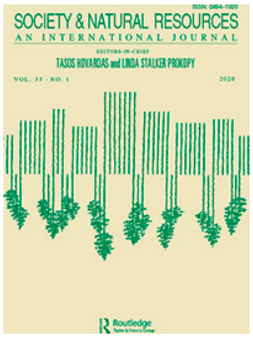

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Assessment of Portuguese Community Forestry using the Voluntary Guidelines on the Responsible Governance of Tenure and FAO Community-Based Forestry Framework

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ABSTRACT

In the last five decades, Community-Based Forestry (CBF) has become a subject of special attention. It is assumed that the transfer of rights to local communities will improve forest management. In Portugal more than 13% of the forest area belongs to local communities (termed *baldios*). Following FAO tools, assessments of Forest Tenure and CBF were conducted to evaluate the effectiveness of four *baldio* management types. The results revealed the most common challenges for *baldios*, vis-à-vis, rights associated with their management, protection of these rights, weak land administration, weak mechanisms for conflict resolution, problems with decentralized state support, cash flow management, and environmental challenges leading to wildfires, loss of biodiversity, and inadequate control of pests and invasive species. Resolution of these challenges is urgently needed at the legal, administrative and local levels. Future research should include assessments of CBF in other European countries to reduce the existing knowledge gap.

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Baldios; community lands; forest management; legal framework; tenure rights

Introduction

Since the 1970s, the transfer of forest governance to local communities and smallholders has been observed in many countries around the world (Colfer and Capistrano 2005; Andersson 2006). New types of forest tenure emerged within Community-Based Forestry (CBF) which became the subject of considerable attention worldwide (Ostrom 1999; Pagdee, Kim, and Daugherty 2006; Živojinović et al. 2015). The objective of many governments in introducing such reforms was to reduce the financial burden of forestry while recognizing the livelihood dependence of local communities on forest products. As a result, these forest tenure reforms have contributed to more democratic forest governance inclusive of local populations compared with centralized control (Agrawal, Chhatre, and Hardin et al. 2008; FAO 2016). Simultaneously, several forms of CBF tenure regimes have also been restituted in European countries, that existed until

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18th–19th centuries as important aspect of rural economies and livelihoods (Jeanrenaud 2001). These various forms of CBF have emerged with different levels of tenure rights and participation of local communities (Montagne, Niedwiedz, and Peyron 2014; Živojinović et al. 2015), as well as with different forms of grouping of stakeholders (Montiel-Molina 2003; Valente et al. 2013). The COST report "Forest Land Ownership Change in Europe" showed that 16 European countries support various forms of community forest ownership, or forest management by rural communities (Živojinović et al. 2015, 10). However, there are few dedicated studies on these and quantitative data are lacking.

Despite several decades of implementation, CBF worldwide has yielded mixed results. More detailed studies show that in practice, transfer of forest tenure rights has been only partially realized (Moeliono, Wollenberg, and Limberg 2008; FAO 2016; Hajjar, Kozak, and Innes 2012; Duguma et al. 2018). In most countries, the governments have retained significant authority over forest management, or the implementation of the legal provisions has been very weak (FAO 2017). In addition, there are few studies on the effectiveness of various types of CBFs at the regional and national scales.

In order to understand the extent and effectiveness of these forests tenure systems, FAO in collaboration with experts from around the world developed two assessment tools. The first tool promotes a rigorous review of the underlying Forest Tenure arrangements with respect to the "Voluntary Guidelines for the Responsible Governance of Tenure to Land, Fisheries and Forests" in the Context of National Food Security, commonly referred to as the VGGT. The VGGT represent the first and most comprehensive global guidance on strengthening governance of tenure. This Forest Tenure assessment tool helps to assess the level of alignment of countries to the VGGT and to identify recommendations to overcome challenges with regard to good governance of tenure (FAO 2012b). This can be used by any country or region to improve policies, legislation, and institutions related to control and administration of tenure (e.g. Forestry departments, Ministry of Lands, Courts, Finance, Civil Registry, etc.). The second tool (CBF) provides for analyses of various Community-Based Forestry regimes in countries at the national levels. Specifically, the CBF tool provides for the analysis of the rights and obligations of CBF managers and members, along with the extent and effectiveness of CBF on the environmental, social, and economic dimensions. In particular, it compares the status of the indicators before and after the introduction of the CBF tenure system. Both tools complement each other and allow an in-depth analysis of the presence or absence of enabling conditions, as well as the impacts as perceived by stakeholders. Such assessments have been conducted in 20 countries around the world, and findings used to promote policy dialog in the host countries.

In 2017, for the first time, the VGGT and CBF assessments were conducted in a European Union country. Under an agreement between FAO and the Center for Applied Ecology "Prof. Baeta Neves" (CEABN), at the University of Lisbon, four types of community forest management (*baldios)* were analyzed and compared (CEABN 2017).

The *baldios* have a long history of traditional collective use, carried out and controlled by rural communities. These lands are located mostly in the north and center of mainland Portugal, occupying approximately 500 thousand hectares (Germano 2013).

Prior to 1938, *baldios* were the most important farming system of rural communities providing construction material, fuel, pasture and bedding for livestock, as well as space for small vegetable gardens (Baptista 2010; Brouwer 1995). Between 1938 and 1968 *baldios* were occupied by the State and an Afforestation Plan was introduced. Approximately 332 thousand hectares were chosen for afforestation, mainly with *Pinus pinaster* Aiton (Rego 2001), and the extensive forest plantations on *baldio* lands were developed by the Forest Services (FS). The main goal was to reduce the severe soil erosion resulting from agriculture and overgrazing, as well as to improve the state of water resources and river basins (Devy-Vareta 2003; Germano 2000).

