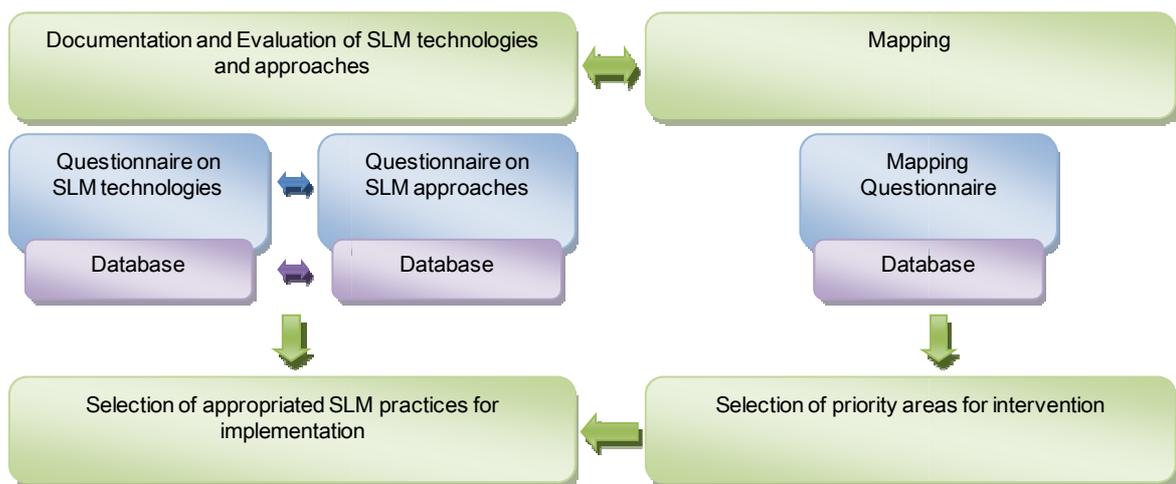
The assessment of the DESIRE methodology in different cultural and environmental contexts, their outcomes and the linkage with process design and context was already discussed in other publications (Schwilch et al., 2012a; de Vente et al., *in press*).



5.3.2.2. Stakeholders and scientists working together to document SLM

«Based on the belief that neither science nor local experimentation alone can lead to sustainable solutions to combat desertification and land degradation processes...», the mission of WOCAT is to provide tools which support innovation and decision-making processes under SLM (Schwilch et al, 2012b: 9). This is accomplished by connecting stakeholders, analysing and synthesising experiences and setting direction, improving capacity and knowledge, developing and applying standardized tools for knowledge enhancement and management (Liniger, 2008). Under these aims, WOCAT has been focussed on enhancing several dimensions of knowledge, such as raising SLM know-how, developing tools and methods for knowledge management and decision support, increasing information, dissemination and networking, and promoting research training and education on how to use WOCAT tools, among other areas.

The WOCAT decision support tools are divided in two main levels: i) documentation and evaluation of SLM technologies and approaches (case study level); and ii) mapping (Figure 5.9). These levels are addressed by three comprehensive questionnaires and three databases designed to document all relevant aspects of SLM technologies and approaches as well as area coverage (Liniger and Schwilch, 2002; WOCAT, 2007).



Source: Adapted from www.wocat.net

Figure 5.9: WOCAT decision support tools

All questionnaires and databases are available online, accessible wherever internet is available, and can be used to find solutions suitable in different environmental and socio-economic settings. Although providing a wealthy package of SLM solutions, «WOCAT methodology and databases do not offer 'plug-and-play' SLM solutions (...). They provide a proven methodology and a tool to document and evaluate what one is doing in terms of SLM strategies as well as a means to compare one's own experience with those of others» (Schwilch et al., 2009: 318). The technologies and approaches database has already proved to be quite helpful in selecting SLM solutions for implementation, as shown by the methodology for appraising and selecting SLM strategies applied under the DESIRE project.



So far, more than 470 SLM technologies and 250 SLM approaches were documented from over 50 countries in WOCAT database (see: www.wocat.net). These cases cover various land use degradation and conservation types, including technical as well as socio-economic information. The documented technologies aim to prevent, mitigate or rehabilitate land degradation and enhance productivity in the field and represent agronomic, vegetative, structural and management measures. The SLM approaches are linked to the technologies, namely on supporting their introduction and the implementation on the ground. The WOCAT/LADA/DESIRE mapping questionnaire and the associated database describe the type, location, degree and causes of degradation, but it also focuses on SLM technologies already applied in the area, including their effectiveness and impacts on the ecosystem services. Portugal has been represented in WOCAT databases since 2011 with two SLM technologies and one SLM approach concerning forestland, and SLM mapping of two municipalities affected by wildfires (Schwilch et al., 2012b).

5.3.2.3. Deriving some lessons

WOCAT network deals with the lack of systematization and dissemination of the know-how on SLM (Schwilch et al., 2007). Most of the past experiences were focussed on documenting land degradation processes and their extent and causes, while WOCAT provides a different insight, on the field of local solutions and best practices which could be widespread and adopted elsewhere (Schwilch et al., 2004).

The application of WOCAT questionnaires and of DESIRE participatory methodology in Portugal highlighted the benefits of joint work between scientists, local and external stakeholders and land users, such as a better understanding of local problems and local solutions, a greater awareness of land degradation and conservation, an increase of stakeholder mutual learning, an enhancement of some partnerships and further collaborations and ultimately a contribution to increase knowledge, now shared worldwide (Valente et al., 2011a; Schwilch et al., 2012a; Schwilch et al., 2012b).

WOCAT progress and its application in various contexts provided some important lessons to improve future initiatives and methodologies, namely:

- i) besides creating innovation, it is important to share existing knowledge on SLM and to monitor and assess SLM practices;
- ii) to stress the positive effects of SLM technologies and approaches, instead of focusing only on land degradation studies;
- iii) to create standardized and easy handling tools as well as education and training when and where needed;
- iv) to enhance stakeholder and science collaboration for bridging local, technical and scientific knowledge.



Many of the benefits of stakeholder participation, described in section 4.2.1.1, were also achieved under the DESIRE participatory methodology and the WOCAT initiative, namely in promoting social equity and social learning among those stakeholders included on documentation or on using WOCAT tools as decision-support tools (Schwilch, 2012).

5.3.3. Landcare: equity, sustainability, community...⁴⁸



5.3.3.1. Grassroots movement to sustainable resource management

Landcare can be defined as a grassroots voluntary movement characterised by a multi-stakeholder partnership between government, farmers, conservationists and community groups (Campbell, 1994 in Wilson, 2004). This movement started in 1986, as a programme to improve agricultural productivity, in a small town of the state of Victoria in Australia. Since then, many achievements have been accomplished, such as the creation of the National Landcare Programme⁴⁹, which aimed to develop and implement resource management practices to enhance Australia's soil, water and biological resources, funding landcare groups, and also the announcement of the 1990s as the 'decade of Landcare'.

Within 25 years the Landcare movement had evolved from the aim of finding solutions to combat desertification and erosion, to broader themes such as urban and coastal protection (Wilson, 2004). But landcare groups also grew in their structure and organization, from local catchments into regional and national processes and networks. Besides the spread of landcare groups all over Australia and to New Zealand and Fiji, it has also reached Africa (Republic of South Africa, Kenya and Uganda), America (USA, Canada and Jamaica), Asia (Sri Lanka and Philippines) and Europe (Iceland and Great Britain) (Youl et al., 2006).

Wilson (2004) defines Landcare, referring to several other authors⁵⁰, as an environmental movement to respond to the severe land degradation problems in Australia, but also as a social movement which emerged to respond to the agricultural crisis and rural depopulation that hit Australia over the last few decades, which contributed to a reduced sense of trust among the communities (Sobels et al., 2001). In fact, most landcare groups have been developed in rural contexts, being a model for community action to land degradation management moving towards

⁴⁸ From Andrew Campbell (First National Landcare Facilitator), presentation on Growing Sustainable Communities: 25 years of Landcare | 1986-2011, 12-13 October 2011, Iowa, USA.

⁴⁹ The National Landcare Program was formalised in 1989, and aimed to develop and implement resource management practices to enhance Australia's soil, water and biological resources. It was funded nationally by the Australian Commonwealth and finished in 2008. Webpage: <http://www.landcareonline.com.au/>

⁵⁰ Beale and Frey (1990); Barr and Cary (1992) and Curtis and Lockwood (2000) about land degradation in Australia; and Martin (1995) and Martin and Halpin (1998) about rural decline.



a more sustainable resource use (Curtis and De Lacy, 1996). The bottom-up philosophy under Landcare is presented as the key for its success. However, top-down government stimulus can be a catalyst for bottom-up community development (Sobbels et al., 2001; Youl et al., 2006).

5.3.3.2. Landcare activities

Landcare groups are known by their strong inclusiveness, usually formed around local catchments and based on a volunteer base. As Youl et al. (2006:10) referred «*Landcare groups come in all sizes (...). Existing public and farmer organisations spawned some groups while local and state governments catalyse others, as did numerous small circles of neighbours and friends*».

As previously mentioned, Landcare aims are strongly linked to SLM practices, with a huge on-ground work dimension. The activities take place on private and public land and include (Curtis and De Lacy, 1996; Sobels et al., 2001):

- i) Debate: meetings to discuss issues, identify priorities and develop actions and strategies;
- ii) Field days and walks: to observe problems and established demonstration sites;
- iii) Educational and promotional activities: hosting tours, conferences, newsletters, field guides, media releases, etc;
- iv) Planning activities: to coordinate planning activities at different levels (property, farm and catchment);
- v) Funding: preparation of submissions for government funding;
- vi) On-ground work: e.g. tree planting, pest animal and weed control, erosion control structures, etc.

Besides the specific landcare group activities, these groups started to develop interactions between them, creating 'Landcare networks' where the network acts as an umbrella organisation, increasing funding. These networks are described by Sobels et al. (2001) as more successful, increasing coordination, communication between and within the groups, but also increasing access to the resources (financial, experts) and bridging the gap between local landowners and national and regional planning bodies.

5.3.3.3. If Landcare did not exist, we would have to invent it...

Landcare is recognized as a success story, joining governmental and non-governmental advocates towards sustainability of Australia's and other countries natural resources. Several characteristics have been referred to as the key of success, namely the respect for local communities and local knowledge, the democratic and egalitarian features of the process, the support from both communities and government, and also the non-binding nature (Youl et al, 2006). These characteristics are linked to the many benefits and positive outcomes that have been documented during the last decades.



Curtis and De Lacy (1996) developed a survey in 1993 (applied to landcare and non landcare respondents) in 12 small catchments of the state of Victoria, aiming to assess the impact of landcare participation in raising awareness about land degradation issues, in increasing the level of knowledge and in adopting best practices. The study provided evidence showing that landcare participants were significantly more aware of land degradation issues, had greater levels of knowledge about land management and had higher levels of adoption of the best practices included on the survey. The discussion of problems and ideas, the joint work to tackle common problems and the possibility of getting financial and technical support are direct achievements of landcare participation.

Learning amongst communities and groups has been mentioned as one of the most important benefits of landcare participation, as it develops awareness about land degradation issues but also increases the capacity to deal with the bureaucracy, the confidence to discuss more complex concepts and information (Curtis and De Lacy, 1996; Youl et al, 2006). Youl et al. (2006) also describes empowerment as a major outcome from landcare networks, generating confidence in people, developing learning from experience and developing social capital.

The Figure 5.10 shows the main benefits of landcare activities. Raising awareness on land degradation issues together with more informed and skilled land managers can promote grassroots actions and a greater adoption of best practices. These benefits will probably have an impact on SLM.

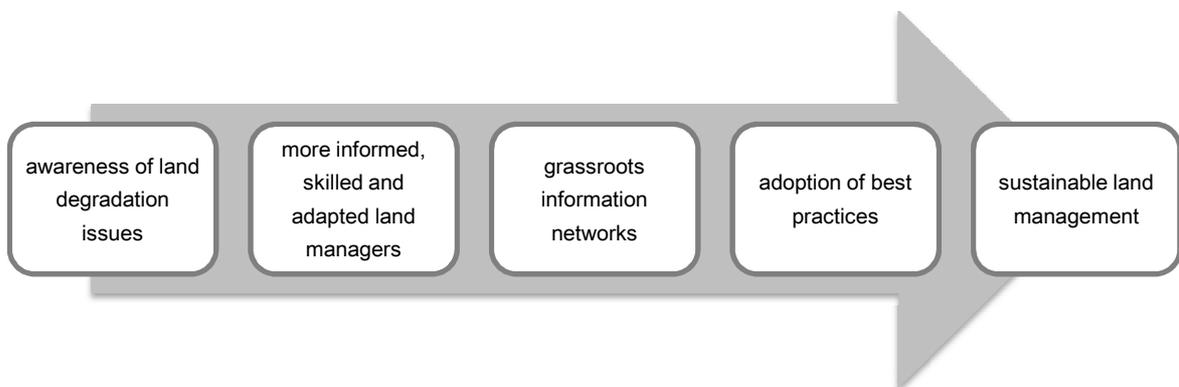


Figure 5.10: Benefits of participation in Landcare

Notwithstanding, landcare continuity demands dealing with some challenges, such as promoting self-sufficiency, raising urban involvement, maintaining government benefits, enlarging access of indigenous communities to funds, maintaining community ownership and converting the enthusiasm of planning into on-ground results (Youl et al, 2006).

A criticism is the close affiliation with the State and its agencies, although being a social movement. Another criticism is the failure in being totally inclusive, especially in what concerns women, aboriginal communities and other minorities. There is little evidence proving that landcare has been able to actively shape governmental policies.



5.4. Synthesis

The three described practical examples have been built on lessons learnt from previous experiences and evolved in their own structure, aims and methods. Throughout the last 15 years, LforS approach, WOCAT initiative and Landcare networks have been broadening their focus, building new partnerships, including new subjects, integrating new stakeholders and even improving the approach and methods used. The flexibility and interactivity of these initiatives are responsible for their maintenance over time, being reproduced in other parts of the globe (Cornwall and Jewkes, 1995). All the initiatives seem to meet the most relevant goals and benefits of participation. The promotion of social learning, as a change in individual understanding but also disseminated through social networks (Reed et al., 2010), was identified in the three examples as well as the endorsement of a systemic view of problems and solutions and the dissemination of locally-adapted solutions.

The participation methods and techniques used within these initiatives were quite different from each other, depending on the level of stakeholder involvement. WOCAT aims to listen and document experiences, providing a tool for decision-making, which can be used in a participatory methodology of SLM appraisal and selection (such as the one developed in the DESIRE project) to help local stakeholders to discuss best solutions to land degradation. LforS extension approach aims to discuss and agree on a vision and solutions, supporting their implementation and monitoring. Landcare represents a grassroots movement, where communities are empowered.

Stakeholder participation has been sometimes used in a superficial way by politicians and researchers to meet their needs, compromising the potential outcomes in terms of decision-making process and natural resources management. Many aspects have been mentioned as challenging issues, where the definition of the level of participation, of the methods and the selection of stakeholders are included. The thinking about the aims of the process will help to define the conditions and setting for holding participation, and will dismiss eventual pitfalls underlying participation. Using Reed (2008: 2426) words, «...*participatory processes may seem very risky, but there is a growing evidence that if well designed, these perceived risks may be well worth taking*». In this sense, planning a participatory approach is a crucial step.

Figure 5.11 presents a new proposed framework for designing a participatory approach developed in this research. After identifying the local setting and defining the issue at stake, the participation aims have to be clarified. In carrying out a stakeholder analysis and selection it is very important to select the 'right' participants who have influence and interest in the issue at stake and on the potential outcomes from participation. The third step is to select the methods and techniques most appropriate to the type of participants, the size of the group, their heterogeneity and their interests. The fourth step is implementing the participation process in the local setting, with the right stakeholders and right methods, using a professional facilitator and achieving the expected outcomes. This framework was used in the design of the participatory methodology described in Chapter 7.



Figure 5.11: Steps for designing a participatory approach

Reed (2008) identified eight key issues in order to promote best practices of stakeholder involvement, which are discussed here. Participation and stakeholder involvement in decision-making is already recognized as a successful alternative to traditional top-down approaches, which are increasingly refused by citizens. In environmental management, binding regulations are being complemented by grassroots movements towards best environmental practices. The value added by community approaches is even integrated in areas traditionally the domain of technical expertise and science. This goes along with **issue 1 - integration of local and scientific knowledge**. The methods and techniques available to facilitate this integration have also evolved from the traditional ones, such as surveys and public hearings, to more inclusive and innovative approaches, such as focus groups, workshops and community mapping. The WOCAT approach is a successful example of this integration, where local knowledge is combined with technical and scientific know-how, compiled and disseminated throughout the world.

Some key issues of best participation practices are focussed on process design, such as **issue 2 - time of participation**. Stakeholder involvement should start as soon as possible and maintained along the process, avoiding misuse of people's time in already taken decisions (Richards et al., 2004). The performance of participatory approaches also relies on the **issue 3 - identification of real aims** and on the right communication to stakeholders of those aims. **Issue 4 - tailoring the process and methods to the decision-making local context** - is related with meeting local communities' needs and with achieving locally better adapted solutions.

Issue 5 - stakeholder analysis and selection - was already mentioned as a challenging issue in participation. Representativeness is quite important, but innovative methods demand the integration of small stakeholder groups. Choosing the 'right' participants, and motivate them to participation, is connected with some benefits of participation, such as social equity and decision legitimacy and implementation. Another important aspect is the **issue 6 - role of skilled facilitators** in achieving a better performance of participation process, promoting equity, raising interest, trust and facilitating potential conflicts of interest.



Stakeholder participation needs to be underpinned in a philosophy that emphasises **issue 7 - empowerment, equity, trust and learning**, which was discussed throughout this chapter. Additionally to some potential direct outcomes, stakeholder involvement has the potential to increase social capital and learning and to empower communities in the management of their resources. LforS and Landcare approaches development highlighted these achievements.

A more aware, knowledgeable responsible and pro-active society will only be possible if their organizations support this change, through their willingness for sharing decision and power. This leads to **issue 8 - institutional change towards a participation culture** (Richard et al., 2004; Reed, 2008).