After the revolution of 1974, *baldios* were recognized as the property of rural communities by Law n° 39/76 and returned to their historical community owners (Baptista 2010). The current management types of these forest areas are defined by the 1976 legal framework. The first two occur when citizens from villages with *baldios* areas (termed commoners) form the Commoners Assembly that is responsible for major decision-making including choosing the type of management for their community areas. These two management types correspond to options below appearing in art. 9° of Decree Law 39/76:

- I) Co-management by Commoners and Forest Services (FS) or
- II) Autonomous management by Commoners

However, in villages where such Assembly was not established, or based on commoners' decision, the temporary administration of *baldios* was retained by local authorities (parishes). Thus, two additional management types arose (CNVTC 2010):

- III) Co-management by Parishes and Forest Services, and
- IV) Autonomous management by Parishes.

Of the 1107 *baldios* registered in 2013, 586 belong to co-management type I and 275 to co-management type III. The *baldios* under autonomous management are less common: 187 belong to type II and 59 to type IV (Germano 2013).

Currently, the area of *baldios* occupies approximately 13–15% of the national forest area and represents a valuable heritage and an important space for forestry activities (CNVTC 2010; DR 2015). Most communities (more than 70%) have chosen to manage their forest areas together with the Forest Services (CNVTC 2010). The income obtained from the sale of *baldios* timber is shared between the Forest Services and *baldios* managers. These revenues are not distributable between commoners but, according to the law, it must be invested for the local communities benefit, in particular for the administration of community properties, for forest management, for the improvement of cultural and social aspects of the communities, and for other purposes of relevant collective interest.

In 2016, *baldios* celebrated its 40th anniversary of governance decentralization. These community lands continue to play an important role in the support and maintenance of rural communities, but at the same time remain conflict areas between the different stakeholders. In addition, in the last decades, *baldios* have been confronted with several

social, economic and environmental problems: the decrease of rural population, decline of agroforestry activities and profitability requiring new economic activities (Baptista 2010). The consequent accumulation of biomass in these forests has resulted in the increase of forest fires, with associated pests (Fernandes et al. 2014; Moreira, Rego, and Ferreira 2001).

This paper presents a comparative analysis of the four *baldios* management types, using the qualitative Forest Tenure and CBF assessment with the following objectives: (i) analyze differences in stakeholder perceptions of the *baldios*; (ii) assess the conditions of community management based on the five pillars underlying the VGGT; (iii) determine the perceived strengths and weaknesses of CBF in the four management types in the last decades and (iv) present possible solutions for the most important problems found during this assessment.

Materials and Methods

In order to collect information on the forest tenure rights in *baldios*, as well as to evaluate the results of their four main management types (Table 1) the two assessment tools (Forest Tenure and CBF) were used. The tools include a series of questions and indicators developed by FAO in collaboration with experts.

The Forest Tenure tool, based on VGGT guidelines, intends to contribute to the achieving of sustainable livelihoods, social stability, housing security, rural development, environmental protection, and sustainable social and economic development (FAO 2012b). This tool allowed us to analyze five pillars: (i) the level of recognition of commoner rights in the national legislative framework; (ii) protection of rights in law and in practice; (iii) provisions for enjoyment of these rights by commoners; (iv) provisions for access to justice in case of infringements and violations of commoner rights; and (v) approaches for the prevention of disputes and conflicts. Thus, through this assessment containing a total of 62 indicators we reached an understanding of the current state of policies, legislation and administration regarding Portuguese community forests, and also revealed gaps regarding the principles of good governance set out in the VGGT guidelines.

The CBF assessment tool points to the principles that must be fulfilled in order to enable community forest management to fully perform its tasks and increase its effectiveness (FAO 2016, xi–xiii). The CBF questionnaire allowed us to compare the effectiveness and sustainability of *baldios* forest management in the last 40 years. This assessment groups a total of 43 indicators under three criteria: (i) degree of CBF

Table 1. The four main baldios management types and distribution of the assessment participants.

Types of *baldios* management	Description of managers	Distribution of 40 participants/ evaluators by management types (%)
Type I	Co-management by commoners and forest services	31
Type II	Autonomous management by commoners	28
Type III	Co-management by parishes and forest services	24
Type IV	Autonomous management by parishes	17

implementation at the Government level and in civil society; (ii) rights and responsibilities connected with the CBF management regime; and (iii) perceived effectiveness of CBF with regard to natural, social/institutional/human, and financial outcomes. The use of this tool helped us to understand how the introduction and development of community management has occurred in practice, with what perceived impacts, and the possible solutions for the problems identified.

This research followed a mixed methodological approach, where different data sources were used including expert consultations, questionnaires and interviews, stakeholder inputs on preliminary results through workshops, and review of secondary literature. These varied sources served to triangulate the information collected (Mathison 1988).

Both assessments also enabled numerical rating of each of the indicator. These were first completed through expert consultations, and then through input of the diverse stakeholders in the workshop setting. Thus, assessment participants were asked to assess the different Forest Tenure and CBF indicators and to provide a satisfaction score about its condition on a scale from 0 to 5, where 0 indicated "unsatisfactory" and 5 indicated "very strong satisfaction" with regard to effectiveness.

In addition, the questionnaire required participants to evaluate the 27 indicators of the effectiveness of the CBF regime in managing natural, social and financial capital (e.g. the size of forests, their phytosanitary condition, the level of sustainability of resource management, etc.) on a separate scale. In particular, participants were asked to assess the change in the indicators from the time of introduction of the CBF system until the present, choosing one of three pre-established options: "increased," "decreased," or "unchanged."

The original assessment framework from FAO was translated into Portuguese and the process of collecting and processing data began, using three main stages (Figure 1). Stage 1 focused on the data collection, processing, analysis, and interpretation. Stage 2 focused on analysis of participant inputs in a preliminary report for sharing with them and discussing the results in the final workshop. Stage 3 focused on elaboration and dissemination of the final evaluation report.