CHAPTER 6

STAKEHOLDER PARTICIPATION IN NATURAL RESOURCE MANAGEMENT: LESSONS FROM PORTUGUESE EXPERIENCES ABOUT THE ROLES OF CONTEXT AND PROCESS DESIGN⁵¹

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⁵¹ Data presented in this chapter were also published in:

de Vente, J., Reed, M., Stringer, L., Valente, S. and Newig, J., *in press*. How does the context and design of participatory decision-making processes affect their outcomes? Evidence from sustainable land management in global drylands. *Journal of Environmental Management*.



«Se os cidadãos sentirem que as suas opiniões influenciam efetivamente as decisões... isso fará com que eles participem»⁵²
Anonymous, 2012

6.1. Introduction

Stakeholder participation has become a common practice in decision-making processes, mainly due to the perceived benefits in achieving more socially acceptable decisions (Pretty, 1995; Beierle and Konisky, 2000; Stringer et al., 2006; Reed, 2008). Reasons for participation can be both normative, i.e. more focussed on process, and pragmatic, aiming to generate ‘better’ decisions (Reed, 2008). This is linked within the discussion whether participation should be an *end* (improving decisions’ efficiency) or a *mean*, as part of the process (Warburton, 1997). Environmental management is one of the fields where participatory processes greatly increased in the last years, as a mean to engage citizens in planning decisions, promoting the democratic right of participation on environmental decision-making, and to promote collaboration between scientists, policymakers and stakeholders at all levels, improving decisions (Beierle and Konisky, 2000; Carr and Halvorsen, 2001; Konisky and Beierle, 2001; Beierle, 2002; Hjortsø, 2004; Prell et al., 2006; Reed, 2008).

As already discussed⁵³, the spectrum of reasons for using participation is quite large and has different meanings to different persons (Richards et al., 2004). Additionally, there is a wide list of participatory approaches, methodologies and techniques (see: Arnstein, 1969; Wilcox, 1994; Warburton, 1997; Health Canada, 2000; Rowe and Frewer, 2000; Involve, 2005) as well as methods for stakeholder analysis and selection (see: Prell et al., 2006; 2009; Elsasser, 2007; Reed et al., 2009). Nevertheless, choosing and designing a participatory process is a complex challenge and a ‘one size fits all’ approach does not exist (NEA/OECD, 2004; Reed, 2008).

Stakeholder involvement in decision-making has the potential to develop governance, strengthen democratic legitimacy, stimulate active citizenship and promote capacity building (Carr and Halverson, 2001; Abelson et al., 2003; Involve, 2005). Several authors have also argued about the opportunities for social learning and change behaviours (Fraser et al., 2006; Stringer et al., 2006; Reed, 2008; Rawson and Hooper, 2012). But a major goal of stakeholder involvement is to deliver more sustainable decisions and to contribute to their acceptance and effective implementation. Nevertheless, participation is often overlooked and misused and is frequently absent or not fully integrated in decision-making processes (Buchy and Race, 2001; Rawson and Hooper, 2012). Moreover, there is a lack of empirical evidence on the outcomes of stakeholder participation in

⁵² Quote from a stakeholder interview responding to what makes stakeholders participate in environmental management; English translation: *«If the citizens feel that their opinions will effectively influence the decisions... this will make them to participate».*

⁵³ In Chapter 5: Public Participation: approaches, methodologies and best practices.



natural resources management (Buchy and Race, 2001; Reed, 2008; Martineau-Delisle and Nadeau, 2010).

The main question of the research presented in this chapter aimed to contribute to this gap, trying to understand if stakeholder participation, carried out within research projects, contributed to improving natural resource management and conservation. It assesses: i) social and environmental outcomes from stakeholder participation in projects concerning natural resources management; and ii) the role of the process design and of the local context in stakeholder participation. The ultimate goal was to contribute with some lessons for improving participation and stakeholder engagement in natural resources management projects. The research was supported by data collected from interviewing facilitators and participants in five different participatory processes concerning natural resources management developed in Portugal.

6.2. Scientific approaches to stakeholder participation in natural resource management

Environmental problems are complex, uncertain, multi-scale and affect diverse stakeholders (Reed, 2008). Therefore, it is increasingly recognized that decision-making processes concerning natural resources management should integrate multiple interests, values and types of knowledge (scientific, technical and lay perspectives). The importance of stakeholder participation gained particular visibility since the United Nations Conference on Environment and Development (UNCED) of 1992 in Rio de Janeiro, which was officially recognized in the Aarhus Convention, and focussed on interactions and cooperation between civil society and public authority in environmental management. But the recognition that stakeholders should influence environmental decisions (Prell et al., 2006; 2009; Reed, 2008) and that participation can enhance natural resource management (Luyet et al., 2012) has been driven by a raising societal interest about the environment, materialized in civic environmentalism, community-based environmental protection and ecosystem management, among other social movements (Beierle and Konisky, 2000). Other important issues were the international commitments (such as the UN conventions) and incentives, the recognition of participation as a democratic right and the failures of centralized and top-down forms of decision-making (Beierle and Konisky, 2000; Fraser et al., 2006; Reed, 2008).

The need for stakeholder involvement in environmental research has also been promoted by many scholars (e.g. Beierle, 2002; Brody, 2003; Sabatier et al., 2005; Halvorsen, 2006; Stringer et al., 2006; Dietz and Stern, 2008; Reed, 2008) as well as by leaders from all levels of government (Beierle and Konisky, 2000). Until recently, science was dominated by the positivist paradigm, and scientific knowledge was applied widely and irrespective of local context (Pretty, 1995). This caused, and is still causing, some disagreement among the scientific community with two opposing paradigms. The first paradigm is characterized by objectivity and rigour, which is provided by a quantitative and top-down model of scientific research, but it is quite difficult for local people to use. The second paradigm embraces a participatory learning process between



communities and researchers, critically evaluating both scientific and local knowledge (Pretty, 1995; Glicken, 2000). The needed transition from the first to the second paradigm was well expressed in the words of Cornwall and Jewkes (1995: 1674): «...conventional research can, and has an imperative to, adapt to increasingly participatory agendas. Not only can insights of local people improve the quality of research and ensure face validity, their involvement has important implications for the sustainability and appropriateness of interventions».

Participatory natural resources management is then a process that engages stakeholders on multiple levels of decision-making and facilitates the formation and strengthening of relationships among them that may lead to increased trust, collaboration and mutual learning (Grimble and Wellard, 1997; Stringer et al., 2006; Prell, et al., 2009). Including participation in natural resources management has also the potential to increase the sense of public ownership and responsibility for environmental problems (Evely et al., 2011). The opportunities for developing understanding, learning new skills, change behaviours (Evely et al., 2011; Rawson and Hooper, 2012) and promote social learning (Tippett et al., 2005; Reed, 2008) are also potential strengths of stakeholder participation.

The idea of combining traditional scientific knowledge with new qualitative and bottom-up approaches including local knowledge can also enhance learning by both public and scientists (Pretty, 1995; Reed et al., 2006). Relatively new scientific approaches, such as participatory research (Cornwall and Jewkes, 1995; Blackstock et al., 2007) or action research (Rist et al. 2006; Cerf, 2011), claimed to be more likely to lead to the understanding of more complex systems, to define more durable and equitable solutions and to increase active citizenship (Blackstock et al., 2007). Participatory research is a collaborative process for problem solving, generating co-production of knowledge through sharing perspectives and experiences (Blackstock et al., 2007). So, it is characterised as 'knowledge for action', through respecting and understanding the people with and for whom researchers work and also involves the potential to explore local knowledge and perceptions (Cornwall and Jewkes, 1995). Action research should start by people expressing their need and willingness to change, and look for collaboration between researchers to jointly investigate why and how to achieve that change (Cerf, 2011). The use of both participatory research and action research depends on the attitude of researchers, which determines how, by and for whom participation is (Cornwall and Jewkes, 1995). de Vente et al. (*in prep.*) highlighted that some researchers still favoured top-down and 'evidence-based' approaches, demonstrating unpreparedness to use bottom-up approaches.

Despite the claimed benefits of participation, there is still a lack of literature assessing if those are really achieved in practice (Blackstock et al., 2007; Reed, 2008). There is also no guarantee that participatory research leads necessarily to increased scientific knowledge (Cerf, 2011). Participation successfulness depends on who participates, on the level and design of participation, on communication, transparency and trust issues, on links to policy or public action, among many other factors (Fung, 2006; Reed, 2008). Furthermore, participants, facilitators and promoters of a



participation process can develop different, and sometimes opposite, goals and expectations over the same process (Abelson and Gauvin, 2006).

The evaluation and monitoring of participation is though a crucial step in order to identify best practices of participation. Previous attempts to critically analyse participation have typically been based on qualitative case study approaches or on comparisons of case studies in very different contexts (for a recent overview see Newig and Kvarda, 2012). However, there is little information on the evaluation criteria to assess the performance of participatory approaches and methods (Rowe and Frewer, 2000; Carr and Halvorsen, 2001, Beierle, 2002; Abelson et al., 2003; Abelson and Gauvin, 2006) and previous assessments were usually focussed on the process rather than on the outcomes (Beierle and Konisky, 2000; Buchy and Race, 2001; Blackstock et al., 2007; Reed, 2008).

6.3. Research methodology

The benefits of joint work between researchers and local communities, have promoted major efforts by the academia to increase stakeholder involvement in science, but a comprehensive evaluation of the benefits and limitations of stakeholder involvement in those experiences is often lacking or limited to the researchers perception, excluding other participants' opinions (Martineau-Delisle and Nadeau, 2010).

This study provides an assessment of stakeholder participation in five projects concerning natural resources management in different regions of Portugal. Aiming to evaluate the main social and environmental benefits generated by participation as well as the role of process design and of local context on a successful stakeholder participatory process, the perspectives of a small group of participants and facilitators are analysed⁵⁴. Due to its limited setup, the analysis does not aim to generate major statements with the aim to contribute to the improvement of future stakeholder participation processes.

6.3.1. Research projects and participatory processes

The cases of participatory approaches were selected on the basis of two main criteria: i) project aims related with natural resources management and conservation; and ii) inclusion of different levels of stakeholder involvement (e.g. consultation techniques, workshops, seminars, training sessions, field visits...). DESERTLINKS⁵⁵, DESIRE³⁰ and MEDACTION⁵⁶ are international projects promoted by scientists and focussed on desertification and environmental degradation.

⁵⁴ Data collection was carried out in collaboration with the Involved project, funded by a Research Development Award from the British Academy to Mark Reed. The project is collaboration between the University of Aberdeen, the University of Leeds, The Leuphana University and the EU funded project DESIRE. Webpage: <http://homepages.see.leeds.ac.uk/~lecmsr/involved/>

⁵⁵ DESERTLINKS - Combating Desertification in Mediterranean Europe: Linking Science with Stakeholders was funded by European Commission under Framework Programme 5. Webpage: <http://www.kcl.ac.uk/projects/desertlinks/>

⁵⁶ MEDACTION – Policies for Land Use to Combat Desertification was funded by European Commission under Framework Programme 5. Webpage: <http://research.ncl.ac.uk/medaction/>



Restoration of Burned Areas (RAA)⁵⁷ project is a national initiative, funded by the Portuguese government, aiming to increase and disseminate knowledge about post-fire management and environmental restoration after fires (Coelho et al., 2010b; Moreira et al., 2010b). Finally, Agenda 21 Local of Mindelo (A21L Mindelo)⁵⁸ is a community-based approach, held in a small village in northern Portugal, to develop an Action Plan for Sustainable Development, with a special focus on environmental conservation of a sensitive sub-humid area.

Table 6.1 describes the level of stakeholder involvement, the initiator of the process, the participation methods and techniques and the type of stakeholder selection for the five cases of participatory approaches used in scientific projects. Using Pretty (1995) categorization, the evaluated processes ranged from stakeholder consultation, where people were consulted, to interactive participation, where people jointly analysed, discussed and developed a decision (e.g. action plan, recommendations, specific technologies, etc). Stakeholder involvement in the RAA project aimed to meet some project goals, such as providing training on post-fire management. The participatory process held in this project was an example of functional participation, aiming to meet predetermined goals related with the project (Pretty, 1995).

Table 6.1: Overview of research projects

Project	Participation level (Pretty, 1995)	Initiator	Methods and Techniques	Stakeholder selection (Fung, 2006)
MEDACTION (2001-2004)	Participation by consultation	Science	Stakeholder meeting; Questionnaires.	Open, target-recruiting: Farmers, local and national GO and NGO, scientists.
DESERTLINKS (2001-2004)	Interactive participation	Science	Stakeholder workshop; Questionnaires.	Open, target-recruiting: Farmers, local and national GO and NGO, scientists.
A21L Mindelo (2003-...)	Interactive participation	Environmental NGO	Field survey; Questionnaires; Workshops; Public meetings.	Diffuse public sphere: Local communities, local and regional GO and NGO.
RAA (2005-2010)	Functional participation	Science/ Policy	Field surveys; Workshops; Training sessions.	Professional stakeholders: Forest technicians from national, regional and local GO and NGO.
DESIRE (2007-2012)	Interactive participation	Science	Questionnaires; Interviews; Stakeholder workshops; Field visits.	Open, self-selection: Landowners, local, regional and national GO and NGO, agro-forestry industry.

⁵⁷ RAA project was funded by the FFP. Webpage: <http://www.phoenixefi.org/content/1/24/raa-homepage/>

⁵⁸ A21L Mindelo was promoted by a local NGO - Associação dos Amigos do Mindelo para a Defesa do Ambiente. Webpage: <http://www.jf-mindelo.pt/>



All evaluated participatory processes were initiated by scientists, except for the A21L Mindelo that was started by an environmental Non-Governmental Organization (NGO). Fung (2006) distinguishes participation dimension according to who participates, varying from a more restrictive to more inclusive approaches (Table 6.1). A21L Mindelo was an open and inclusive process. DESIRE, DESERTLINKS and MEDACTION were also open, but key and representative stakeholders were recruited to participate based on a stakeholder analysis. RAA participatory activities assembled professional stakeholders from all country, particularly forest technicians, representing local, regional or national GO or NGO.

Stakeholder involvement activities of the evaluated projects were developed during the last decade, but most participants were unable to identify accurately the date and type of decision achieved. The DESIRE project was an exception, probably because it was the most recent project and by the time of the survey participants were still receiving some information about the project. A21L Mindelo is a continuous process, but was fading out by that time.

6.3.2. Methods of data collection and analysis

A survey was carried out in 2011 in which 22 respondents, distributed by the five participatory processes, were interviewed using a two-part template: a qualitative and quantitative part. The qualitative data was gathered through a semi-structured interview⁵⁹ with participants and facilitators of the process questioning: i) some background information about the participant or facilitator (e.g. role on the process, age, gender) and about the research project (e.g. environmental problem, process duration); ii) factors that make participation work in achieving goals of natural resources management; iii) challenges to participation in the context of the specific project; and iv) main outcomes from participation. The interviews were transcribed from audio recordings and translated into English and then analysed using grounded theory analysis (Glaser and Holton, 2004).

The second part of the survey consisted of 55 closed questions, where respondents were asked to score (using a scale from '0 to 4' or from '-4 to 4') questions relating to: i) the environmental and social outcomes from the process (results' feasibility, flexibility and sustainability as well as equal participation, social acceptance, implementation, etc.); ii) the process design (rationale, methodology, stakeholder selection, etc.); and iii) the context where participation took place (legal setting, public attention, conflicts, etc.). The data were analysed using Spearman's rank correlation coefficient (Spearman's rho) to identify statistical dependence between context, process design and outcomes. This data was only gathered for four projects, as only two participants from MEDACTION were found available to be interviewed and one did not provide any quantitative data.

⁵⁹ The survey template was developed under project Involved. Annex 4 - Interview template.



6.3.3. Selection of respondents

The respondents had performed different roles in the participatory process, being either facilitators (1 per project) or participants (Table 6.2). Participants were also distributed among five target groups, represented in each participatory process, including scientists, GO, NGO and general public (Table 6.2). All facilitators and two of the participants were researchers. Although gender was not a selecting criterion, there were 9 female and 13 male respondents. The respondents within each project were selected ensuring different types of stakeholders. Some projects were developed 10 years ago, with no further contact between researchers and participants, being quite difficult to find people available to participate in this study.

Table 6.2: Respondents distribution by type of stakeholder and by research projects

Role on the process	Type of stakeholder	MEDACTION	DESERTLINKS	A21L MINDELO	RAA	DESIRE	Total
Participants	Scientists				1	1	2
	GO stakeholders		1	1	3	2	7
	NGO stakeholders	1	2	1		1	5
	Citizens		1	2			3
	Total	1	4	4	4	4	17
Facilitators	Scientists	1	1	1	1	1	5
Number of respondents		2	5	5	5	5	22

6.4. Results from stakeholder participation in natural resource management

The results section is divided in two main parts. The first part is related to respondents' particular experience within the project and is focussed on the outcomes, context and design of the participatory process. The second part deals with respondents' perceptions about factors and challenges to make participation in natural resources management work, highlighting which issues are related with process design and which are linked to contextual parameters.

Using keywords from what respondents said, Table 6.3 describes the main environmental problems affecting the study areas addressed in the participatory cases. Desertification and land degradation were important topics in DESERTLINKS, MEDACTION and DESIRE cases. These problems were connected with soil erosion, soil productivity losses and biodiversity degradation. MEDACTION and DESERTLINKS had study sites located in south Portugal (respectively, Mértola and Castro Verde municipalities), where climate is drier and rainfall is lower. The link between desertification and rural abandonment and ageing was also discussed in the three cases. In DESIRE project, repetitive and intense forest fires were considered the main cause of desertification in central Portugal (Mação and Góis municipalities).

The central problem addressed in RAA project was also forest fires, but mainly focussed on mitigating the problems of soil erosion and runoff after fire (Table 6.3). Although concerning also



environmental problems, the A21L Mindelo deals with different problems such as the abandonment and degradation of a sensitive sub-humid area as well as water and air pollution and also the lack of environmental awareness among citizens (Table 6.3).

Table 6.3: Main environmental problems affecting the areas studied in the research projects

Project	Study areas	Main environmental problem	Quotes from qualitative interview
MEDACTION	Castro Verde – Alentejo region	Desertification	«Desertification is a generic name to something very complex and that cannot be described or pointing solutions as a single problem» [NGO, participant]
DESERTLINKS	Mértola – Alentejo region	Desertification/ land degradation/ soil erosion Extreme events Socio-economic drivers and impacts	«The environmental problem here is soil erosion. The number one! What are the causes? Mainly bad agricultural practices, such as successive tillage throughout the years in a skinny and poor land, with 10 or 15 centimetres of land...» [Citizen, participant] «Extreme events (precipitation and droughts) are increasing and this leads to insecurity» [GO, participant] «...agriculture abandonment. People say that their fields are not productive and this leads to abandonment or to bad practices, such as monocultures» [GO, participant]
A21L Mindelo	Mindelo – north region of Portugal	Threat to an environmental sensitive area Pollution Socio-economic drivers and impacts	«The problems were the protection of the natural values in the Mindelo Ornithological Reserve and the conflicts with landowners» [Scientist, facilitator] «The cowsheds... I think it will be solved with the regulations» [Citizen, participant] «The main environmental problem is the social disobedience to the environmental rules, not only domestic but also industrial» [Citizen, participant]
RAA	National level	Forest fires/ Burned areas Land degradation/ soil erosion/ runoff	«It must be assessed the emergence situations after a fire, related with risk of soil erosion, degradation of water quality or even floods, runoff, putting at risk infrastructures, people and other goods» [Scientist, participant] «The burnt areas have huge environmental impacts, mainly soil and water. The water quality of the river basin, the sediment and soil losses... Has a huge environmental impact, and which can be translated in money» [GO, participant]
DESIRE	Góis and Mação - central region of Portugal	Forest fires Land degradation Socio-economic drivers and impacts	«The main problem, environmental problem is in our case and in both projects are forest fires» [Scientist, facilitator] «basically the environmental problem is forest fires that can, induce desertification, loss of productivity, loss of biodiversity, desertification on site and they can then in physical terms they can increase the amount of nutrient in the particular ecosystem off site and they can even induce flood peaks» [Scientist, participant] «Forest fires are closely related with human depopulation, because of land and traditional activities abandonment, such as fuel and wood collection and farming practices. (...) The major difficulty is the absence of intervention after fire, there is no people living there. Besides some little intervention with economic purposes, the major part remains without any intervention, wasting an important economic resource» [NGO, participant]



6.4.1. Outcomes from stakeholder participation in natural resource management

Table 6.4 presents the main outcomes from stakeholder participation identified by participants and facilitators considering their experience in the analysed projects. The analysis of the qualitative data highlighted knowledge exchange and mutual learning as the outcome mentioned most, especially in RAA (more related with knowledge exchange) and DESIRE (more related with mutual learning). Increasing the environmental social awareness and citizenship was the most important aspect in the A21L Mindelo mentioned to by all respondents.

Table 6.4: ‘What are the most important outcomes from stakeholder participation based on this particular participatory experience?’

Outcomes	Description	Quotes from qualitative interview
Knowledge exchange and mutual learning 11/22 respondents	Related with exchanging experiences and knowledge between different types of stakeholders. Mostly referred in DESIRE and RAA.	«Mutual learning, I would say mutual learning is maybe one of the most important» [Scientist, facilitator, RAA project] «...this can lead to a platform of information and ideas exchange and allowing to discuss solutions» [NGO, participant, DESIRE project]
Citizen awareness and active citizenship 8/22 respondents	Aspect mostly mentioned in A21L Mindelo, concerning the increase of environmental education and societal awareness about local problems Societal awareness about desertification problem – two respondents in DESERTLINKS	«These processes are always important because they contribute to increase the degree of environmental education and make people more demanding in relation to the environmental practices, their own practices and their neighbours practices» [Scientist, facilitator, A21L Mindelo].
Scientific and technical outputs 8/22 respondents	Most important for RAA respondents, concerning the transfer of technical knowledge and development of some tools (handbook)	«Other outcome was the transfer to the local level of some technical and scientific knowledge...» [NGO, participant, DESIRE project] «...the publication of this handbook, which is extremely helpful for any doubt we have we can consult this. This handbook is easy to use and can help to implement some techniques» [Scientist, participant, RAA project]
Networking and further collaboration 6/22 respondents	Mostly mentioned by participants in DESIRE and DESERTLINKS concerning the establishment of contacts and further cooperation among stakeholders	«For me it was the cooperation inside entities and also inter-entities» [NGO, participant, DESIRE project]
Reaching consensus 4/22 respondents	Referred by participants, consensus around important problems and subjects	«...to articulate interests of different publics about the same subject. To join these persons in thinking about a common thematic is not easy; they have with different visions» [NGO, participant, DESERTLINKS project]
No outcomes 3/22 respondents	1 participant from MEDACTION 1 participant from A21L Mindelo 1 participant from RAA	«The lessons learnt were that these initiatives did not change their behaviour [technicians]; the participation was located inside the room and during the moments proposed» [Scientist, participant, RAA project]
Less mentioned outcomes (1 or 2 respondents): contribution to local and national policies; involve hard-to-reach stakeholders; more effective decisions; conflict mitigation.		

Another very important aspect mentioned by participants was the delivering of scientific and technical outputs (this aspect was mostly mentioned to in RAA project, namely publications with technical information, training courses and other material). Three participants from different



cases mentioned that no outcomes were achieved from participation, based on their particular experience.

The lack of implementation of decisions on the ground is responsible for some disillusionment and distrust about participation. The five cases of participatory approaches aimed to identify local priorities of the relevant environmental problems and enabled a dialogue between the interested parties about potential solutions. Although implementation of the solutions within the research projects was not an objective in four of the evaluated participatory processes, it was expected that each process would contribute to increase the acceptance and implementation of the solutions proposed. The aim of A21L Mindelo was to develop and implement actions for sustainable development. However, the majority of the actions proposed had to be implemented and supported by Governmental Organization (GO), which fell below expectations. The DESIRE case represents the exception, where a field trial was planned within the project activities and there was an opportunity to test and monitor the selected SLM technologies.

Table 6.5 ranks respondents' assessment of the main benefits of participation, using quantitative data. As aforementioned, MEDACTION project was not included in this analysis due to the lack of quantitative data. The average score provides the mean of all respondents from all projects and higher values demonstrate better performances of each variable. The standard deviation provides a measure of variation between the results from each project. Higher values present higher variations.

Table 6.5: Benefits of the four participatory processes (scores and standard deviation)

OUTCOMES	AVERAGE SCORE (possible range)	STANDARD DEVIATION
Sustainable solutions	3.33 (0 to 4)	0.7
Understanding of the problem by participants	3.25 (0 to 4)	0.7
Acceptance by the competent authority	3.17 (0 to 4)	1
Mutual gains/ win-win solutions	3.05 (0 to 4)	0.8
Feasibility of solutions	2.88 (0 to 4)	0.9
Information input to decision by participants	2.85 (0 to 4)	0.8
Acceptance by other participants	2.85 (0 to 4)	1.3
Acceptance by implementers	2.78 (0 to 4)	0.9
Flexible solutions and adaptive to new knowledge	2.65 (0 to 4)	1.2
Trust between competent authority and scientists	1.95 (-4 to 4)	1.4
Socially equitable output	1.89 (-4 to 4)	1.8
Economically rational output	1.89 (-4 to 4)	2.2
Conflict resolution	1.82 (-4 to 4)	1.1
Implementation of solutions	1.71 (0 to 4)	1.2
Trust between non-state actors and scientists	1.45 (-4 to 4)	1.6
Trust between non-state actors	0.95 (-4 to 4)	1.8
Attainment of initial goals	0.7 (-4 to 4)	1.1
Trust between non-state actors and competent authority	0.32 (-4 to 4)	1.9



Respondents found that the solutions/decisions proposed met the initial aims and did not produce environmental negative impacts. In fact, the decisions were considered reasonably feasible, flexible and adaptive to new conditions (Table 6.5). Respondents also stated that the solutions were economically rational, socially equitable and sustainable, the latter representing the highest average score (Table 6.5). However, they indicated that decisions are not being implemented and complied with.

Participants mentioned understanding the problem better after participation in all processes (Table 6.5) and respondents believe that all stakeholder groups' involved in decision-making (competent authorities, implementers and scientists) accepted the decision reached through participation (Table 6.5).

Trust was only slightly built-up among different groups of stakeholders (between scientists and authorities; between scientists and public; amongst public) during this process (average scores on these variables were below 2; Table 6.5). The scores under these variables also presented higher standard deviation showing major discrepancies between different projects. In fact DESIRE and A21L Mindelo participatory cases performed better in building trust. In RAA participatory case, respondents attributed a negative score to trust between authority and public (-0.5) and amongst public (-1.3) and a positive score (1.6) to trust between scientists and authority.

6.4.2. The role of process design in stakeholder participation

A21L Mindelo was a citizen initiative, while DESIRE, DESERTLINKS and RAA projects were initiated by researchers, based at academic institutions. Although the competent authority was not the main initiator, respondents considered them as participants and even as a mediator in RAA and A21 Mindelo cases. In all processes, stakeholder selection was not rigorously controlled, but respondents believed that there was a reasonably legitimate representation of all affected parties with only minor power imbalances during participation. Respondents identified a high representation of important leaders and a medium representation of the ones who have to implement the decisions. Respondents mentioned that non-state actors (including landowners, civil society organizations and private enterprises) influenced reasonably the decision-making in all processes. In A21L Mindelo and DESERTLINKS cases, it was considered that NGOs' participants received little information from GOs' representatives. Discursive fairness (i.e. people allowed to initiate the discourse and to participate during decision-making process) was found high in all cases as well as equal opportunities to contribute to decision and information exchange, through face-to-face discussions.

The significant ($p < 0.01$) and weaker associations ($p < 0.05$) between outcomes and process design are presented in Table 6.6. A fair distribution of the discourse (discursive fairness) among the participants was significantly positively correlated with more socially equitable outputs, an increase of trust amongst civil society and an increased learning by participants. Weaker association were also found with more feasible outputs and a greater acceptance of decision by



implementers (Table 6.6). Learning by participants and socially equal outcomes were also associated with equal opportunities in the decision-making process ($p < 0.05$).

Table 6.6: Significant Spearman correlations between outcomes and process design variables

SPEARMAN'S RHO		OUTCOMES										
		3	5	6	7	10	11	12	14	16	17	
PROCESS	Involvement of implementers										0.52*	
	Power imbalance							0.48*				
	Communication to non-state actors			0.62*								
	Deliberation with equal opportunities					0.49*					0.52*	
	Discursive fairness to all participants	0.62**			0.62**	0.54*	0.51*				0.53*	
	Participation rationale: empowerment						0.61*					
	Participation rationale: democratic legitimacy				-0.72*							
	Participation rationale: conflict resolution										0.72*	
	Participation rationale: legal requirements					0.80*						
	Participation rationale: environmental benefits										0.60*	
	Competent authority as participant									-0.51*	0.54*	
	Competent authority as mediator				0.59*							-0.51*
	Structured information aggregation		-0.53*									

(*: significant with $p < 0.05$; **: $p < 0.01$; empty cells mean not significant)

Key for outcomes: 1: Information gain; 2: Attainment of initial goals compared to final decision; 3: Feasible solutions; 4: Flexible solutions and adaptive to new knowledge; 5: Sustainable solutions; 6: Conflict resolution; 7: Acceptance by implementers; 8: Acceptance by authority; 9: Acceptance by participants; 10: Learning by participants; 11: Trust amongst civil society; 12: Trust between civil society and authority; 13: Trust between civil society and scientists; 14: Trust between authority and scientists; 15: Economically rational output; 16: Socially equitable output; 17: Actual (expected) implementation of solutions.

Participatory approaches can be used to promote the efficient achievement of certain goals or to mitigate specific conflicts or to reinforce democratic legitimacy. The efficient achievement of goals and the achievement of environmental benefits were identified as main rationales for participation in all cases (Table 6.7). Democratic legitimacy and empowerment were also considered important rationales in DESIRE and DESERTLINKS cases. No significant association was found between the rationale for using participation and participation outcomes (Table 6.7).

Table 6.7: Rationale for using participation (scores)

RATIONALE	DESERTLINKS	A21L MINDELO	RAA	DESIRE
Empowerment	4	2.7	Not relevant	3.4
Democratic legitimacy	4	Not know	Not relevant	3.4
Instrumental (achievement of specific goals)	3.7	3.7	3.8	3.2
Conflict resolution	3.3	Not know	Not relevant	2.2
Legal requirements	3.3	Not know	Not relevant	0.75
Environmental benefits	3.3	3.8	2.8	3.4



Concerning the participatory methodologies used in the evaluated cases, respondents mentioned that participants did not have the opportunity to self-design the processes and considered the methods highly structured. The information provided by participants was aggregated (e.g. voting) and the process was conducted by a facilitator.

6.4.3. The role of context in stakeholder participation

Using quantitative data provided by respondents, 18 of 20 respondents indicated that there are laws regulating the policy field of the environmental problem at stake. However, laws were considered uncertain and ambiguous, which correlated negatively (with weaker association; $p < 0.05$) with sustainable and socially equitable solutions.

The decision-making process was classified as reasonably autonomous (average score above 2.5 in all processes) and there were two or three levels of governance involved (local, regional and national). A higher number of governance levels involved in the decision-making process correlated positively both with feasible solutions and trust between authorities and scientists ($p < 0.01$). DESIRE and DESERTLINKS processes were developed at the municipal level, but also included the involvement of national and regional stakeholders. The RAA project took place at national level and A21L MINDELO was developed at sub-municipal level. Most of the respondents considered participation an uncommon practice at the local context.

The problems discussed within the evaluated processes were considered very complex (Table 6.8) and strongly related to nature conservation and with exploitation of scarce natural resources (Table 6.8). Respondents considered that Portuguese people are all affected by the problem under discussion. An exception was the A21L MINDELO process, which was a more local problem, with local dimension. In DESIRE and RAA projects, related to their concern with wildfires, a previous law, the competent authority and the general society were viewed as responsible for bringing the problem on the agenda. Media and society attention for the problems at stake were not high, except in wildfire-related DESIRE project (Table 6.8). The RAA project was related with post-fire management, which is still a neglected component of fire management (Table 6.8). Significant correlation ($p < 0.01$) was found between the acceptance of solutions by non-state actors and problems brought on the agenda by a previous law or by the general public (Table 6.9).

Table 6.8: Environmental problems addressed in participation (scores)

ENVIRONMENTAL PROBLEM	DESERTLINKS	A21L MINDELO	RAA	DESIRE
Linked to nature conservation	4	4	3.8	3.8
Linked to human health	3.6	2	3	2.8
Related to exploitation of scarce resources	4	2.8	1.2	3.2
Complexity	3.8	3.2	3.4	3.6
Public attention	1.4	1.6	1.8	3



Table 6.9: Significant Spearman correlations between outcomes and context variables

SPEARMAN'S RHO		OUTCOMES																	
		1	2	3	4	5	6	7	9	10	11	12	13	14	15	16	17		
CONTEXT	Uncertain and ambiguous laws					-0.48*											-0.54*		
	Governance scale			-0.63**										0.58**					
	Agenda setter:	previous law								0.78**	-0.55*								
		non-state actors								0.80**			0.52*					0.47*	0.55*
		research project	-0.55*															-0.49*	
	Networking between	non-state actors (NSA)					0.55*						0.47*					0.49*	
		NSA and authority		0.59**					0.63**										
	Participation culture																	0.51*	
	Problem related to	nature conservation							-0.63*										
		human health												-0.70**					
	Problem complexity									0.62*					0.50*				
	Conflict of values	-0.56*																	
	Win-win potential																0.55*	0.68**	
	Problem understanding	government									0.48*		0.51*	0.55*	0.54*				0.50*
		private enterprises						0.86**					0.76**						
		NGO										0.51*		0.50*	0.51*				
		individuals												0.57*					
Cooperating individuals				0.57*															

(*: significant with $p < 0.05$; **: $p < 0.01$; empty cells mean not significant) **Legend:** 1: Information gain; 2: Attainment of initial goals; 3: Feasible solutions; 4: Flexible solutions and adaptive to new knowledge; 5: Sustainable solutions; 6: Conflict resolution; 7: Acceptance by implementers; 8: Acceptance by authority; 9: Acceptance by participants; 10: Learning by participants; 11: Trust amongst civil society; 12: Trust between civil society and authority; 13: Trust between civil society and scientists; 14: Trust between authority and scientists; 15: Economically rational output; 16: Socially equitable output; 17: Actual implementation of solutions.



It was also asked whether certain stakeholders were cooperative towards the process and how well they understood the environmental issue at stake. In general, cooperation was lower than problem understanding, as participants and facilitators in all processes attributed higher values to understanding than to cooperation (Table 6.10). NGOs were considered the most cooperative group with best problem understanding (Table 6.10).

Table 6.10: Stakeholder contribution towards the process and good understanding of the problem at stake (scores)

STAKEHOLDER GROUP	COOPERATION/ UNDERSTANDING	DESERTLINKS	A21L MINDELO	RAA	DESIRE
Government	Cooperation	2.4	2.4	3	2.4
	Understanding	2.8	2.6	3	2.6
Private enterprises	Cooperation	2.4	2.7	2	Not relevant
	Understanding	2.2	2.3	3	Not relevant
NGO	Cooperation	3.4	3	2.4	3.3
	Understanding	3.6	3	3.2	3
Individuals	Cooperation	2.4	2	Not relevant	3
	Understanding	2.4	2.4	Not relevant	3.2

Respondents indicated little trust and weak dynamics of social networks between different stakeholder groups. The lower average values were reported on trust and social networks amongst civil society and between civil society and authorities. There were no major conflicts between stakeholders about the problem or about the area where a certain problem should be solved, and it was generally considered that decisions made in the process had a win-win potential regarding environmental and socioeconomic objectives. Greater win-win potential of the decisions correlated positively with more socially equitable solutions ($p < 0.01$).

6.4.4. Key factors for making participation successful on natural resource management

Respondents were asked to identify general aspects for making participation work in achieving goals in natural resources management, as part of the qualitative interview. Similar themes emerged from the qualitative analysis of the main challenges to participation in the context of the evaluated processes. These themes were grouped into eight key factors for successful participation (Table 6.11), where stakeholder selection stood out as the most relevant factor. Many of the key factors identified by respondents were related with process design (e.g. stakeholder selection, facilitation methods, power balance), which can be optimised to increase chances for success. However, some issues were also related to contextual factors (e.g. trust, participation tradition, local support from GO) that are more difficult to change.