In order to cover the different views on the Forest Tenure and CBF for the four management types of *baldios*, the same questions were asked of three different groups at three different times: first, meeting with a group of academic researchers and representatives of the Forest Services; second, workshop with *baldio* managers (commoners and representatives of the main Portuguese *baldio* Associations—BALADI and FORESTIS) in two places; and third, skype interview with experts on technical and legal support provided to the *baldios*.

The participants on the first and third groups were selected based on their role (theoretical and practical) of improving the management of *baldio* areas. The second group of participants was organized according to the "snowball" technique (Biernacki and Waldorf 1981), after contacting the main *baldio* federation and associations. Participant responses were collected in two introductory workshops in May 2017 in Coimbra and Vila Real (districts in central and northern Portugal with greater density of *baldios*) (see Figure 2). In total, 40 participants attended the assessment, 65% men and 35% women aged 30 to 70 years (Table 1). All the participants agreed to participate in this study. Each questionnaire was given a code to keep the anonymity of the respondents.

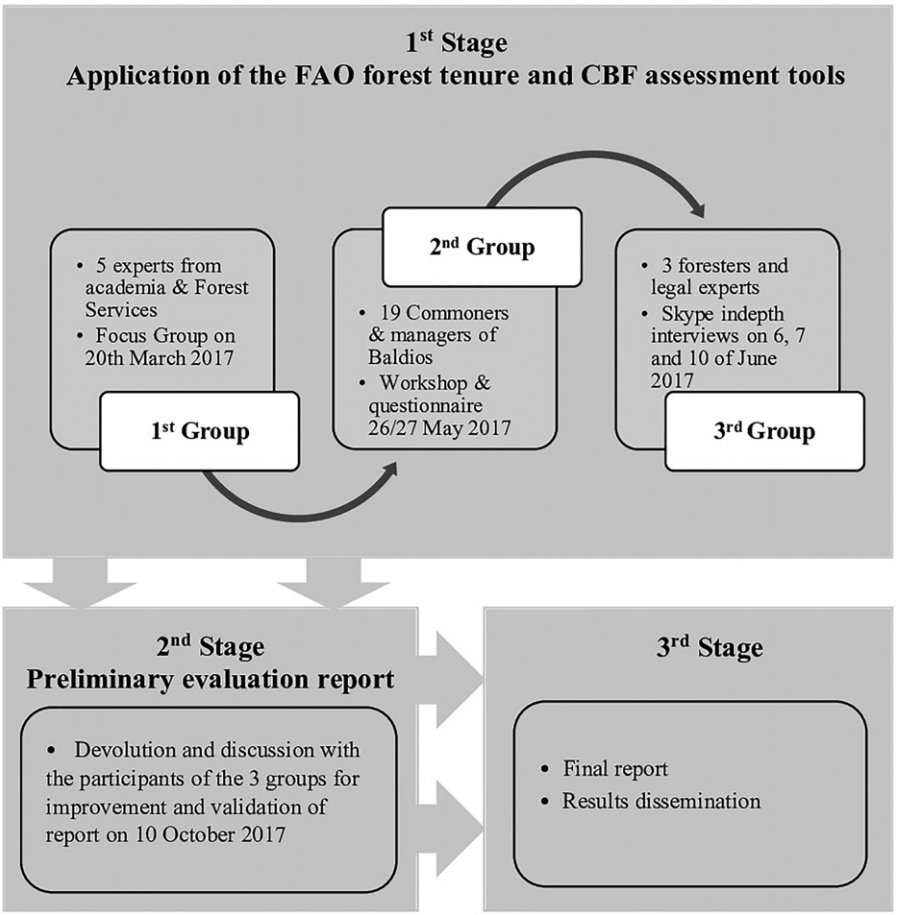

Figure 1. Methodology and stages of the assessment.

During the second stage, the collected assessments and responses of all participants of the meetings and workshops were analyzed and organized in the form of a single interim report (Figure 1). The responses with a rating of 0 to 5, were presented as average values. When processing the CBF effectiveness related responses, that is natural, social/institutional/human and financial indicators with three categorical rating scales (increased, decreased, or maintained), the one that received the majority was considered as the final rating.

The statistical analysis ANOVA ($\alpha = 0.05$) was applied to test the statistical significance of differences between the average values from the four types of management analyzed.

The data collected in Stage 1 were organized in the form of one general document, and the evaluations and comments of participants were analyzed in order to identify common management problems for the four types of *baldios* analyzed. Further, taking into account the comments of the participants, possible solutions to these problems were discussed by the authors of the manuscript and included in the conclusion of interim report.

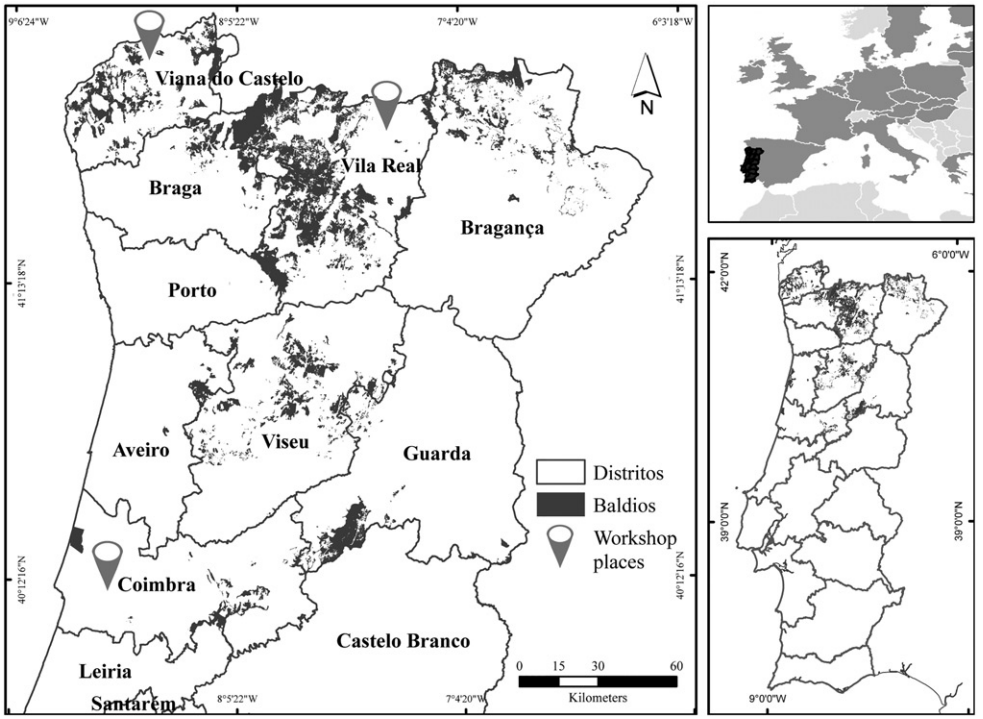

Figure 2. Location of Portugal in Europe, of the baldios in mainland Portugal and sites where the workshops were carried out.

The interim report in Portuguese was sent to all study participants for their later discussion in the validation workshop held in October 2019 in Viana de Castelo (northern Portugal). During this seminar, the results were discussed and validated by the participants. The main conclusions of this discussion were incorporated in the final report. The entire discussion was documented and highlights presented in the summary report for FAO along with the main results compiled in Stage 1. In addition, key final results of this assessment were presented but not published at the VIII National Forestry Congress in 2017 and at the IUFRO Small-scale Forestry Conference in 2018.

Results

The results of the study are presented below following the order of the objectives of the research. The first objective focused on differences perceived by the stakeholders in relation with the four *baldio* management types. To analyze these differences, the average, standard deviation (Table 2) and ANOVA were calculated. Table 2 presents each overarching indicator along with the associated ratings. Each of the sub-indicators are not presented here due to space limitations.

The ratings for each *baldio* management type differ slightly in both Forest Tenure (F1) and CBF evaluation systems (F2) (Table 2) which were confirmed by nonsignificant differences in ANOVA tests ($F1_{3,244} = 0.12$, $p = 0.94$ and $F2_{3,168} = 0.44$, $p = 0.72$). In general, the average values of satisfaction with the state of the analyzed indicators are

Table 2. Average and standard deviation for the Forest Tenure and CBF indicators for the four baldio management types.

		Management types							
		I		II		III		IV	
		Averages ($\bar{x}$) and standard deviations (s)							
Assessment system	Analyzed indicators	$\bar{x}$	s	$\bar{x}$	s	$\bar{x}$	s	$\bar{x}$	s
Forest Tenure	Recognition of rights	3.6	0.6	3.9	0.5	3.8	0.7	3.9	0.6
	Protection of rights	3.4	0.7	3.4	0.6	3.3	0.9	3.3	0.9
	Provisions for enjoyment of rights	3.2	0.6	3.3	0.6	3.2	0.6	3.2	0.6
	Access to justice	3.8	1.0	3.8	1.0	3.8	1.1	3.8	1.1
	Prevention of disputes/conflicts	3.8	0.7	3.9	0.8	3.9	0.9	3.9	0.9
CBF	Enabling environment	3.4	0.6	3.4	0.5	3.4	0.6	3.5	0.7
	Balance of rights and responsibilities of commoners/*baldio* managers	3.5	0.7	3.7	0.6	3.5	06	3.5	0.7
	Effectiveness in achieving sustainable forest management	2.8	0.4	3.2	0.4	2.6	0.5	2.6	0.5

Management types: Forest Services co-management with commoners (I) or with Parishes (III); Autonomous management by commoners (II) or Parishes (IV). The rating range from 0 to 5 reflected the level of satisfaction of participants with the state of the indicator. The minimum of "0" indicates unsatisfactory and maximum of "5" indicates very strong satisfaction.

located between two levels: close to "3" (some satisfaction) or close to "4" (strong satisfaction).

Often, weaknesses identified in the CBF system were explained in the Forest Tenure assessment, namely gaps in the legal framework, the functioning of institutions or tenure administration.

Five Pillars of Forest Tenure Assessment Results (VGGT)

The second objective focused on the assessment of enabling conditions of *baldio* management based on the five pillars underlying the VGGT: recognition of rights, protection of rights, provisions for enjoyment of rights, access to justice, prevention of disputes/conflicts.

The constitutional recognition of *baldios* as a type of rural community ownership was deemed as highly satisfactory by a majority of the participants in evaluating the "Recognition of rights" (approximately 65% rated as "4" or "5") (Table 2). However, since about 70% of the *baldios* are still managed in cooperation with FS or by Parish Councils (Germano 2013), the participants felt that there was some confusion in the Portuguese society about this kind of ownership that tended to consider *baldios* as a public open access area. This fact may have influenced the perceived "provisions for enjoyment of rights" (creating conditions for the full exercise of tenure rights), since it is the pillar which has the lowest score in all the *baldios* management types which included indicator participation in policy dialog. Approximately 85% of the participants mentioned that it was very difficult to participate in the public discussions related to *baldios* organized by the central government or FS. Also, participants noted that there were some conflicts related to the incompatibility of different laws, which create unnecessary restrictions for the commoners.