Table 6.11: Key factors for making participation successful in achieving goals in natural resources management (description, representative quote and connection to the identified challenges)

Key factors	Description	Quotes from qualitative interview	Link to challenges in the context of the evaluated processes
Stakeholder selection 17/22 respondents	Stakeholder analysis, mainly concerning the following issues: to include local communities; to select key persons and opinion leaders; to include policy and decision makers; to ensure representativeness, inclusiveness and gender balance.	«To include key persons, these persons are important to make contacts and to promote awareness among other persons» [Citizen, participant, A21L Mindelo]	To deal with stakeholder diversity To motivate participation
Process design and facilitation methods 12/22 respondents	The aims of participation processes need to be clearly defined. Participatory process should: follow a step by step structure; use high quality and innovative tools; have 'good' information and dissemination; and use of a friendly and relaxing environment.	«The methodology was very interesting, very participative and inclusive and that make people think and exchange knowledge...» [GO, participant, DESIRE project]	To use the right facilitation
Power balance 11/22 respondents	The willingness to share power between GO and NGO should be in place as well as to ensure equal influence on decision-making process. The inclusion of local knowledge.	«It is the competent authority that demonstrate if there is effective participation or not, if the contribution of public participation is included in the decision making process or not» [Scientist, facilitator, A21L Mindelo]	To deal with power imbalances
Trust 7/22 respondents	The process should be transparent and trust between diverse stakeholder's groups should be in place. The promoters of participation should be respected by participants.	«... to have an intermediary to win farmers' trust, otherwise there will be some mistrust...» [Farmer, participant, DESERTLINKS project]	To build-up trust
Subject addressed 5/22 respondents	The subject has to be related with people's interests and needs and should address feasible solutions.	«Greater interest about the subject will also lead to greater participation of local communities. The thematic has to be related with people's interests» [NGO, participant, DESERTLINKS project]	To ensure that everyone understand the issue at stake To deal with multi-dimensions of a subject
Participation follow-up 4/22 respondents	Participation process follow-up should be planned, namely the dissemination of participation outputs and financial sources for implementation.	«The second factor is obviously the funding. After having specific problems and ideas, there is the need of funding (private or public)» [Scientist, participant, RAA project]	To make people accept innovation and change behaviours To implement solutions
Local context 3/22 respondents	Participation process should be organized in loco.	«Another aspect is the constant appeal to the local pride, to the local identity» [NGO, participant, A21L Mindelo]	To have a suitable policy and institutional framework
Stakeholder perception on participation 3/22 respondents	Avoid stakeholder fatigue and prevent participatory processes with unrealistic outcomes.	«The problem is that until recently public participation was uniquely used by politicians to legitimate their decisions» [NGO, participant, DESERTLINKS project]	To deal with stakeholder fatigue or participation inexperience



Dealing with stakeholder diversity was indicated as a challenge in the context of the evaluated processes, namely to overcome individual interests and power disparities and to reach consensus in a group with multiple backgrounds, expertise and schooling. Additionally, farmers are generally older and less educated than other non-State and State participants. This represents a dual challenge, as the farmers can be considered 'hard-to-reach' citizens (Timotijevic and Raats, 2007) and the latter group tends sometimes to teach the former instead of sharing and listening, even if they have similar roles in the participatory process. This occurred for example in the first DESIRE stakeholder workshop, where GO representatives attempted to control discussions on the second day leaving little room for other stakeholders.

Process design and facilitation methods are increasingly recognized as important for participation success. Based on the qualitative statements, the respondents identified 'good' information as crucial to make people embrace these initiatives. DESIRE respondents highlighted innovative methods and exercises. Similarly to the quantitative results from the interviews, power balance and trust also emerged as relevant factors to make participation work from the qualitative analysis.

The relevance of the subject addressed was also mentioned by five respondents. This is linked to the challenge of dealing with multiple dimensions. The absence of participation culture emerged from some qualitative statements, as illustrated in the following key quote related to the tradition of participation:

«... we [Portugal] do not have much tradition of participation, we have some examples, at least considered by law to get people involved in participation, but in fact they did not work as such» [Scientist, facilitator, RAA project].

6.5. Discussion

The previous sections provide some evidence into the benefits of stakeholder participation in natural resources management projects as well as into the relevant factors to make participation work. This section discusses these results confronting them with the theoretical framework and findings from other similar studies. The main conclusions from the results section are presented as statements, heading each of the following subchapters.

6.5.1. Although contributing to reaching sustainable solutions, stakeholder participation does not guarantee an effective improvement in natural resource management

Stakeholder participation is increasingly being used to develop solutions to environmental problems in the expectation that it will contribute to a higher adoption rate of solutions. It is generally recognized that integrative and participatory decisions could help to increase the social acceptance and the implementation of decisions (Pretty, 1995; Richards et al., 2004; Stringer et al., 2006; Reed, 2008). However, public participation processes also tend to have limited formal decision-making power or limited efficacy in changing policies when they are not linked to actual



policy decisions or include policy makers (Konisky and Beierle, 2001; Martineau-Delisle and Nadeau, 2010). The participatory processes analysed under this study, reflect this vision where, based on feedbacks from participants, sustainable decisions were identified as an output from the participatory processes but with limited implementation of solutions.

The findings characterized the decisions coming from stakeholder participation processes as feasible, economically rational, socially equitable and accepted by all stakeholder groups. Along with this, several experiences have demonstrated that participation can contribute to a better understanding of the problems and consequently to identify better solutions, which are locally-adapted and socially accepted (e.g. Beierle and Konisky, 2000; Beierle, 2002; Stringer, et al., 2006; Wandersman, 2009). Except for RAA project, all participatory processes led to consensus building over the main environmental problems and potential solutions. But the findings also illustrate a low degree of implementation and compliance of those decisions, either by the competent authority, or the general public and landowners. Halvorsen (2006), citing several other authors, also reported situations where citizens input did not affect decisions or was poorly used. On the opposite side, there are some studies proving that public participation processes contribute to the achievement of concrete outcomes and to increased effectiveness of the management process (e.g. Buchy and Race, 2001; Martineau-Delisle and Nadeau; 2010).

The level of decision-making allowed within a stakeholder participation process can also vary considerably (Konisky and Beierle, 2001). While some processes provide participants with full power over the decision-making, others significantly limit that influence. Diverse levels of influence on decision-making can produce different types of outcomes. Martineau-Delisle and Nadeau (2010) described three levels of stakeholder participation impact: i) effective, related with decisions coming from participation, such as the development of a plan or the application of a technology; ii) procedural, related with the way participation process is conducted and with lessons learned to improve future public participation processes; and iii) reflexive, related with stakeholders mutual learning and trust. DESERTLINKS, MEDACTION and RAA processes did not aim to implement a specific technology or measure, but rather to identify the problem and provide recommendations regarding best practice solutions. Notwithstanding, it became clear that participants valued both effective impacts and reflexive impacts.

The lack of actions on the ground can develop a sense of waste of time among the participants and therefore negatively affect the social view of participation or cause stakeholder 'fatigue'. To see something has changed on the ground (e.g. adoption of a specific action or technology) was mentioned as being a challenge in the context of the evaluated projects. The idea of some respondents that participatory experiences are a waste of time can only be contradicted by the achievement of real impacts, ranging from the implementation of a specific technology to the integration of participants' inputs into policy-making, or clear social outcomes such as learning and increased trust, which in turn may lead to increased implementation in the longer term (e.g. Young et al 2013).



The implementation of decisions relies on local stakeholders and communities, through local empowerment, and on decision-makers, through their commitment to implement or to provide adequate resources to implement the solutions defined through stakeholder involvement (Richards et al., 2004; Reed, 2008). If there is no commitment from the competent authority, participation is less likely to lead to actual implementation of solutions to address specific problems (Beierle and Konisky, 2000; Konisky and Beierle, 2001). This is in line with the findings, where respondents identified the willingness by policy-makers to share power of decision, as one of the key factors of a successful participation process.

6.5.2. Stakeholder mutual learning is a major outcome of participation in natural resource management

Although stakeholder participation provides many opportunities to achieve gains and benefits in several fields, a great emphasis is being placed on the reflexive impacts potential of stakeholder participation (Martineau-Delisle and Nadeau, 2010). The reflexive impact of participation (e.g. individual or social learning, trust, social networks, etc.) can emerge even if no decision is achieved from the stakeholder involvement process (Selin et al., 2000).

Respondents identified mutual learning, knowledge exchange, networking and awareness as major results of stakeholder participation. Other studies have also identified similar impacts, identifying learning, more solid relationships between participants and improving communication and dialogue (e.g. Buchy and Race, 2001; Martineau-Delisle and Nadeau, 2010; Young et al., 2013). The opportunities for social learning and change provided by participation have also been widely discussed (Fraser et al., 2006; Stringer et al., 2006; Reed, 2008; Evely et al., 2011; Martineau-Delisle and Nadeau, 2010; Rawson and Hooper, 2012). It is not possible to assess whether actual social learning outcomes were achieved in the selected processes. Although Schwilch et al. (2012a) concluded that social learning was partially achieved in the DESIRE study sites, multi-stakeholder learning was found to be the major outcome from DESIRE participatory processes.

All participatory processes in the study dealt with complex problems (e.g. related with desertification, forest fires, rural abandonment, and traditional activities abandonment). The process of joint discussion and the exchange of experiences allowed reaching consensual decisions and solutions. In DESIRE and RAA cases, the possibility of having stakeholders from different regions increased stakeholder knowledge exchange. In the DESERTLINKS case, the mitigation of some biases about desertification was also identified.

Learning also relies on the quality of how many people are encouraged to participate and to control the outcomes and on the quality or extent of engagement. Autonomy, feeling valued, information sharing, involvement on decision-making and fairness of the process are crucial components for a positive learning development (Evely et al., 2011). This is also linked to the idea of combining traditional scientific approaches with new qualitative and bottom-up approaches, which can enhance learning by both public and scientists (Pretty, 1995; Reed et al., 2006).



Feedback from participants highlighted that those issues were also achieved in the selected participation processes, as it will be discussed in 6.5.4.

6.5.3 Trust was not a key strength in the stakeholder participation process

Trust between target stakeholder groups is important to achieve a successful participation process, but at the same time trust can be developed during participation process (Beierle and Konisky, 2000; Reed, 2008). Both ideas were analysed in this study. Before embracing a participatory process, trust among participants must be reinforced, whereby the quality of communication with the government and the commitment of the lead agency are crucial factors (Beierle and Konisky, 2000). This is related to the findings on what key factors are needed to make participation work in achieving natural resources management work. The respondents referred to the willingness to share power, trust and transparency as important issues. However, social networks and trust between different stakeholder groups were classified as weak.

Conflicts are quite common in participatory natural resources management, as it involves stakeholders with diverse claims on natural resources, aims, values, interests and backgrounds. Trust represents a fundamental element for negotiation, collaboration and conflict resolution between stakeholders (Idrissou et al., 2013). The results of the current study highlighted the non-existence of major social conflicts.

All participatory processes provided equal opportunities to all stakeholders and only minor power imbalances during the process, and this contributed to increase trust. The relationship between process design and trust was already highlighted in Evely et al. (2011), concerning participation in nature conservation projects. Nevertheless, results show that trust was only slightly built-up during the participatory processes. This is divergent from other studies where stakeholder involvement contributed to increase trust amongst stakeholders (Buchy and Race, 2001; Abelson and Gauvin, 2006; Young et al., 2013). If we take the trust building process between park direction and communities over the management of Pendjari national park in Benin into consideration, it became clear that trust and distrust are a dynamic frame and could be both used strategically (Idrissou et al., 2013). These authors concluded that a certain level of distrust could be functional in building trust and collaboration. Despite the existence of little trust between stakeholder groups in the evaluated processes, findings did not indicate a positive trend after the participatory process in trust issues. This is probably linked to the lack of effective implementation of decisions.

6.5.4. Successful stakeholder participation relies on stakeholder selection and discursive fairness

There are plenty of techniques and methods for participation as well as methodologies for stakeholder analysis and selection (Prell et al., 2006; Elsasser, 2007; Reed et al., 2009; Prell et al., 2009) and it is not possible to single out a best technique. Participation outcomes depend on the type of process, but techniques should be selected concerning the aims of participation in each process (Konisky and Beierle, 2001).



Process design, especially regarding guaranteeing equal opportunities to participate and fair power distribution and using methods for structured information aggregation, influenced participation results positively, namely producing more feasible and socially equitable solutions and increasing trust among stakeholder groups. A fair decision-making process, which involves all interested parties and provides them equal opportunities to participate and expose their ideas, is more likely to be perceived as legitimate (Halvorsen, 2006). This is also linked to the assumption that 'better' participatory processes deliver 'better' outcomes (e.g. the association between the broad acceptance of the decision and processes in which participants are motivated and have some control over the process, and competent authorities are responsive, as suggested by Abelson and Gauvin, 2006). However, there are authors claiming that «...*the appropriateness of a particular participatory strategy will depend more on the way techniques are implemented than on a specific choice of technique*» (Buchy and Race, 2001:296).

Another crucial aspect provided by the findings was the importance of stakeholder selection. Although stakeholder analysis was not considered a major issue in any of the selected participatory processes, stakeholder selection was indicated as a major key to successful participation. Participants considered representation of all interested parties to be legitimate and did not describe important power imbalances during the participatory process.

Identification of appropriate stakeholders is one of the six steps, identified by Glicken (2000), for an effective stakeholder inclusion process. Diverse literature has been published concerning stakeholder analysis and selection (e.g. Glicken, 2000; Konisky and Beierle, 2001; Prell et al., 2009; Reed et al., 2009). Prell et al. (2009) identified power and legitimacy as criteria to select stakeholders for participation. Feedback from respondents highlighted stakeholder selection related to gender balance in the process, inclusion of the powerless or the 'hard-to-reach' citizens, inclusion of experts and also representation of landowners and other actors. Many processes have been criticized of being limited to represent interest groups (Konisky and Beierle, 2001; Halvorsen, 2006) or of considering local communities as homogeneous entities (Pretty, 1995). As referred by Halvorsen (2006) participants of public meetings frequently perceive representativeness as tied to fairness and legitimacy of the process.

Respondents' concern about selecting the appropriate stakeholders was already expressed in other studies. Rawson and Hooper (2012), for instance, identified the dangers of having power imbalances, of assuming homogeneity within stakeholder groups and of using techniques that exclude certain stakeholders.

6.5.5. Local context was overruled by national context

All participatory processes analysed were developed in the last decade, addressed similar environmental subjects and were initiated (all processes, except for A21L Mindelo) or mediated by researchers (all processes). So, there were no major contextual differences between the evaluated participatory processes. The few context variables affecting process outcomes were outnumbered by process design factors. The respondents stressed the ambiguity and uncertainty



of the Portuguese laws and the lack of a participation culture as main contextual problems. Both aspects contributed negatively to socially equitable outputs and to sustainability. The findings are in line with Beierle and Konisky (2000) who showed that process design is more important to make participation in natural resources management work than local context. On the other hand, Koontz (2005) found that the degree to which collaborative planning led to policy change was determined largely by local contextual factors rather than by the design of the participatory process. So, as mentioned by Abelson and Gauvin (2006), more research is needed to analyse the role of local context in stakeholder participation.

6.6 Conclusion

Due to its limited setup, the conclusions are rather indicative and need further evaluation, integrating more cases. However, stakeholder mutual learning emerged as the most significant outcome from stakeholder participation, while the effective implementation of decisions was often lacking and is probably one of the drivers of stakeholder 'fatigue'. Despite not being an explicit objective, as most projects were research-initiated, implementation of and compliance with participation-associated decisions seem to be crucial to improve social perception about public participation processes. The absence of feedback or follow-up from participation, common in some participatory processes carried out by academic institutions or by government structures, can harm the credibility of such processes.

Three key ingredients to make stakeholder participation work, regarding environmental and social outcomes, emerged from this study:

- i) trust: especially between GOs and NGOs actors and civil society. Communication, networking and knowledge exchange between different stakeholder groups should be improved;
- ii) equity in the decision-making process, embracing a collective learning process among diverse stakeholders and types of knowledge;
- iii) process design and fair participant selection: stakeholder analysis and selection proved to be of utmost importance for a successful participation allowing to involve groups with interest and influence to make and implement decisions.

Trust represents the fragile element of the trilogy, as participants believed that trust amongst target groups is weak and the participatory process did not build trust. This is an important issue, as decision-making processes need to include diverse stakeholder groups (e.g. NGO actors, landowners) and need to be embedded in a governance structure. The absence of trust between those stakeholder groups can compromise the whole process and the outcomes of participation.

Process design was demonstrated to be important for improving participation, especially concerning the way methods and techniques are being used, how stakeholders are defined and participants selected and the form in which information is shared and exchanged between



participants. Professional facilitators have a crucial role here and need to be endowed with appropriate skills to ensure power balance, discursive fairness and equal opportunities to speak. The role of local context in participation outcomes needs further evaluation, using other experiences with contextual dissimilarities. The national context was found to be of minor importance in these participatory cases. This was also found for other cases (de Vente et al., *in press*).

This study described different perspectives of five participatory processes, but would greatly benefit from the analysis of other experiences of participation, either included in research projects, or in the fields of policy-making and public decision-making. However, the findings highlighted an important lesson: stakeholder participation should be underpinned by a careful selection of aims, targets and participants, avoiding false expectations, distrust or frustration and emergence of conflicts. Moreover, an institutional and societal change towards a participation culture needs to be in place, ensuring a commitment from both government structures and citizens to cooperate on natural resources management and conservation practices.



CHAPTER 7

A PARTICIPATORY METHODOLOGY FOR DISCUSSING AND NEGOTIATING A STRATEGY FOR SUSTAINABLE FOREST MANAGEMENT IN FIRE-PRONE AREAS

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- 7.3. Stakeholder analysis and selection
- 7.4. Participatory approach and methods
 - 7.4.1. Stage 1: Stakeholder perception survey
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*«With public sentiment nothing can fail.
Without it, nothing can succeed.»
Abraham Lincoln*

7.1. Introduction

The failures of top-down decision-making processes (Beierle and Konisky, 2000; Rowe and Frewer, 2000; Gossum et al., 2005; Fraser et al, 2006; Reed, 2008) have opened doors to new models of participatory forestry management and to a greater acceptance of those models, either by society or by policy-makers and technicians (Cheng et al., 2006; Kohsaka and Handoh, 2006; Ananda, 2007; Ní Dhubháin et al, 2008). Besides the likely improvement of decisions, public participation in forestry decisions has a great potential to increase public commitment, to reduce conflicts and misunderstandings and to reduce distrust, especially between local stakeholders and public authority (Ananda and Herath, 2003a).

The integration of stakeholder participation in the decision-making processes is more challenging in countries with long tradition of top-down policies (Atmis et al., 2007). This is the case of Portugal, where public policies are mainly defined by the national public authority, with limited consultation of the private sector and civil society (Coelho and Carvalho, 2002), leaving aside, in the case of forest policies, thousands of small-scale forest owners, either individual owners or associated in small organizations.

Additionally, *«the small-scale is not only present in forest property. Unfortunately, the Public Administration and their stakeholders show a ‘mental and institutional small-scale’ that needs urgent consolidation»* (Mendes, 2003: 363). This is related with the unbalanced public mechanisms, which gave preference to financial incentives, with no proper rural extension services (neglecting small-scale forest owners), or to regulations and long administrative procedures instead of delivering innovative, flexible and decentralized incentives to private investment.

This leads to the central core of this thesis: **to propose a new participatory methodology for discussing and negotiating strategies for Sustainable Forest Management (SFM)**, at different levels (local, municipal, regional) and by all stakeholders (e.g. public authority, local associations and organizations, industrial private sector, forest owners, farmers, and civil society).

The methodology was designed under four main objectives:

- i) to assess stakeholders' perceptions about forests and forest management;
- ii) to jointly identify common problems and objectives of forests;
- iii) to define strategies for SFM (solutions and actions);
- iv) to identify roles and responsibilities in the implementation of SFM strategies.



The methodology also aims to enhance societal awareness concerning the multifunctionality and values of forests and to contribute to stakeholder mutual learning, social learning and empowerment of local communities.

Using elements from the literature review about the state of forests and the policies and tools available in Portugal (see: Chapter 2 and 3) and from the social perception survey about forests (Chapter 4), the methodology enables the inclusion of all relevant issues for improving forest management, especially in what concerns the economic and socio-ecological values of forests and the prevention and mitigation of fire hazard. The literature review on stakeholder participation approaches and methods (see: Chapter 5) and the empirical assessment of participatory experiences in natural resource management (Chapter 6) supported the design of tools to guarantee the inclusion of the perceptions and interests of those concerned, to promote a continuous process of stakeholder collaboration and to improve multi-stakeholder communication.

From the stakeholder participation literature review, the design of the methodology was based in four main steps (see: Chapter 5, Section 5.4.):

- i) Defining context: related to establishing the local setting before participation as well as the dimensions and limits of the issue at stake and the aims and potential outcomes of participation (see: Section 7.2.);
- ii) Stakeholder analysis and selection: selecting participants, based on an assessment of the roles, interest and influence of all groups of stakeholders (see: Section 7.3.);
- iii) Participatory approach and methods: defining the level of participation, the methods and techniques appropriated for each stage and establishing the needed and available resources (see: Section 7.4.);
- iv) Implementing the participatory methodology: preparatory work and testing (see: Section 7.5.);

The proposed participatory methodology combined ideas and methods adapted from other contexts, such as the DESIRE three-step participatory methodology for selecting and assessing Sustainable Land Management (SLM) strategies (Schwilch, 2012; Schwilch et al., 2012a; Schwilch et al., 2012c;) and the methodology developed for defining the Action Plan for Sustainable Development of Oliveira do Bairro (Valente et al., 2009), with novel ideas developed within this research, aiming to improve the performance of the methods in achieving the main participation aims and outcomes. This will be described in Section 7.4.

In the scope of this research, the methodology was implemented in the municipality of Mação (central Portugal) and the results are presented in Section 7.5. The methodology was also made available and implemented by other research teams in two other study sites - Góis municipality (central Portugal) and Montemuro Mountain (north Portugal). Although results are not presented



in this research, relevant aspects coming from the observation as well as the assessment of the methodology by the participants and by the facilitators are presented in Section 7.6.

7.2. Defining context

The role of national and local contexts in the success of stakeholder participation has been described as less influential when compared to process design or stakeholder selection process (Beierle and Konisky, 2000; de Vente et al., *in press*). Notwithstanding, the idea that the same participatory process can produce different outcomes in diverse contexts (Richards et al., 2004) demonstrates the importance of assessing relevant contextual variables before engaging in a participatory process. Those variables could be linked to cultural, socio-economic and environmental features as well as to the political, legal and institutional settings.

Some relevant aspects regarding Portuguese forest areas, previously discussed in chapters 2 and 3, are summarized in box 2. Because of the diversity of forests, this research was primarily focussed in the north and central regions of Portugal, where forest holdings are very small and a strong cooperation is needed between local organizations and forest owners.

Box 2: Key aspects regarding forest areas in Portugal (focus on north and central regions):

Environmental context:

- Forest and shrubland are major land uses;
- Natural regeneration of pine and eucalyptus plantations;
- Shrubland and pasture land has increased in the last decades;
- Eucalyptus areas increased and pine areas decreased;
- Agriculture and grazing abandonment;
- Severely affected by fire hazard during the last 30 years;
- Signs of land degradation (vegetation degradation, soil erosion and runoff, biodiversity decrease, etc).

Cultural context:

- Land inheritance – affective value;
- Living far away from forest properties;
- Low education of forest owners;
- Dominance of individual management;
- Low environmental awareness;
- Lack of participation culture.

Socio-economic context:

- Rural out-migration since 1950s;
- Low and aged population;
- Small size of the land;
- Low investment in forest (due to physical and financial constraints);
- Available technical capacity at local level (Forest organizations and associations, Forest Technical Offices);
- Strong industrial forest sector (pulp industry, cork industry and timber supplier).

Political context:

- Centralized and top-down policies;
- Uncertainty and ambiguity of policies and institutions;
- Complex legal framework;
- Distance between local and central governmental organizations;
- Non-integration of local perspectives into global strategies.

Previous experience of participation and the potential existence of stakeholder participation fatigue can facilitate or undermine a participatory process. The lack of participation culture and



the lack of implementation of decisions coming from participatory processes in Portugal (see: Chapter 6) were relevant aspects to both design and implementation of the participatory methodology. The definition of simple and engaging methods and exercises to identify and define specific actions were means implemented to deal with these issues.

Although stakeholder participation in the Mação municipality is not a new practice among local decision-makers and technicians, due to participation in previous research projects (e.g. MedChange project; DESIRE project, etc.) and activities under United Nations Convention to Combat Desertification (UNCCD), the lack of implementation of the decisions was a relevant aspect included in the research. Concerning local communities, participation is still an unfamiliar practice; however results from the surveys presented in Chapter 4 and Chapter 6 highlighted an increasing awareness about the importance of stakeholder participation in forestry decisions.

The insufficient stakeholder participation in Portugal conducted by Governmental Organizations (GO) and Non-Governmental Organizations (NGO) in the forest sector, mostly materialized in public presentations, public discussions and preparation of documents for consultation, can also be indicative of the existence of power imbalances or a persistent unwillingness of public authority to share the power of decision-making (Pretty, 1995; de Vente et al., *in press*).

Finally, the process of definition and communication of the aims of participation is quite important for optimizing a participatory process. Often people are invited to participate without knowing exactly what are the aims and the targets of their participation. Another frequent mistake is to include participation approaches in decisions already taken or where participants' contribution will not necessarily be integrated in the decision (Richards et al., 2004). This means that information and transparency are key elements for guaranteeing that stakeholder participation process does not raise expectations beyond the potential outcomes. Even with proper communication, it is possible that participants carry some individual objectives to the participatory process, such as specific individual need or complaints.

7.3. Stakeholder analysis and selection

There is no right answer to the question 'who should participate in what', but the involvement of all stakeholders and the adequate representation of their views are essential aspects in any participatory and learning process (Pretty, 1995). Forestry decisions in Portugal are affected and affect many stakeholder groups, increasing the challenge of integrating different interests and influences held by multiple actors around the same issue. This diversity and complexity also highlight the importance of developing new ways of balancing all these dimensions, meeting specific stakeholder groups' needs and enhancing the public and common interest.

The proposed participatory methodology starts by including all individuals and groups related with forests, evolving to a stakeholder analysis and selection, based on the: i) identification of all stakeholders and their roles concerning forest management, ii) categorization of stakeholder groups and iii) knowledge about the relationships between them (Reed et al., 2009).



Using the categories proposed by the Department for International Development of the UK⁶⁰, namely the *enablers* (State), the *deliverers* (private sector) and the *users* (citizens), the stakeholder analysis performed in this research included all those concerned in forestry and identified the different roles groups play (Table 7.1). These categories are not rigid, and many groups can perform more than one role. Some go-between categories were also identified, such as the forest associations facilitating communication between enablers and deliverers. Stakeholders performing other activities, such as agriculture, grazing, apiculture, hunting, as well as entities and stakeholders concerned in Forest Protection against Fires (DFCI), biodiversity conservation, water management, fight against desertification and rural development were also included in the process.

The following step was to assess, based on the analysis of the institutional setting and forestry stakeholders developed in Chapter 2, Section 2.5.3.2., stakeholders' current influence in forest management (Table 7.1). The major influence in forest decisions belongs to the national government, by the Ministry of State for Forests and Rural Development (SEFDR) and by the Institute for the Conservation of Nature and Forest (ICNF). The strategies and policies are defined at central level as well as the approval of regional and local forest plans. The ICNF is also responsible by the management of public forests.

Table 7.1: Stakeholders' role and influence on forest management in Portugal

Stakeholder Groups	Scale of intervention	Main role in forest management	Influence in forest management
National Government (several ministries)	National	E	++++
Institute for Nature and Forest Conservation (ICNF)	National/ Regional	E / D	++++
Civil protection	National / Local	E	++
Fire brigade	Regional / Local	E	++
National Republican Guard (GNR)	Regional / Local	E	+
Agriculture department	Regional	E	+
Forest Organizations and Associations(ex: ZIF)	Regional / Local	E / D	+++
NGO (rural development, environmental conservation)	Regional / Local	E	+
Local GO (Municipal Council , parishes)	Municipal / Local	E / D	+++
Industries (wood, pulp, cork, etc)	Regional	E / D	+++
Large forest owners	Local	D	+++
Small-scale forest owners	Local	D	+++
Communal lands	Local	D	++
Civil society	Local	U	+
Tourists	Local	U	+

LEGEND: E – Enablers; D – Deliverers; U – Users / ++++ high; +++ medium; ++ low; + very low

Own source

⁶⁰ See: <https://www.gov.uk/government/organisations/departement-for-international-development>

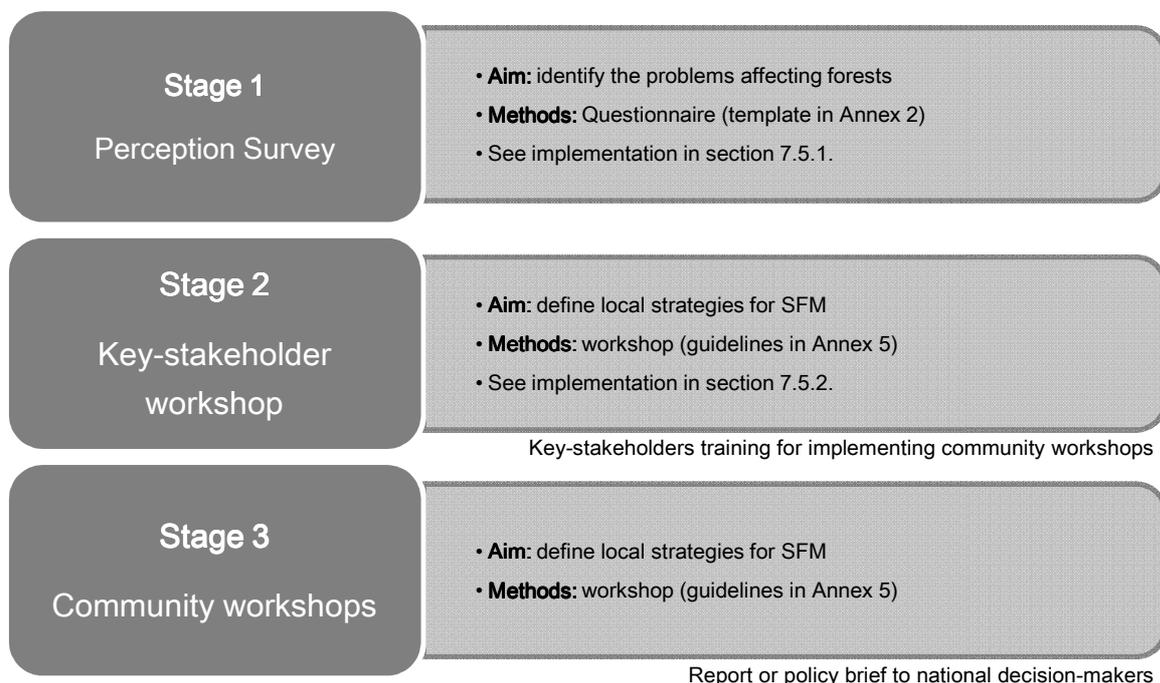


The industrial private sector (pulp, cork and timber industries), large forest owners and Forest Producers Organizations (OPF) were classified as having medium influence. Small-scale forest owners (with less than 5 ha) were also considered as have medium influence due to their large number in north and central Portugal (Table 7.1). Local GO have also a medium influence, as the municipalities are responsible for supporting the private sector in implementing national forest policies and also in preventing disturbances to forests. Fire brigade and civil protection, although very important in fire suppression activities, have a low influence in forest management. The stakeholder groups identified as performing weaker roles in terms of their influence are mainly stakeholders involved in complementary activities to forests or the civil society, including both inhabitants of forest areas and other citizens, or tourists (Table 7.1).

7.4. Participatory approach and methods

The methodology proposed in this research combined three stages, involving different participatory techniques and targeted at different stakeholder groups (

Figure 7.1). The first stage included a perception survey about forests and forest management. The results from the survey were then used as a basis for discussing and negotiating SFM strategies in the key-stakeholder workshop (Stage 2), mediated by an external facilitator, and in community workshops (Stage 3), mediated by local key-stakeholders.



Own source

Figure 7.1: Overview of the participatory methodology



7.4.1. Stage 1: Stakeholder perception survey

The complexity and multitude of dimensions and of stakeholders involved determines the importance of establishing a common understanding of the main opportunities and threats to forests before engaging in a participatory process. The assessment of social perceptions will help to identify the issues which should be focussed in the next stages and the issues able to raise stakeholders' interest and participation.

The perception survey (see: Chapter 4) constituted the first stage of the participatory methodology proposed, aiming to identify the political, technical and social perspectives over the problems and constraints affecting forests and forest management at a specific site. This was achieved through the development and implementation of a questionnaire to key-stakeholders and to a sample of the local communities. This technique enables involving a considerable number of participants, when compared to other techniques. To guarantee the same type of information, the questionnaire template was mainly composed of closed questions and simple language was used⁶¹ (see Annex 2).

7.4.2. Stage 2: Key-stakeholder workshop

The second stage of the participatory methodology consisted of a key-stakeholder workshop. A workshop constitutes an excellent opportunity to enhance mutual learning between different groups of stakeholders to break down misconceptions and to set common goals (Applestand, 2002). In fact, previous experiences have demonstrated that learning between participants is one of the benefits of participation recognized most (Schwilch et al., 2012c; Martineau-Delisle and Nadeau, 2010; Young et al., 2013).

After selecting the key-stakeholder groups, the participants were invited beforehand, assuring a reasonable group (10 to 30 participants). It was also very important to guarantee the representation of all stakeholder groups. The duration of each workshop can vary between 4 to 6 hours and should be carried out in the village, giving preference to informal meeting places or even outdoor meetings if possible. A relaxing and enjoyable atmosphere can make participation easier and can motivate to further participation. Another important aspect is the Portuguese typical formality in public events, with formal opening sessions, with personal interactions using professional titles and with some stakeholders participating using uniform (such as the Republican National Guard or the Fire Brigade). All these aspects can be mitigated with the use of simple language and interactive exercises by the facilitator, with badges with stakeholders' first name and avoiding lecture rooms and opening sessions.

The absence of a participation culture in Portugal and the differences between forest technicians and other stakeholders' discourses and languages highlighted the need for using techniques able to provide interactive participation, focusing on the promotion of equal opportunities to all

⁶¹ Many thanks to Gudrun Schwilch and Andreas Kläy (CDE, University of Bern, Switzerland); to Elisabete Figueiredo (University of Aveiro, Portugal); and to João Pinho (ICNF, Portugal) for their contributions to the questionnaire design.



participants. The workshop started with two initial activities (expectations cards and picture gallery), enabling a relaxing and informal environment among all participants.

The workshop sequence and exercises are briefly presented in Figure 7.2, combining the participatory exercises developed in the workshop with the five components for a strategy for SFM. The workshop guidelines were designed considering the principles and ideas proposed by Chambers (2002) and are available in the guide for the key-stakeholder workshop (Annex 5).

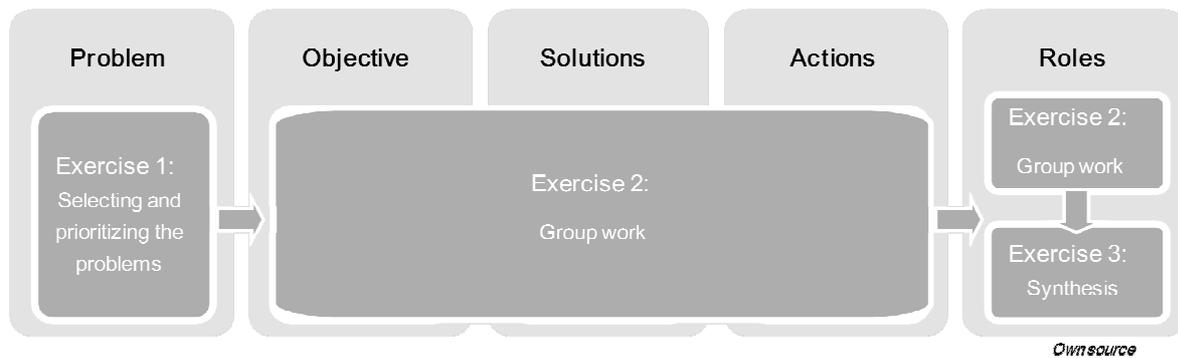


Figure 7.2: Workshop sequence and exercises for building a SFM strategy

Exercise 1 relied on the results from Stage 1, where the main problems and constraints from the perception survey were brought into discussion. Participants had the opportunity to add problems, which they considered neglected in the survey. After voting the most important problems, they were organized in small groups to build a strategy for preventing, mitigating or solving the problem, identifying solutions, actions and responsibilities for implementing those actions - **Exercise 2** – using the five components proposed for defining a SFM strategy (Figure 7.2).