Despite the cooperation between the FS and the *baldio* associations in addressing challenges in the legal framework and management of community areas in recent years, the process of collecting and incorporating the opinions of the stakeholders remains weak. According to one participant:

> … information on the possibility of participating in the discussion is often poorly disseminated and the means used to collect opinions [via the Internet], are often not adequate to collect information at more decentralized levels.
>
> Forestry technician of baldios, 43 years old

In relation to the "Protection of the rights" of *baldio* owners, all the numerical ratings were above 3, however, the participants mentioned that there is "weak satisfaction" specifically related to the registration of this type of property. Although by law it is foreseen that these areas should have cadastre or at least have a place and system to registration of rights. This has not been implemented in practice, resulting in a violation of the commoners' rights to register these areas. The "Access to Justice" pillar received high scores but with several problems mentioned by the participants with regard to the litigation in community areas and the pending and unresolved cases in the courts. A map developed by FS technicians shows that in 2013 areas under litigation occupied

around 10% of the total *baldio* area with management plans (Germano 2013). Meanwhile, according to another participant:

> … court trials are costly and time-consuming due the remoteness of courts from rural areas and the small number of community property experts.
>
> Commoner and baldios manager, 70 years old

Finally, participants had similar perception on "Prevention of disputes/conflicts," for which the scores were high for all the management types (average rating from 3.8 to 3.9) (Table 2), but problems were identified with regard to dissemination of information on allocation of rights and financial flows.

Main CBF Assessment Results

The third objective of the study was to determine the perceived strengths and weaknesses of CBF per type of *baldios* management in the last decades with regard to the enabling environment.

As in the previous evaluation, the ratings obtained during CBF assessment were very similar across the four types of management. However, differences were observed when comparing the two regions studied (north and center of Portugal). In this part of the CBF assessment, *baldio* managers of central Portugal were less satisfied with the existing technical, legal, and subsidy supports provided by FS and by the small number of associations in comparison to the north of Portugal. The average rating of indicators varied from 2.8 in the center and 3.9 in the north. According to the participant's, this difference is primarily because of (i) the stronger presence of *baldio* associations in the north of Portugal, (ii) the uneven distribution of financial support provided by national development programs; and (iii) differences in cooperation between decentralized FS and *baldio* managers at the regional levels.

Although the ratings on the level of satisfaction with the balance of rights and responsibilities of commoners and *baldio* managers (Table 2) were largely the same across the various *baldio* management types, the assessment of the CBF rights (Table 3) show us another reality. As it turned out, managers of types I and III (both co-management with the FS) found it harder to enjoy rights and fulfill their duties due to the bureaucratic nature of these management types. Transfer of forest governance in last decades has placed more responsibility on the commoners and the Parish Councils. The decrease in the technical staff of the FS (*baldio* co-manager) and in financing complicated the management processes. This is especially noticeable in the implementation of management plans, wood extraction and investment in exploited and/or post-fire *baldio* forests in I and III management types.

The differences observed in the satisfaction with rights related to the extraction of wood can be explained by the *baldios* in co-management models since there is more bureaucracy and the revenue must be divided between commoners and FS compared with the *baldios* managed by communities or Parish Councils alone.

The right to compensation for the expropriation of *baldio* areas for public purposes was rated by more than 50% of the participants as "very weak satisfaction" or even "unsatisfactory". This is because in cases of expropriation *baldio* owners receive no

Table 3. Average scores of the rights associated with the CBF for each of the baldio management types.

	Management types							
	I		II		III		IV	
	Averages ($\bar{x}$) and standard deviations (s)							
Type of rights	$\bar{x}$	s	$\bar{x}$	s	$\bar{x}$	s	$\bar{x}$	s
Right to enter a defined forest	4.8	0.3	5.0	0.0	5.0	0.0	5.0	0.0
Extraction of NWFPs	4.4	0.1	4.6	0.3	3.9	0.7	4.3	0.5
Extraction of wood	2.7	0.7	4.3	0.5	3.0	1.2	4.3	0.5
Extraction of firewood	4.3	0.2	4.6	0.3	4.4	0.4	4.3	0.5
Right to management	3.0	0.8	4.3	0.5	3.4	1.1	3.5	1.0
Right to exclude outsiders	3.8	0.7	3.8	0.9	3.1	1.3	3.0	1.0
Right to lease	3.7	0.0	4.3	0.6	3.9	0.7	4.3	0.5
Right of sale	3.3	0.3	3.9	1.0	4.0	0.6	3.0	2.0
Rights to the compensation of lost rights	3.0	1.8	3.4	1.3	2.3	0.5	3.0	0.2

Each right was assigned a score ranging from 0 to 5, which reflected the satisfaction of participants with the state of the assessment indicator. Thus, the minimum of "0" reflects unsatisfactory and maximum of "5" reflects very strong satisfaction.

compensation. Surprisingly the right of sale was scored above 3, even though the sale of these lands is strictly prohibited by law.

> … The lack of interest of commoners in the management of their areas is one of the causes of the appropriation of baldios by third parties.
>
> Baldioś manager, 67 years old

An analysis of effectiveness with regard to social/institutional/human and financial outcomes of the *baldios* showed stability or increase (Table 4). Natural or environmental indicators showed less positive results.

Although the participants felt that many financial and social indicators had improved over the last 40 years, the issues of economic sustainability and social equality need deeper analysis. Participants comments indicate that the financial management of *baldios* is not always transparent regardless of the management type and that in many cases the disclosure and dissemination of income information (provided for in the legal framework of *baldios*) was not always carried out. This lowers the interest of commoners to manage their forests, despite their relatively high profit potential. It was also mentioned that:

> … stagnation in baldio job development can be explained by the need for new types of economic activities.
>
> Representative of the Baldios Association, 45 years old.