Group results were then discussed in a plenary session and a synthesis was organized by the facilitator (**Exercise 3**). The synthesis was organized, considering the roles of different stakeholders in each action, in three columns entitled: i) what relies on us (local stakeholders); ii) cooperation/ partnerships; iii) what relies on them (external stakeholders). The synthesis helped to identify:

- i) responsibilities and actions at local level, whose implementation relies on local capacities and should and can be implemented;
- ii) actions that needs partnerships and cooperation amongst several stakeholders, which can be initiated by key-stakeholders meeting those partners;
- iii) responsibilities and actions relying on the public authority for forests or other external stakeholders.

This last item is developed in the **Exercise 3** of the workshop, which aimed to collect some ideas from the participants to develop a policy brief (or report) communicating the main results from the participatory process and the needs identified at the local level to national decision-makers, especially in what concerns their roles.



The workshop sequence and exercises were revised and adapted after testing at the University of Aveiro, with a group of 12 researchers (backgrounds in forest and environmental sciences or social sciences) and two local forest technicians⁶².

7.4.3. Stage 3: Community workshop

The Stage 3 of the participatory methodology aimed to replicate the workshop in smaller areas, such as the villages or the Forest Intervention Area (ZIF), involving forest owners and other citizens. After participating in the key-stakeholder workshop, participants are encouraged to engage in a continuous process, developing similar workshops in their communities, using the same workshop sequence and exercises (Figure 7.2). This enables the bringing of people into the scene that otherwise would not participate (e.g. small forest owners, interested citizens, etc).

The community workshops could be organised with little financial resources and using key-stakeholders (e.g. forest technician, ZIF representative, etc.) as facilitators, guided with proper training. Although the advantages of using an external and professional facilitator, building facilitation capacities at local level is very important to guarantee the continuousness of participation processes and can contribute to the setup of a participation culture. However, the choice of a local facilitator should avoid power holders or people with conflicting roles and not accepted by the communities.

7.5. Implementing the participatory methodology – Mação municipality

The proposed participatory methodology was designed to be applied at a local level, aiming to raise the discussion about SFM among GO and NGO key-stakeholders and local communities, and enabling the communication of their interests, values and needs to the national decision-makers. The methodology was tested in the Mação municipality in central Portugal and then used in other contexts and by other facilitators.

As already mentioned, some participants in the key-stakeholder workshop in Mação were already familiar with participatory approaches. The participatory experience under the DESIRE project in the Mação municipality was assessed in Chapter 5 as well in other relevant publications (Schwilch et al., 2012a; de Vente, *in press*), where it became clear that the use of innovative, interactive and structured methodologies was highly appreciated by participants. The implementation of the participatory methodology developed in this research benefited from all previous research developed in this area, from previous contacts and from networking already established between researchers and local stakeholders.

⁶²The methodology was implemented under ForeStake Project. A special acknowledgement to Cristina Ribeiro, Alexandra Marta-Costa, Filipa Manso Torres, José Portela, Luís Tibério, Rui Pinto, Beatriz Fidalgo, José Gaspar, Lúcia Saldanha, Raúl Salas, Tiago Correia, António Louro, João Fernandes, Nuno Bragança and Anne-Karine Boulet for the support in advising, reviewing, testing and implementing the methodology. Report of the experimental workshop is presented in Annex 6.



7.5.1. Stage 1: Stakeholder perception survey in the municipality of Mação

7.5.1.1. What, who and how?

The methodology proposed in this research is anchored in a transversal social perception study developed in the Mação municipality, which could be equally developed in other areas of Portugal. The survey applied to the identified technicians and decision-makers and to a sample of the local population (see: Chapter 4), provided insights from the technical perspectives (both national and local) and from the social perceptions (both forest owners and other citizens) about the main problems and constraints affecting forest management. The number and type of respondents are presented in Table 7.2. The rate of response was quite high both from national and local technicians.

Table 7.2: Number and type of respondents in the perception survey

Type of respondent	Selected	Answered
National technicians (1)	15	13
Local technicians (2)	23	17
Forest owners	5% of the inhabitants	208
Other citizens	living in Mação	115

(1) Includes decision-makers and technicians from the forest public authority and other related entities at national and regional levels.

(2) Includes decision-makers and technicians from local GO and NGO, ZIF representatives, etc.

Both local technicians and local communities were interviewed by research assistants (Figure 7.3). For national and regional decision-makers and technicians the questionnaire was sent and replied by e-mail.



Figure 7.3: Questionnaire application to a local respondent



7.5.1.2. Main outcomes

A summary of the results from the social perception study carried out in Mação (see: Chapter 4 for detailed results), used in the key-stakeholder workshop, is presented here:

- i) **Forest fires:** were identified as the major hazard, both in technical and social perceptions. These events were mainly caused by arsonists or by negligence, and were related to the absence of forest clearing and tree thinning, to climatic conditions and dry vegetation and to the lack of buffer areas (such as agriculture lands). Local communities were especially concerned with the economic damages and less aware of the environmental impacts caused by fire;
- ii) **Rural abandonment:** this issue was linked to both rural depopulation and ageing and to the abandonment of traditional agro-forestry and grazing activities. In fact, since the late 1950s Mação municipality had lost more than 65% of their inhabitants, changing completely the rural paradigm;
- iii) **Fire-prone landscape:** this problem is linked to the two previous problems. The rural abandonment led to forest and shrubland encroachment into former agricultural and grazing areas. Additionally, most of the forest owners do not manage their properties or only do minimal actions to clear vegetation or wood logging and the natural regeneration capacity of the vegetation easily provides combustible fuel for potential successive and repetitive wildfires;
- iv) **Small-scale holdings:** forest areas have been divided, by inheritance, into smaller and smaller parcels (less than 0,5ha), endangering the multiple use of forests and the competitiveness of productive forest areas. This aspect was relevant to national and local technicians, but not recognized by forest owners and other local inhabitants;
- v) **Forest owners' absenteeism and lack of interest in forest resources:** many forest owners do not live locally and the ones who still live there were aged and with no financial and physical investment capacity;
- vi) **Legal and institutional uncertainty and bureaucracy:** only mentioned by national and local technicians and were related with the frequent institutional changes and multiple and ambiguous laws.

Other important conclusions were:

- i) The absence of forest management was identified as a problem by forest owners; however most of them considered that they manage their areas;
- ii) Forest owners and other inhabitants were not aware of the policies and legal tools available to forest management;
- iii) Although not recognized by many inhabitants, there was a widespread acceptance of the ZIF approach by more informed forest owners and by local technicians.



7.5.2. Stage 2: Key-stakeholder workshop in the municipality of Mação

The results from the key-stakeholder workshop held in the Mação municipality (22 April 2013) are presented in this section (report of the key-stakeholder workshop is provided in Annex 7). Some notes from the implementation of the methodology in the Montemuro area (24 May 2013) and in the municipality of Góis (30 May 2013) are also discussed.

7.5.2.1. Who participates?

If we take the information provided in section 7.2.2. into consideration, the selection of key-stakeholders to participate in the workshop in Mação included 24 stakeholders performing different roles considering SFM (Figure 7.4). Only 10 participants attended the workshop (46% of the invitations). The major absences were observed in stakeholders from regional and national level and in the mayors of Mação parishes and ZIF representatives. This was probably linked to conflicting agendas between the workshop and a meeting in the Municipal Council. The key-stakeholder workshops in Góis and Montemuro had a higher attendance rate of 22 and 16 participants, respectively.

Stakeholder Group	Selected	Participated
City Council	2	1
Civil Protection	1	2
Fire brigade	1	1
GNR-GIPS	1	0
Parishes Councils	8	2
Forest Association	1	1
ZIF representatives	5	1
Apiculture Association	1	1
Industrial private sector	1	1
ICNF (regional)	1	0
Regional Association for Development of Pinhal Interior Sul	1	0
National Focal Point of UNCCD	1	0
Total	24	10

Group Photo



Figure 7.4: List of stakeholders and participants (left) and group photo (right) from Mação key-stakeholder workshop

7.5.2.2. Initiating the workshop

Before starting the workshop, participants were asked to write down on a card what were their main expectations concerning the workshop (Figure 7.5). Most cards in the Mação workshop expressed participants' interest in learning more about forest management and sustainability or in learning new approaches. Three participants expected to share ideas and solutions to improve forest management in the Mação municipality. Participants' expectations highlighted that they were already aware of the workshop thematic and participation aims. Participants were then



guided to circulate among the posters exhibiting some results from the social perception study (Figure 7.5).



Figure 7.5: Participant sticking an expectation card in the Montemuro workshop (left) and poster exhibition (right)

A picture gallery was used as an ice-breaking exercise, where participants were asked to select a picture illustrating their vision about forest. This exercise was used in DESIRE workshops concerning land degradation and land conservation pictures. The main difference was the type of pictures provided to participants, which in this methodology there were only examples from the Mação municipality, enabling participants' choice, as they were selecting from familiar landscapes (Figure 7.6).



Figure 7.6: Examples of pictures available in the picture gallery exercise



Participants were then asked to stick the selected picture on the ‘Sustainable Forest Management Board’ (Figure 7.7), adjusting the position to less or more sustainable image. Although there was no clear distinction between pictures showing sustainable landscapes and pictures with bad practices, it can be said that abandoned terraces, empty villages, burned areas, pine natural regeneration area with no intervention were chosen on the negative side, while contour planting, cork oak areas, fire breaks and recreation areas were placed on the positive side of the board.

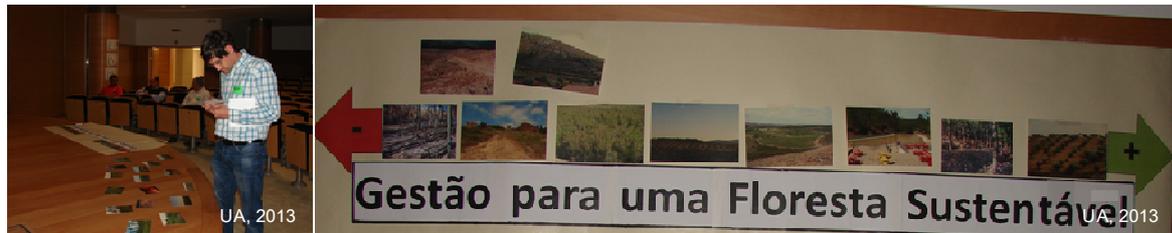


Figure 7.7: Participant choosing a picture (left) and central board for sticking the pictures (right) in the Mação workshop

The picture gallery exercise provided a relaxing atmosphere and informal beginning. After this, everyone was invited to sit and to present themselves briefly. In the Mação workshop, all participants were asked to say some words around the question: *In 20 years from now, how do I see forest and my relationship with it?* The answers were quite diverse between more positive answers and a hopeful future and some pessimist views, concerning fire hazard and total abandonment of rural areas.

7.5.2.3. Exercise 1 – Selecting and prioritizing problems affecting SFM

After presenting the main problems identified in the perception survey (see: sub-section 7.4.1.2.), the participants were asked to comment and to add other problems, if needed. In Mação, two additional problems were suggested, the low economic profitability of forest and the inadequate use of public funds. Participants were then invited to vote on the problems, which they perceived as more urgent (Figure 7.8). Each participant received three votes, to be used in a flexible manner (e.g. a participant could vote for three different problems or use the three votes for the same problem).



Figure 7.8: Problem voting in Mação workshop (left) and problem voting in Góis workshop (right)



The voting results indicated three main problems: abandonment of the agriculture, forestry and grazing activities; small-scale of the forest holdings; and forest owners' disinterest (Table 7.3). These problems were frequently mentioned in the survey by national and local key-stakeholders. The local population also identified land abandonment and forest owners' disinterest, but the size of forest holdings was not indicated. Forest fires which were identified as the central threat to SFM in the social perception survey, did not receive any votes in the key-stakeholder workshop. The selected problems nevertheless are drivers or consequences of forest fires.

Table 7.3: Comparison between the survey results and participants' votes in the Mação key-stakeholder workshop

Problem affecting SFM:	Survey results:	Participants votes
Abandonment of rural activities (agriculture, forestry and grazing)	<ul style="list-style-type: none"> ▪ 69% national technicians ▪ 35% local technicians ▪ 39% forest owners ▪ 52% other inhabitants 	9 votes
Small-scale of forest holdings	<ul style="list-style-type: none"> ▪ 77% national technicians ▪ 53% local technicians ▪ 10% forest owners ▪ 10% other inhabitants 	9 votes
Forest owners' disinterest	<ul style="list-style-type: none"> ▪ 31% national technicians ▪ 59% local technicians ▪ 32% forest owners ▪ 40% other inhabitants 	7 votes
Lack of forest interventions (clearing vegetation, thinning, pruning)	<ul style="list-style-type: none"> ▪ 12% national technicians ▪ 34% forest owners ▪ 27% other inhabitants 	2 votes
Legal ambiguousness/ Bureaucracy/ Inadequate of public funds	<ul style="list-style-type: none"> ▪ 23% national technicians ▪ 6% forest owners ▪ 1% other inhabitants 	2 votes
Rural depopulation and ageing	<ul style="list-style-type: none"> ▪ 62% national technicians ▪ 65% local technicians ▪ 67% forest owners ▪ 54% other inhabitants 	1 vote
Forest fires	<ul style="list-style-type: none"> ▪ 62% national technicians ▪ 71% local technicians ▪ 84% forest owners ▪ 89% other inhabitants 	0 votes
Low economic profitability of forest sector	<ul style="list-style-type: none"> ▪ 15% national technicians ▪ 12% forest owners ▪ 9% other inhabitants 	0 votes

Although there are some similarities to the problems indicated in the perception studies in Mação, Góis and Montemuro areas, the participants from Montemuro and Góis workshops added more problems into the discussion (4 additional problems in Montemuro workshop and 7 in Góis workshop). Voting results were also quite different in the three workshops. Montemuro



participants voted for the conflicting interests of landowners, the low value of forest products and the absence of land registry, while Góis participants selected ageing and depopulation, the lack of strategy and planning of forest and plagues and diseases. In these two workshops fire hazard was also not voted as the main problem to be solved.

7.5.2.4. Exercise 2 – Building a SFM strategy

After identifying the most important problems to discuss, participants formed small groups to build a strategy to deal with that problem. Each strategy has an objective and answer to three main questions: what?; how?; and by whom? The results were then presented in a plenary section (Figure 7. 9).



Figure 7. 9: Exercise 2 in the Mação workshop

In the Mação workshop, the participants were randomly divided in three groups. One of the groups worked on a strategy to reverse land abandonment, through the revitalization of traditional rural activities, such as grazing, agriculture and forestry. The results are presented in Table 7.4.

The main solutions proposed by this group were related with organizing landowners into joint forms of natural resources management (communitarian herd or land consolidation actions). Marketing and improving the selling of products were also mentioned. The strategy also envisaged the need for public incentives on the first stage, due to the low income of local farmers and forest owners. Sustainable practices were also addressed in this strategy, namely wood certification and good practices of soil mobilization and tree selection.



Table 7.4: Draft of a strategy to reverse rural activities abandonment in the Mação key-stakeholder workshop – Results from Group 1

Objective	Solutions:	Actions:	Roles:
Problem: Abandonment of rural activities (agriculture, forestry and grazing) Results from Group 1			
To reverse rural activities abandonment (e.g. agriculture, grazing, etc.)	<ul style="list-style-type: none"> ▪ Create a communitarian herd; ▪ Improve milk, meat and other products marketing and sells 	<ul style="list-style-type: none"> ▪ To create an association or to enlarge the objectives of an existent association ▪ To create an administrative shepherd to manage the herd ▪ To define an market exploitation plan 	<ul style="list-style-type: none"> ▪ Shepherds; ▪ EC Funding
	<ul style="list-style-type: none"> ▪ Joint management of agricultural areas 	<ul style="list-style-type: none"> ▪ To create an association or to enlarge the objectives of an existent association 	<ul style="list-style-type: none"> ▪ Associated farmers or other investors; ▪ Public incentive in the initial phase
	<ul style="list-style-type: none"> ▪ Improve agricultural products marketing and sells 	<ul style="list-style-type: none"> ▪ Find distributors, identify selling strategies and exportation opportunities 	<ul style="list-style-type: none"> ▪ Creating a commercial department in the association
	<ul style="list-style-type: none"> ▪ Create irrigation system of farming areas 	<ul style="list-style-type: none"> ▪ To implement a water collecting system from Tejo river ▪ To increase water availability (e.g. pits) 	<ul style="list-style-type: none"> ▪ Associated farmers ▪ State investment
	<ul style="list-style-type: none"> ▪ Increase wood certification 	<ul style="list-style-type: none"> ▪ Implement correct soil mobilization practices ▪ Adequate selection of forest species (use of autochthon species). ▪ Diversification of forest species, increase multifunctionality of forests. 	<ul style="list-style-type: none"> ▪ Forest owners associations ▪ Public incentive in the initial phase
	<ul style="list-style-type: none"> ▪ Improve forest management practices 		
	<ul style="list-style-type: none"> ▪ Increase the consociation of forest species 	<ul style="list-style-type: none"> ▪ Forbid the use of more than 50ha with the same forest specie. ▪ Implementation of the infrastructure network (Road network, fire breaks, fuel management strips). 	<ul style="list-style-type: none"> ▪ State ▪ Partnerships

Group 2 and Group 3 selected as their problem for discussion the small-scale of forest holdings, and defined as their objective to reduce the impact of small-scale holdings through supporting and incentivizing the increase of forest intervention scale (Table 7.5; Table 7.6).

Although the small-scale size of the holdings was not identified as a major problem by forest owners in the perception survey, the workshop participants connected forest abandonment and lack of forest planning to excessive land fragmentation. Both groups indicated the implementation of the ZIF approach and forest land consolidation as the main solutions to deal with this problem. The changes in the legal framework, namely concerning the responsibilities of non-adherent forest owners, and the definition of incentives to promote joint management were identified as important issues to be dealt by the central GO.