In relation to the environmental indicators, the results showed that threats to *baldio* areas has either increased or did not change. In all management types participants noted a decrease in forest area (except in type IV); an increase in burned areas; an increase in uncontrolled post-fire regeneration; and an increase of pests, diseases and exotic woody species. The decrease of wood volume in types III and IV was explained by:

> .a disturbance caused by an excessive cutting of trees and no reforestation of exploited areas
>
> Baldios' manager, 67 years old

Table 4. Changes in natural, financial, and social indicators over the past 40 years for the four types of baldios management.

Management type	I	II	III	IV
Financial indicators				
Income from sale of timber	↑	↑	↑	↑
Income from sale of fuelwood	–	–	–	–
Income from sale of wildlife	–	–	–	–
Income from sale of NWFPs	↑	–	↑	–
Income to individual households	–	↑	↑	–
Income to community groups	↑	↑	↑	↑
Reinvestment in management and forest areas	–	↑	↑	–
Use of income for social purposes	–	↑	↑	↑
Community based enterprises	–	↑	–	–
Jobs directly related to CBF activities	–	–	–	–
Social indicators				
Social/institutional capital	↑	↑	↑	↑
Human capital	↑	↑	↑	–
Equity	–	↑	–	–
Inclusiveness	↑	↑	–	–
Use of forest goods for spiritual purposes	↑	↑	↑	↑
Recognition and use of traditional knowledge	–	–	–	–
Natural indicators				
Forest condi-tions				
Forest area	↓	↓	↓	↑
Wood volume/biomass	–	–	↓	↓
Regeneration	↑	↑	↑	↑
Biodiversity	↓	–	–	–
Ecosystem services (erosion control, soil fertility, water quality, sequestration of atmospheric carbon, etc.)	–	–	–	↓
Threats				
Wildfires	↑	↑	↑	↑
Illegal logging	↓	↓	↑	↑
Wildlife poaching	–	↑	↑	↑
Encroachment for agricultural purposes	–	↓	↓	↓
Land grabbing	↑	–	↑	↑
Pests, diseases and exotic woody species	↑	↑	↑	↑

In the table above "↑" indicates an increase, "↓" represents a decrease, " – " represents no change.

The increase of "wildlife poaching" and "land grabbing" in three of the four management types was explained by the lack of clear definition of the limits of the *baldio* lands due to the absence of the cadastre. Also, judging by the results of the survey, CBF did not affect biodiversity indices and environmental services in *baldio* areas. Among the main reasons for the overall deterioration of forests in *baldio* areas are: (i) policy restrictions on changes in the type of land use applied in the last decades with the introduction of obligatory forest land use and a network of protected areas, (ii) the lack of environmental education as a response to the increasing environmental degradation, (iii) the lack of compensation of *baldio* managers for environmental services provided by their forests. This has led to a loss of interest in forest management, the accumulation of biomass and consequently the increased risk of wildfire. In addition, 80% of the participants from *baldio* types I and III commented that the FS as co-manager failed to provide help in restoring burned areas nor did it invest in *baldio* forests. Participants of *baldio* management types II and IV indicated the risks of investing in reforestation in light of the high probability of losing it to the frequent wildfires.

Discussion

This study allowed us to conduct a qualitative assessment of the conditions and effectiveness of *baldio* management at the national level. The assessment covered the over 40-year period from the recognition of community property at the constitutional level and transfer of tenure rights, until the current time. The results of this study complement knowledge obtained from studies conducted in previous years at the national level, but without the comparison of the various management types or the use of qualitative methods in these earlier studies (CNVTC 2010; Lopes et al. 2013). The findings also complement studies carried out at the regional or local scales on *baldios* located in the north of Portugal (Baptista 2010; Gomes 2009; Luz 2017, etc.).

Lack of data on spatial extent, the enabling conditions, and effectiveness of CBF tenure regimes in other European countries (Weiss et al. 2018; Živojinović et al. 2015) makes it difficult to compare the results of this study at the international level.

General Assessment Results

The results of the assessment of Forest Tenure rights in *baldios* showed the existence of a well-developed legal framework established to protect the rights of commoners and their collective property. The improvement in the enjoyment of this right is a continuous process and is confirmed by the constant revision of the referred legislative framework (Gralheiro 2018). However, a large number of problems related to the management of *baldio* resources remain unresolved both at the legislative and the executive levels. Protection of rights of commoners in the management of community forests is quite high, but lack of compensation in cases of expropriation as well as lack of knowledge and technical support is leading to the declining local interest in managing these areas.

Increasing *baldios* in co-management with FS are choosing to opt away from joint management to autonomous management types provided for in Law 75/2017. The good management of these forest areas becomes increasingly difficult, especially in the context of continuous rural exodus (Nunes 2012). Therefore, we recommend that the commoners group their *baldios* (provided for in the modern legislative framework) or transfer control to local authorities where there are low numbers of commoners or where activity of commoners is low as one of the possible solutions for weak governance.

As for the general results of CBF, the analysis of the participant responses also show that in all types studied, the quality of the *baldio* management also depends on: the *baldio* managers/commoners pro-activity levels, location and size of the area under management (due to the difficulties related to the "scale" in the management of small *baldios*, especially in mountainous areas), quantity and quality of the available natural resources and presence or absence of land use restrictions.

The Main Weaknesses Detected and Suggestions for Its Improvement (Objective IV)

In general, noticeable weaknesses were found in the commoner tenure rights and effectiveness of Portuguese CBF modalities, and whose resolution is urgent. These weaknesses

can be divided into three groups: juridical, administrative, and environmental. Below, we provide a detailed description of these obstacles and proposals for their improvement.

Rights and Obligations Associated with the CBF Regime

All rights, listed in the CBF assessment methodology, are available to Portuguese commoners (Table 3), except the right of sale of *baldios*. Such approach was designed to improve the living conditions of the rural population in areas with community lands, while ensuring the protection and transmission of this heritage to future generations.

The centralization of *baldio* management carried out by the Portuguese government prior to 1974 (Brouwer 1995) has led to commoners' loss of knowledge about their right to manage these areas. Poor dissemination of the *baldio* legislative framework, technical language of the laws, and lack of support in juridical interpretation has exacerbated this situation. At the same time, lack of technical support from the co-managers and the insufficient number of the *baldio* associations (especially in the Center of Portugal) make for difficulties in the execution of the duties of commoners in the management of these areas and its resources. Thus, the dissemination of information regarding the rights and duties of *baldio* managers should be improved. Searching for alternative ways of disseminating information to (e.g. seminars, workshops, courses, publications in social networks and local newspapers, etc.) could increase the effectiveness of this process.

As for the *baldio* associations, taking into consideration the increasing shift from co-management to autonomous models, not only the number of these institutions but also the number of forest technicians employed by them should be increased. Our analysis has shown that in some associations the forest area supported by a forestry technician exceeds 20,000 hectares, while in others such specialists may even be absent.

Land Administration and Protection of Rights

The cadastre is one of the important elements in the land tenure system and creates an objective basis to ensure clarity and protection of rights. In Portugal the lack of cadastre is a common problem for all types of rural properties. The Portuguese land cadastre registration system implemented between the 1930s and the 1990s covers 50% of the total forest property only (Beires, Amaral and Ribeiro 2013) mainly in the south of Portugal. Until recently, it was not compulsory to georeference information concerning property limits in the rural property registry at the Institute of Registries. The cadastre Law n° 78/2017 tries to fill this gap, but the new simplified cadastre system does not foresee the regularization of the *baldios* along with other rural property types. For the *baldios*, Portuguese Law n° 75/2017 provides for the creation of a special electronic platform, but the institutions responsible for its development and maintenance are still not identified (Gralheiro 2018).

Unlike private owners, contemporary commoners do not always know the exact limits of their *baldio*s (Gomes 2017). In the 1930s, during the occupation of community lands by State more than 7000 *baldios* covering over 500,000 ha were documented

during an inventory (MA 1939). Following 1976 and the transfer of *baldio* governance to communities, activities were resumed in 1107 *baldios* covering 380,000 ha (Germano 2013). This difference can be explained by different factors. Over the past decades, many *baldios* have been handed over to local authorities and are currently owned by Municipalities or Parish Councils. Some were occupied by third parties or considered as public areas, due to a lack of interest on the part of commoners in their management. Others merged or were split up during national administrative reforms. Consequently, the development and implementation of a *baldio* registration system in the near future is extremely important. Only a complete and exhaustive record of the *baldio*s can ensure effective and economically sound land and resource management. The State should simplify the registration process, and help communities and commoners understand the significance of demarcating and registering their *baldios*. In particular, the State should develop and implement an electronic platform as mentioned in Law n° 75/2017.

Conflict Resolution

Among other things, the lack of cadastre has led to litigation in some *baldios*. In the course of this assessment, as well as during the study of the relevant literature (Germano 2013) we found that 10% of *baldios* face boundary litigation problems involving neighboring communities or third parties. A literature review indicates that this type of conflict is common to CBFs regardless of the level of development of the country or community (e.g. Skutsch 2000; Bullock and Hanna 2007; FAO 2012a; Acharya and Upreti 2015; Milupi, Somers, and Ferguson 2017). In this sense, Portugal is no exception (Gomes 2017). In addition, forest management in Portugal is fragmented and often subject to an unclear, overlapping, competing or conflicting legal framework as in many other countries (FAO 2016).

As noted by FAO (2012a), growing tensions and disputes can undermine good governance. Escalation of conflicts leads to human suffering, loss of interest in management, economic recession at the national level and, as a result, environmental degradation (Means et al. 2002). According to Ostrom (1990), clear boundaries, as well as rapid and low-cost conflict-resolution mechanisms are amongst the eight main conditions for the sustainable governance of common pool resources. Alternative dispute resolution (ADR) tools can make the resolution of resource management disputes more accessible, quick, simple, cost-free or inexpensive, while offering court security guarantees (Floyd, Germain, and Horst 1996). In Portugal, the ADR system includes arbitration centers, peace courts and public mediation systems, but their distribution across the territory is scarce, and commoners are often not aware of the existence of these legal services. On the other hand, FS (co-manager of the *baldios*) does not offer paralegal services or free legal assistance, nor mobile services for remote communities. Its lawyers work on internal issues only. Thus, the territorial expansion of the Peace Court network is of the utmost importance to reduce *baldio* boundary conflict problems.

Additionally, means of formal dispute resolution should be reviewed and improved to ensure faster and more efficient procedures. The State should also provide support of

paralegals, mobile dispute resolution services or free legal assistance to marginal rural areas.

Finally, regional offices or One Stop Shops should be developed and made available to support community-based forestry. Here, the FS could register *baldios* and, at the same time, serve commoners on an exclusive basis and update them on all important information. Also, it is important to create mechanisms that promote the transparency and dissemination of all *baldio* management data in the public domain.

Governance Decentralization

The Law n°75/2017 opened the door for the continuation of the process of transfer of *baldio* governance to commoners. The idea behind this was to further devolve all the responsibility of the management of *baldios* to local communities and authorities, dismantling the systems of co-management with FS (types I and III).

According to studies by Kumar and Kant (2003), the shift from a bureaucratic centralized management toward CBF requires frequent interactions of the FS with local communities. At the same time, the experience of European countries shows that sustainable forest management is an ever-changing task that does not begin nor stop with decision making at the centralized or local levels. As society changes, so does forest management. The ability to adapt forestry to new socio-economic conditions (a masterful balance between top-down and bottom-up decision-making systems) is a difficult task even for highly decentralized countries (e.g. Küchli and Blaser 2012), but it is necessary in the process of improving CBF.