Table 7.5: Draft of a strategy to reduce the impact of small-scale forest holdings in the Mação key-stakeholder workshop – Results from Group 2

Objective	Solutions:	Actions:	Roles:
Problem: Small-scale holdings Results from Group 2			
To reduce the impact of small-scale forest holdings	<ul style="list-style-type: none"> ▪ Increase the intervention scale in forestry 	<ul style="list-style-type: none"> ▪ To implement ZIF on-ground ▪ To organize forest owners 	<ul style="list-style-type: none"> ▪ Forest owners associations ▪ Individual forest owners
		<ul style="list-style-type: none"> ▪ To implement forest land consolidation measures (<i>emparcelamento</i>) 	<ul style="list-style-type: none"> ▪ State ▪ Forest owners
	<ul style="list-style-type: none"> ▪ To adjust the intervention scale in forestry 	<ul style="list-style-type: none"> ▪ To create an internal regulation helping to adjust the scale of intervention 	<ul style="list-style-type: none"> ▪ Forest owners associations ▪ Individual forest owners
		<ul style="list-style-type: none"> ▪ Define the duties of each stakeholder 	<ul style="list-style-type: none"> ▪ State
		<ul style="list-style-type: none"> ▪ To implement SFM practices 	<ul style="list-style-type: none"> ▪ Forest owners associations ▪ Forest owners ▪ State
	<ul style="list-style-type: none"> ▪ To create incentives to increase the intervention scale in forestry 	<ul style="list-style-type: none"> ▪ Positive discrimination in the EC funding ▪ Positive discrimination in tax system ▪ Incentives for forest owners organization 	<ul style="list-style-type: none"> ▪ State
<ul style="list-style-type: none"> ▪ To plan the intervention scale in forestry 	<ul style="list-style-type: none"> ▪ To create an advisory commission with experts 	<ul style="list-style-type: none"> ▪ Universities ▪ Forest owners associations ▪ State 	

Table 7.6: Draft of a strategy to reduce the impact of small-scale forest holdings in the Mação key-stakeholder workshop – Results from Group 3

Objective	Solutions:	Actions:	Roles:
Problem: Small-scale holdings Results from Group 3			
To reduce the impact of small-scale forest holdings	<ul style="list-style-type: none"> ▪ To implement the integrated management of ZIF 	<ul style="list-style-type: none"> ▪ To change ZIF law concerning: <ul style="list-style-type: none"> - non-members - ZIF condominium, where each member (adherent or non-adherent contribute to a common fund to common activities inside the ZIF) - Create the concept of village enterprises 	<ul style="list-style-type: none"> ▪ State
	<ul style="list-style-type: none"> ▪ To increase forest land consolidation (<i>emparcelamento</i>) 	<ul style="list-style-type: none"> ▪ To define a legal framework to incentive land consolidation after severe forest fires 	<ul style="list-style-type: none"> ▪ State ▪ Forest owners
	<ul style="list-style-type: none"> ▪ To create a Central processing for biomass 	<ul style="list-style-type: none"> ▪ To create support measures to local territories ▪ To promote the creation of funds of forest investment 	<ul style="list-style-type: none"> ▪ State



7.5.2.4. Exercise 3 – Defining roles and responsibilities

This exercise aimed to identify the main responsibilities and roles in a threefold direction: i) increasing local responsibility by forest management; ii) communicating to public authority the efforts and needs at local level; and iii) finding synergies and partnerships between local and regional or national levels.

While groups were presenting their strategies, the facilitator organized a synthesis of the most important actions and roles (Figure 7.10). No new information came from this exercise, only a summary of the main ideas. The synthesis was then presented to stakeholders, focusing on the roles that were attributed to local stakeholders and forest owners and to central decision-makers. The areas for cooperation and participation were also highlighted. In the Mação workshop, the main roles attributed to local stakeholders were concerned with organization and promotion of local associative structures. The roles of national and external stakeholders mainly related to creating incentives and improving the legal framework of the forest sector.



What relies on us – internal and local stakeholders?	Participation/ cooperation	What relies on them – national and external stakeholders?
<ul style="list-style-type: none"> ▪ To boost the local associative dynamics: farmers, shepherds and forest owners ▪ To create and organize ZIF and other OPF 	<ul style="list-style-type: none"> ▪ To create work teams combining technical support and integration of local reality ▪ Integration of researchers in the definition of measures and action 	<ul style="list-style-type: none"> ▪ To create incentives and forest incentives funds ▪ To adapt and improve the tax system ▪ To reformulate the legal framework (ZIF law and land consolidation)

Figure 7.10: Synthesis of the SFM strategies presented in the Mação key-stakeholder workshop

The second part of this exercise aimed to collect the main ideas to communicate to central decision-makers in terms of the themes discussed in the workshop (Figure 7.12). This information can be used as a starting point for writing a policy brief, emphasizing the need to integrate local communities and local stakeholders in policy and decision-making. Under the title ‘*leave a message to national decision-makers*’, the discussion in the Mação key-stakeholder workshop started with a metaphor made by a participant: «*We have a terminal illness, which needs strong and drastic medicine*». The messages were mostly related to changing and clarifying certain aspects of the legal framework of land ownership and ZIF law and revising the legal tax system, integrating benefits to accomplishe’s landowners and organizations. Funding a pilot ZIF was also mentioned as an urgent task, to see what are the opportunities and failures of this model and see if it can be replicated and what adjustments are needed.



Figure 7.11: Message to the national decision-makers in Montemuro workshop (left) and in Mação workshop (right)

7.5.3. Stage 3: Community workshop

It was not possible to test the community workshops (Stage 3) within the time limit of this research, as it involves selecting and training local stakeholders and implementing several workshops at local communities. Despite workshop methodology being similar, it would be very important to see how the dynamics would function with community groups. From the key-stakeholder workshop where some forest owners and citizens were present, especially in Góis workshop, it was clear that the exercises are inclusive, due to their simplicity and can be accomplished by people with low education level or people struggling with speaking in public. Notwithstanding, the limited participation experience in rural communities can influence the participation outcomes.

7.6. Evaluation of the participatory methodology

The assessment of the workshop methodology was achieved after each stakeholder workshop using two small questionnaires. The first questionnaire was applied to the participants in the three workshops - Mação, Góis and Montemuro – (Questionnaire template in Annex 8.1.) and the second questionnaire was only applied to facilitators in Góis and Montemuro workshops (Questionnaire template in Annex 8.2.). The evaluation performed provided some hints about issues that can be improved in a near future. The aims were to collect a general impression about the methods and exercises used during the session and to assess the importance of participation in forestry decision-making and the factors that can contribute to successful stakeholder participation.

7.6.1. By the participants

The questionnaire applied to the participants had 12 questions, 7 questions related to the evaluation of the stakeholder workshop and 3 questions related to stakeholder participation in



general. The questionnaire was applied to 35 participants distributed among the three workshops (Mação: 9 questionnaires; Montemuro: 15 questionnaires; Góis: 11 questionnaires). Several participants did not provide a questionnaire because they had to leave before the end of the workshop.

Although based on a stakeholder analysis, the participants were asked to identify their stakeholder group or groups. In the Mação workshop, more than half of the participants identified themselves as members of a Forest Association or a ZIF and in Góis the majority were forest owners. In the Montemuro area (which includes several municipalities), 10 out of 15 participants represented a GO (such as: parishes' administration, Forest Technical Office - GTF, ICNF). Although attendance rate differed between areas, stakeholder selection did not, since all workshops selected stakeholders from all target groups.

The reasons behind the stakeholders' acceptance to participate were the same in the three workshops, where 86% of all participants mentioned to a particular invitation. The interest in the workshop thematic was mentioned by 34% and previous contact with the research team was mentioned by 23%.

Participants were also asked to rank some variables evaluating the performance of the methodology. No major differences were found between the scores from participants in the three workshops. Thus, all variables, except the participant contribution to the final results, were ranked above 3 on a scale from 0 to 4, where 0 was low and 4 was high (Table 7.7).

Table 7.7: Evaluation of the key-stakeholder workshops by the participants (scores and standard deviation)

ASSESSMENT VARIABLES	AVERAGE SCORE (possible range)	STANDARD DEVIATION
Importance of stakeholder participation in forestry decision-making	3.77 (0 to 4)	0.4
Methodology contribution to equal participation	3.68 (0 to 4)	0.5
Equitable participation of participants	3.60 (0 to 4)	0.5
Exercises suitability to the aims of the workshop	3.54 (0 to 4)	0.6
Agreement with final results	3.50 (0 to 4)	0.5
Importance of your participation in workshops to define the future of forest	3.26 (0 to 4)	0.6
Knowledge about the subject after the workshop	3.23 (0 to 4)	0.6
Knowledge about the subject before the workshop	3.03 (0 to 4)	0.7
Participant contribution to the final results	2.91 (0 to 4)	0.7

Participants considered their knowledge about forests as quite high before the workshop and only a few considered a slightly increase after the workshop (Table 7.7). The exercises proposed were considered as suitable to the aims of the workshop and the methods used helped to guarantee an equal participation of all participants. However, six participants distributed across the three workshops felt that their contribution to the final results was medium and one considered it low,



mostly because some participants were considered to have less individual knowledge about the issue at stake than other participants (e.g. apiculture association, individual forest owners).

The importance of including stakeholder participation in forestry decision-making received the highest score attributed by the participants. Most of the participants (27 out of 35) attributed the higher possible score to this variable (Table 7.7), highlighting the increase of their willingness to contribute to forestry decision-making. However, the score is slightly different when asked of participants if they consider their participation important (Table 7.7), where only 12 participants attribute the maximum score.

When asked about the most important factors for achieving successful stakeholder participation, the participants mostly mentioned the interest of the subject (77%) and the methodology used in the stakeholder workshop (60%). This last aspect was not considered as important to Mação participants as in the other two areas. This can be related to the familiarity of some of the Mação participants with the methods used. Some exercises were adapted from DESIRE participatory methodology, which was applied in Mação and Góis municipalities, but while in Mação three participants participated in both workshops, in Góis only one person did so. Trust between stakeholders, the implementation of the participation outcomes and the stakeholder selection were also selected to by more than one third of all participants.

7.6.2. By the facilitators

As aforementioned, the participatory methodology was implemented by other research teams in two different areas – Góis and Montemuro. Five persons were actively involved in the Góis workshop and four persons in the Montemuro workshop, between facilitation and organization. An evaluation questionnaire was responded by six facilitators (four from Montemuro and two from Góis) to get some feedback about the strengths and weaknesses of the methodology. The questionnaire applied to facilitators also included some qualitative questions and comments about the methodology and its potential of being applied forward by local key-stakeholders.

Most of them had never performed the role as a facilitator of a participatory session. The respondents identified the technical knowledge about forest management, the knowledge about local context and other skills, such as a friendly and conciliatory capacity, communication skills, and neutral behaviour, as the main skills that a facilitator must have to implement this methodology.

Overall, the exercises were considered both suitable to the workshop aims and to the type of participants. The facilitators believed that the methodology contributed highly to promote equal opportunities to all participants and that the final result represented a shared vision of all participants. Notwithstanding, there are some remarks about the dominance of particular stakeholders, especially during group work when no facilitator was present. This fact is also confirmed by the presence of power holders or opinion leaders, who conditioned the participation of less influential stakeholders in the opinion of two facilitators.



Concerning the assessment of the methodology, facilitators found its major strengths related to the design of the process (Table 7.8). The weaknesses are related to the time management and stakeholder selection issues.

Table 7.8: Assessment of the strengths and weaknesses of the workshop methodology by the facilitators

Strengths:	Weaknesses:
<ul style="list-style-type: none"> - equal participation - informal, relaxing environment - enable to work with diverse stakeholders (age, backgrounds, expertise) - logical sequence of the exercises - simple language and simple exercises - group work, randomly selected groups - dynamic facilitation 	<ul style="list-style-type: none"> - very intense (many exercises, limited time) - lack of time for discussion - limited number of participants - dominance of certain participants - conditioned participation by presence of power holders - no use of technology (e.g. computer) - lack of facilitation in group work - no power to implement decisions

Applying the methodology to smaller contexts, such as small villages or ZIF, was considered possible by facilitators with some adaptations to those contexts and if communities are properly informed about the initiatives. However, some divergences were found on the opinions of facilitators concerning the use of local facilitators. Some facilitators referred that those stakeholders will not be able to put their local role aside and have a neutral position.

Finally, facilitators were also asked to name the three major factors for making stakeholder participation works in forestry decision-making. The most mentioned were: the presence of a facilitator, the implementation of participation outcomes, no power imbalances during the process and trust among stakeholders. The views of facilitators were quite different from the those of other participants, especially concerning the presence of a facilitator which was not considered relevant by participants. The importance of trust and the implementation of decisions were factors mentioned by both sides.

7.7. Methodology towards increased participation benefits

As described before, the participatory methodology, developed within this research, was only partially tested (Stage 1 and 2). The community workshop (Stage 3) was not tested, but the sequence and workshop exercises are the same used in the key-stakeholder workshop. Observing the results from the stakeholder workshop in the municipality of Mação, where ZIF's approach (see: Chapter 3) or other forms of landowners' organization were identified as potential solutions for the main problems affecting the sustainability of forests, this methodology provides a suitable framework to be used within these groups, helping in discussing and negotiating the solutions and actions but also in developing a more sustainable way of forest management.



As the participatory methodology was applied by researchers and not by decision-makers, the integration of participation outcomes into real decision-making processes was not possible to assess. However, the inclusion of national decision-makers in the perception survey (such as the Director of ICNF), the involvement of decision-makers and technicians from regional and local GO and the delivering to national decision-makers of the main results from this process, represented important elements to pursue an institutional change towards a participation culture.

All methods included in the participatory methodology were designed to be inclusive, equitable and fair, including the traditional knowledge, quite often wasted. The methods and exercises implemented in the three workshops performed well both in different contexts and for diverse stakeholder groups. The implementation in these three different areas provided some insights into its potential and constraints. If we take the eight key benefits of stakeholder participation discussed in Chapter 5 into consideration, an analysis of the contribution of the proposed participatory methodology was attempted, identifying some strengths and aspects that need to be rethought (Table 7.9).

The two first benefits were related to the solutions or decisions coming from the process, where the potential to provide a systemic view over complex subjects and the identification of solutions better adapted to local context can be attributed to the proposed methodology. The inclusion of a transversal perception survey and the involvement of many stakeholder groups with different backgrounds enable the inclusion of this multidimensionality and an ability to respond to complex subjects. The risk of including all these dimensions is not being able to discuss and negotiate feasible solutions. This was visible in the workshop, where some participants struggled in dealing with only one problem and the time for discussions was clearly not enough.

The focus on a specific area enhanced the identification of local solutions to local problems with local people. Yet, the inclusion of national stakeholders in the process guaranteed the inclusion of the bigger picture of forests in Portugal. The main flaws under this issue related to the likely overlapping of individual interests with public and societal interests and needs.

The promotion of social equity was a very important aspect in the key-stakeholder workshop. Several powers and levels of decision were involved and the presence of power holders influenced the participation of other stakeholders (e.g. presence of bosses and employee or several persons from the same entity). At community level, where participants can be even more diverse concerning the age, education level and job, this aspect can also be quite important. The participatory methodology was designed to deal with the issues of equity, fairness, power balance and representativeness to prevent conflicts or stakeholder dominance and to raise social equity. This was generated by the use of some techniques (e.g. informal environment and use of simple language) and by the nature of the exercises, such as voting, games, small-groups, etc.



Table 7.9: Contribution of the participatory methodology to the achievement of stakeholder participation key benefits

Key benefits of participation	Contribution	Flaws
Systemic view of the matter at hand	Including a social perception survey; The diversity of stakeholders (e.g. backgrounds, experiences, age); Possibility of bringing a new issue into the discussion, later in the process.	Too many issues are brought to discussion; Insufficient time to allow deeper insights over the issues.
Locally-adapted decisions	Workshops are held at local level, with local stakeholders and local communities; Discussion of local problems.	Possibility of neglecting the global challenges of forests; Overlapping of individual interest over public interest General solutions, depending on external changes. Participants had some difficulties in propose more focussed solutions.
Social equity	The workshop design was very focussed on promoting fair participation and equal opportunities to contribute to the final result; The informal and interactive exercises.	Not sure that the powerless are really included; Some attempts of individual dominance during the workshops.
Increase trust and mitigate conflicts	The social perception survey allowed to identify some potential conflicting areas; Potentially, it increase trust amongst local communities and local GO.	Some conflicts were found between citizens and local GO; Not enough time to work on their mitigation.
Decision legitimacy and implementation	Solutions proposed by local level; Defining roles and responsibilities.	No implementation. Research.
Social learning	The workshops held at several levels within local communities, using the same methods, can develop a change in the collective understanding about the use of natural resources.	Not identified as an effective contribution within the research.
Empower communities	The continuous process of participation and the transfer of methods and skills to local key-stakeholders are strengths of the methodology to communities' empowerment.	Not identified as an effective contribution within the research. Needs time to evaluate.

Although the design of participatory methodology aimed to increase trust and to mitigate potential conflicts, these aspects were not evaluated within the time limit of this research. Moreover, only a continuous participatory process, with real commitments from forest owners, local GO and public authority, can develop those benefits as well as to increase social learning and to empower communities. The participatory methodology proposed in this research provides some tools to contribute to the development of this process.

The main objective of this chapter was to design a participatory methodology enabling the discussion and identification of potential solutions to forest management. The results of the



implementation in the municipality of Mação are only indicative but the main contributions to the four key issues addressed in this research can be summarized as:

- **Forest fire hazard:** wildfires were central in the perception survey, either in areas already severely affected by fire (Mação municipality) or areas with high fire risk (Montemuro Mountain and Góis municipality). Although not selected as a problem for discussion in any of the key-stakeholder workshops, in the Mação municipality the prioritized problems are drivers of fire hazard in this area (land abandonment and forestry small-scale and landowners' absenteeism). The central idea is that the mitigation of land abandonment and the increase of forest management scale through landowners' organization will contribute to decrease fire risk and mitigate the impacts of wildfires.
- **Productive role of forest:** the study site is mainly occupied by forest areas for production. The three main problems identified in the key-stakeholder workshop were related to the low productivity of forest areas and of rural areas. Some solutions and actions proposed were also related to increase the economic potential of those areas, such as the integrated management of forest areas (combine production areas with conservation areas) or the production of local products (e.g. agriculture, cattle) or even the use of biomass as energy source.
- **Socio-environmental role of forest:** the problems of forest management and the solutions proposed in the workshop did not focus specifically on the social and environmental role of forests, at least not directly. This is related with the dominant presence of pine monoculture and some plantations of eucalyptus and the absence of forest interventions, motivated by economic or other reasons. Some of the solutions proposed can definitely contribute to increase the socio-ecological role of forest, such as the integrated management of forest areas, designating specific areas for biodiversity conservation or for leisure, or more specific actions such as wood certification.
- **Interest and participation of stakeholders:** facilitating communication and discussion amongst local stakeholders and between them and national decision-makers was central in the design of the proposed participatory methodology. Thus, most solutions proposed in the Mação workshop focussed on the relationship between these two groups of stakeholders (e.g. changing legislation, creating incentives and taxes benefits and increase forest owners' organization). The evaluation of the methodology highlighted that the stakeholders valued the participation in forestry decision-making and demonstrated interest and active participation throughout the implementation of the participatory methodology. This emphasizes the importance of including local stakeholders in decision-making processes and raising societal awareness to the value of forests.



CHAPTER 8

CONCLUSIONS AND RECOMMENDATIONS

- 8.1. Introduction
- 8.2. Forest sustainability in fire-prone areas
- 8.3. Maximizing the benefits and gains of stakeholder participation in forest management
- 8.4. Potential of the participatory methodology for designing and discussing SFM strategies
- 8.5. Challenges and limitations of the research
- 8.6. Recommendations
- 8.7. Fields for future research



«Participation provides people with the skills and relationships so that they are better able to govern themselves.»
Sir Bernard Crick

8.1. Introduction

The main argument sustaining this thesis is that Sustainable Forest Management (SFM) can be enhanced if forestry decision-making framework evolves to a multi-stakeholder participatory approach. The central core of the research consisted in developing and testing a participatory methodology for discussing and negotiating SFM strategies at local level, by local stakeholders and local communities, enabling collaboration with decision-makers.

As mentioned in the introductory chapter, the emphasis of the research was on the development of methods and tools able to promote the inclusive stakeholder participation in forest management decisions, incorporating lessons learned from successes and failures from past participatory experiences. The methods and techniques developed were designed to be easily and readily used at local level, contributing to decrease local reliance on external participatory initiatives, mostly funded by research projects or public funds. These experiences initiated by external promoters and using external facilitators are also very important, but the implementation of continuous participatory processes able to empower communities cannot be achieved with punctual or research-driven initiatives.

The current scenario of the Portuguese forest, especially in north and central Portugal, emphasized the need for development of new approaches able to improve the relationship between forest owners and i) their forests; ii) the local organizations that can support them in planning and implementation and iii) the national and regional authorities for forests. At the same time, participatory approaches have an important role in: i) increasing trust amongst multiple stakeholders; ii) changing institutions towards the integration of stakeholders in forestry decisions; and iii) improving communication structures.

The participatory methodology was designed to increase stakeholder participation and discussion about SFM and solutions to improve forest management in fire-prone areas. This need arose from the failures found in the Portuguese forestry policy framework (Chapter 2) and also the need of increasing the implementation of existing policy tools for forest sector (Chapter 3). The review of participatory literature (Chapter 5) and the assessment of stakeholder participatory cases (Chapter 6) allowed the identification of the main principles and key factors that promote a successful participation in natural resource management. These principles were incorporated in the design and test of the proposed methodology (Chapter 7), including a social perception survey about forest and forest management (Chapter 4) and key-stakeholder and community workshops.



The main conclusions arising from the research are discussed in this chapter, organized in three main topics, namely the central aspects of the sustainability of forest management in fire-prone areas (Section 8.2.); the enhancement of benefits and gains of stakeholder participation in forest management (Section 8.3.); and the potential of the participatory methodology proposed in this research (Section 8.4.). Section 8.5. proposes some recommendations, both to decision-makers and forest technicians on what should be in place to increase stakeholder participation in forest sector. The chapter concludes with the challenges and limitations of the research (Section 8.6.) and the fields for future research (Section 8.6.).

8.2. Forest sustainability in fire-prone areas

Ensuring the full value of forests is already recognized in the Portuguese policy documents relating to the forest sector. But the economic role of forests (mainly timber production) still represents the main recognized value of the forest, unlike the trends in other European countries where forests are increasingly valued for their environmental amenities (Elands et al., 2004; Ní Dhubháin et al, 2009). This was confirmed by the stakeholder perception survey carried out in this research, where timber and non-timber production and employment were identified as the main functions of forests. The economic damages of forest fires were more valued than the environmental and social impacts. This can be associated with the type of forest landscape in the study site, which is representative of central Portugal, dominated by maritime pine and eucalyptus plantations, and should be further researched in other areas, with different types of landscape, such as *montado* areas in the south part of Portugal and other areas with broadleaf species and more concerned with conservation of biodiversity.

Despite the global attention given to SFM, notably as regards the enhancement of the multiple functions of forests, the mitigation of forest disturbances and the increase of stakeholder participation in forestry decisions, an overview of the forest sector in Portugal highlighted many fragilities affecting forest areas (see: Chapter 2). Both national indicators and results from the stakeholder perception survey indicated the fire hazard and land abandonment as the major problems of forest management in Portugal. Thus, the incidence of fire hazard, during the last 20 years, has had a determinant role in positioning this risk at the top of political, technical and social perceptions over forests, leading to the development of a strong public policy to Forest Protection against Fires (DFCI).

Fire hazard has been aggravated by the abandonment of traditional rural activities (such as grazing, farming and collecting fodder and wood for home utilization) and by the increase of forests without proper planning. The fall of the rural subsistence system brought to light the importance of the small-scale of the forest holdings, which are important to communities' livelihoods but are not economically profitable. The dramatic spread of eucalyptus was also related to this situation, where small forest owners started to plant everywhere as a way to take some short- or medium-term profit from their land. If land holding size in north and central



Portugal represents a huge constraint in terms of forest management to decision-makers and forest technicians, for landowners and local communities it is not a problem. They inherited the land as it is and argue that the problem is the landowners' lack of interest and absenteeism.

The public policies have been trying to deal with the problem of land structure and size since the 1990s, through funding and incentivizing forest owners' cooperation and organization to deal with small-scale forestry and to disseminate a professionalized and operational management. This led to the constitution of numerous Forest Producers Organizations (OPF) and more recently to the constitution of Forest Intervention Areas, as a way of increasing spatial scale for planning and management and decreasing fire hazard. The numbers of OPF and ZIF are quite high (Chapter 3), but the impacts on the ground of the existence of these structures are still low, especially concerning the ZIF approach, where the State invested in their creation but did not evaluate the financial sustainability of these structures.

In fact, most organizations are dependent upon public funding and the forest owners do not have resources or are unwilling to participate with money. Despite a certain acceptance among forest owners already informed (recognized in this study), the information and knowledge about ZIF is still insufficient (recognized in this study and in others). Thus, in the Mação case study, ZIF's adherence was high but many people probably do not fully understand the need of this approach (as most of the forest owners surveyed did not recognize land size as a problem). Their adherence is probably linked to the fear of fire (caused by fire frequency and intensity) and to lack of resources for management. The forest owners found in the study site are clearly related with the reserve type forest owners described by Baptista and Santos (2005), where the familiar heritage and affective value of the land are the main reasons to keep the properties.

8.3. Maximizing the benefits and gains of stakeholder participation in forest management

The Portuguese forest sector is characterized by an institutional diversity and uncertainty at national level (within this research there were four different Ministries involved, a public authority that has been restructured twice and several fundamental laws and planning tools that were amended or suspended). Moreover, different institutions have diverse or complementary roles concerning the forest sector, leading to some divergent or even conflicting interests at an institutional level. One example is the discussion around the budget distribution to fire fighting and to fire prevention. The uncertainty of institutional structures and policy decisions is a major handicap, especially in a sector where decisions and policies and public funding should be planned at long-term.

The uncertainty and ambiguity of Portuguese laws and the absence of a participation culture were aspects also identified by stakeholders who participated in participatory processes concerning natural resource management in Portugal (see: Chapter 6) as aspects contributing negatively to sustainable decisions and to socially equitable outputs from stakeholder participation.



Additionally, Portuguese decision-making processes are anchored in the traditional processes, where public authority formulates the decision, consults some forestry partners to fulfil the conditions of public discussion and creates a decision, which should be implemented by forest owners. The main problem is that policies and laws are not being accomplished on the ground. The lack of public consultation and participation in the formulation of national policy was also confirmed in the stakeholder perception survey carried under this research, where the knowledge about forest national guidelines and the participation in ZIF was almost nonexistent among local communities.

This research aimed to try to put rights this fault, through incorporating new mechanisms of participation that include not only the power holders, but which is mainly focussed on an inclusive, integrated and real participation. To fulfil this aim, the review and assessment of participatory experiences to understand the aspects behind successful participatory approaches was considered very important. Many benefits are attributed to decisions coming from a real and effective participatory process, such as a systemic view of complex problems, decisions locally-adapted, promotion of social equity, trust and conflicting management, implementation of decisions, social learning or the empowerment of communities to take their own decision.

The evaluation of stakeholder participation carried out under scientific projects in Portugal showed that stakeholder mutual learning is one of the major outcomes of participation (see: Chapter 6; this was also shown in Schwilch et al, 2012a; de Vente et al., *in press*). This is quite important, as in the present study a huge gap of knowledge of civil society was found about forest national policies and tools and there was no integration of SFM concepts in their opinions. A previous assessment of this information through a stakeholder perception survey also demonstrated the importance of knowing in advance social perceptions before going to a more interactive stakeholder participation process, under the penalty of not including the important assets and discussing the meaningful aspects for local communities.

The process design of stakeholder participation, concerning stakeholder selection and equal opportunities, and the issue of trust amongst stakeholders were also considered major factors for successful participation. While process design can be prepared in advance, based on a stakeholder analysis process and using more suitable methods and techniques, trust seems to be very difficult to build, especially between different levels of intervention and was not a key strength in the stakeholder participation processes analysed in the scope of this research.

8.4. Potential of the participatory methodology for discussing and negotiating SFM strategies

The lack of tradition of stakeholder participation in forest decision-making processes led to development of a participatory methodology able to integrate several levels of participation. This include (1) informing (contacting local stakeholders, explaining the aim of the work, information and asking for collaboration in the villages through the parish mayor and the local priests); (2)



consulting and asking their views (through a questionnaire, applied face-to-face, allowing to collect their insights concerning the questionnaire and other relevant aspects); and (3) discussing and negotiating the decision, achieved in the workshops or other techniques, such as focus group (using simple exercises, which allow everyone to participate).

Bearing in mind that previous research showed a positive relationship between stakeholder participation activities and forest management practices on the ground (Beckley et al., 2006), the aim was to create an approach that, while promoting discussion over SFM, also increases social awareness of the value of forest and promotes the active management of forests, through cooperation and organization. However, these two last issues were not evaluated under the scope of this research.

The methodology proposed was divided into three main stages (Figure 8.1.), enabling the anchoring of a continuous process.

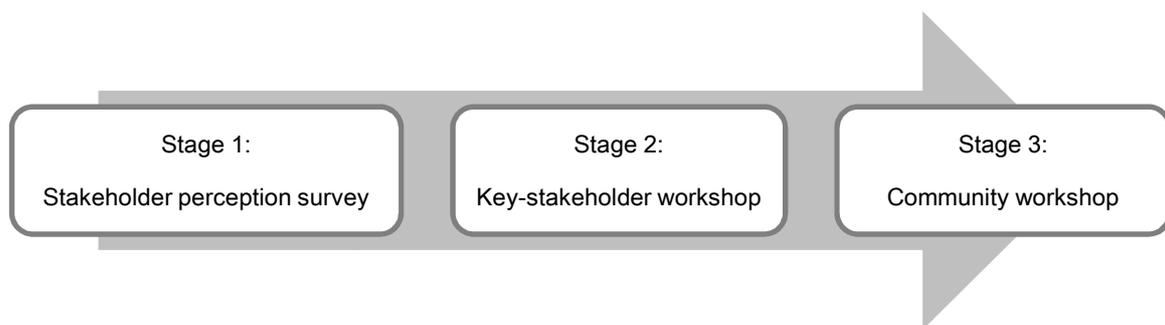


Figure 8.1: Stages of the participatory methodology

The first stage involved the assessment of political, technical and social perceptions about forest and forest management, demonstrating the importance of this knowledge in understanding how people value their forest, how they perceived the problems and potential solutions and how they see their performance of the management of local resources. These perspectives provide a good basis for discussion and help to define crucial points to be discussed in further stages. This helps to improve stakeholder analysis and selection process to the next stage, and providing an overview on social awareness, which is useful to decision-makers. The questionnaire template was developed together with specialists and forest technicians and was already used in other areas (Góis municipality and Montemuro areas).

The second stage was a key-stakeholder workshop which performed well in integrating all stakeholders and all visions and in promoting equal participation with simple exercises. Results from the implementation showed that although stakeholder participation, in the terms proposed, is neither frequent nor promoted by GO or NGO, people are willing to join these discussions and work together in their local future. Most of the proposed SFM strategies highlighted the strong emphasis on cooperation platforms proposed by local stakeholders.

The participation of private forest owners is clearly essential for balanced development of forest policies, programmes and legislation (FAO/ECE/ILO, 2000) and for this reason the use of the



methodology at narrower levels than the municipality is extremely important. For this reason, the participatory methodology proposes the implementation of the same workshop methodology at a local level, oriented to local communities or to specific local groups, such as forest owners (Stage 3). The methodology was designed to be implemented by local stakeholders, such as forest technicians or others, using existing resources and providing the continuous development which has been neglected by researchers and decision-makers. Using these tools and processes will allow resource managers to move from managing public interest and controlling dissent to meaningfully incorporating public interests and conflicting values into the planning process (Beckley et al., 2006).

In summary, the participatory methodology proposed showed a great potential in valuing and in respecting local knowledge and practices, getting common understandings about forests, assessing issues of disagreements between stakeholders and getting consensus around problems and ideas for solutions. At the same time, the workshop promoted multi-stakeholder collaboration, with equal participation and giving voice to the powerless. The methodology also provides a toolkit to be used by local stakeholders with proper training, allowing to develop continuous participation processes which are anchored in local structures and do not rely on external will.

8.5. Challenges and limitations of the research

Forestry decisions are complex, uncertain and long-term, leading to the need for multi-dimensional, inter-disciplinary and multi-stakeholder approaches in their definition and implementation. Dealing with this complexity represents the most challenging issue, due to the difficulty of integrating all the interests and needs as well as all components of the 'full value' of forests. The process of discussion and negotiating those components proposed in this methodology needs a long-term process, to make sure that all important components and stakeholders are engaged. This represents a major limitation, as the methodology was only partially tested and not fully implemented, due to time limits.

Stakeholders' commitment to implement a truly participatory approach is another aspect that goes beyond this study. Although the results from the implementation of the participatory methodology in the three study sites have provided positive feedbacks concerning the need to strengthen local communities and incorporating local views and needs in forestry decision-making, the effective commitment of key-stakeholders to be involved and promote this approach at local context was not confirmed.

The lack of commitment is also linked to other challenges related to the benefits of using external facilitators in the participatory processes. Resource shortage has been strongly cited by participants as a constraint in carrying out a participatory approach. The use of the methodology proposed by local key-stakeholders, such as local forestry managers, with proper training, can mitigate these constraints as the resources are already in place. The use of these participatory



approaches by forest managers or other stakeholder needs to be underpinned by a reflection about potential benefits and gains by using these approaches.

The impact of stakeholder participation in implementation of best practices was quite short in the participatory processes assessed in this research. The proposed methodology was oriented to discussing and negotiating SFM strategies and the definition of a local SFM strategy was indicated as a major outcome. However, the full potential of participation can only be assessed after implementation.

8.6. Recommendations

This research was supported by two central arguments: i) stakeholder participation is an essential element of SFM; and ii) progress towards SFM in fire-prone areas can be enhanced through stakeholder participation. Having this in mind, the progress towards SFM should be anchored in forestry governance, attending to the interaction between people, institutions and policies and ensuring the principles of openness, participation, accountability, effectiveness and coherence (CEE, 2001). This goes along with the transition to more incremental and communicative decision-making processes (Buttoud, 2000), based in truly open participatory processes, where forestry governance is supported by the co-definition of forest policy tools and by the co-responsibilities for action.

The recommendations developed under this research concern the improvement of forest management in terms of the multifunctionality of forests and decrease of fire hazard and with the enhancement of stakeholder participation in forest decision-making processes.

Institutional and societal change towards a participation culture: the traditional top-down processes of decision-making in forest sector need to change into more incremental and communicative decision-making processes. This transition needs an institutional change towards participation culture in Portugal, promoting a more aware, responsible and pro-active society. Funding grass-root initiatives is a promising approach of incentivizing stakeholder participation and empowerment of local communities.

Forest owners' cooperation and organization: the incentives for creating organizational structures allowing for increasing forest owners' cooperation need to be strengthened in order to promote examples of the success of these approaches in terms of SFM. Although the aims of State incentives were mainly related with increasing professional management and also increasing the spatial scale, it is an excellent opportunity to increase participation at local levels and enhance active citizenship.

Integrate the value of local knowledge and local context in forest decisions: the dominance of technical knowledge over traditional practices is no longer sustainable. Traditional knowledge can be quite important in understanding local realities. Forest decision-making processes need to be



underpinned by the integration of different types of knowledge, promoting platforms for participation at different levels, including an assessment of local needs, interests and knowledge.

Promote the environmental role of forests: the low value attributed to forest in terms of providing environmental ecosystems and services, demonstrates that it is very important to recognize these values, compensating forest owners who develop a more close-to-nature management.

Improving communication and information in the forest sector: the forest sector needs to improve communication with the wider society, both in terms of raising societal awareness about the value of forest and in improving the knowledge about policies and tools for the forest sector.

8.7. Fields for future research

The first field for future research would be to apply the participatory methodology to other contexts and to analyse the potential for developing actions on the ground and to establish communication between local stakeholders and national decision-makers.

This research also highlighted some complementary themes that should be investigated in the future, namely the societal environmental awareness about ecosystems and services provided by forests and the ZIF implementation process at a national level as well as other forms of forest owners' organization, finding factors of success and failure.



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