We believe that since the use of forest land in many *baldios* is an obligatory condition, the current process of transfer of management should not lead to dependency on one party but seek to achieve a balance between society and FS. However, this will require a change in the FS to correct its relationship with the *baldios* from serving as an enforcement agency (currently the case) to playing a facilitator role. It is also important to strengthen support to the associations of *baldios* and encourage commoners to work together.

Cash Flow Management

In recent decades, *baldios* have ceased to be the main source of income for many rural families. Yet, at the same time, their role in the social economy of rural communities has increased due to revenues relating to forest resources and new economic activities.

Baldios have become a source for alternative energy (wind, hydroelectric power, solar energy), forestry, NTFP exploitation, wood sales, grazing, recreation, etc. In turn, the Portuguese State has provided tax exempt status for this type of property in order to stimulate investment in community land, as well as strengthen social cohesion and revitalize the rural economy. Thus, in Portugal, CBF is in a much better position when compared to other countries where benefits of community-managed forests for local actors are much lower (e.g. Mahanty, Guernier, and Yasmi 2009).

Additionally, according to the Law n° 75/2017, community land managers are not obliged to maintain accounts of income derived from the sale of *baldio* products and

resources as it is not subject to control in the form of an audit. We believe that this can negatively affect the transparency of the cash flow management system in *baldios*. The legal framework should promote/require transparency in decision-making and record keeping, where large cash income of community lands is involved. Procurement, sales, revenue and expenditure figures should be made available to all interested parties, as well as subject to financial oversight.

Environmental Indicators

Of the three components of CBF effectiveness analysis, the indicators of the natural capital status presented the lowest results (Table 4). The analysis of the responses showed discrepancies between the participants in the interpretation of some of the indicators. From our point of view, these results are not final and should be reassessed by quantitative research at the national level.

Multiple international studies have demonstrated that CBF has the ability to generate and maintain environmental benefits (FAO 2017; Stevens et al. 2014), but there are those who consider these studies as incomplete (Bowler et al. 2012) or difficult to compare, due to differences in the broader set of biophysical, socioeconomic, and institutional factors (Persha, Agrawal, and Chhatre 2011). The absence of detailed studies on CBF in developed countries at the regional and national levels complicates the process of analyzing its potential in environmental issues in the European country context (FAO 2016). Moreover, the influence of independent variables (ranging from internal community traits and resources to external factors) significantly impacts the success of community forestry and make its results case specific and difficult to generalize (Pagdee, Kim, and Daugherty 2006).

In the case of Portugal, such analysis is also difficult due to the complexity of factors that influence *baldio* forest management. Initially, the study of natural indicators of *baldio* areas should in fact be based on the fact that the majority of these forests were not developed in a gradual and natural way, but as plantations. As mentioned above, most of them were created within the framework of the Afforestation Plan between 1938 and 1968 under the strong control of FS (Germano 2000). The significance of the economic and environmental results of this project is undeniable. The Afforestation Plan sought to create, exploit and protect silvicultural wealth, from a national economic point of view, and simultaneously promote forest cover in lands recognized for their public utility. Soil protection in mountainous areas and maintenance of good hydrological conditions of the basins were presented as the main reasons for the obligatory forest occupation in vast parts of *baldios* (Germano 2000; Rego 2001), which increased the ability of these lands to generate ecosystem services. But, forestry was an unfamiliar land use for commoners, so following the transfer of forest governance to commoners, most *baldio* managers faced difficulties in managing and supporting these areas. After the 1990s, more than 70% of communal lands were partially included in the network of protected areas (Natura 2000, natural parks, reserves, etc.), which further aggravates conflicts in management of *baldio* forest areas with commoners (Luz 2017).

Recently, *baldio* associations have increasingly raised the question of the right of communities to receive payments for environmental services which would likely

increase commoners' interest in improving the environmental outcomes of CBF. But this is a complex process, and its results also depends on other equally important factors, such as lack of environmental education for commoners and *baldio* managers, widening the dialog between all types of *baldio* managers, absence of platforms for the exchange of constructive views of stakeholders, and weak involvement of the young generation.

The development of new economic activities (such as wind farms, recreation, etc.) in the recent years has reignited the interest of commoners and reduced the risk of fire in these areas. The development of biomass power stations and the collection of non-timber forest products is equally promising (Verkerk et al. 2018). Thus, supporting the development of new sustainable economic activities that reduce fire risk and produce revenues are a key aspect in improving governance of *baldio* resources.

Conclusion

Community lands (termed *baldios*) are a valuable heritage and an important agroforestry space owned and managed by Portuguese rural communities. The sustainable development of these lands is a current issue with serious repercussions for the future of rural areas of Northern and Central Portugal.

In close collaboration between FAO and the CEABN in 2017, community land tenure conditions of the Portuguese *baldios* were assessed using the FAO Forest Tenure and CBF tools. Several policy, legal, institutional, social, economic and environmental indicators were evaluated to identify weaknesses and strengths of *baldio* management under four management types. The assessment results identified the current challenges in the management whose correction in the near future can improve the socio-economic, administrative and environmental outcomes of these forest areas.

Future research should expand the knowledge gained in this study through quantitative analysis at the national level. It is recommended to pay special attention to the deepening of knowledge related to socio-economic and environmental problems and their solution. To reduce the knowledge gaps about community forestry in other European countries it is also recommended that the Forest Tenure and CBF assessments be carried out in other countries to collect qualitative data by adapting these tools appropriately to the local contexts.

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References

Acharya, S., and B. Upreti. 2015. Equity, inclusion and conflict in community based forest management: A case of Salghari community forest in Nepal. *Dhaulagiri Journal of Sociology and Anthropology* 9:209–23. doi:10.3126/dsaj.v9i0.14029.

Agrawal, A., A. Chhatre, and R. Hardin. 2008. Changing governance of the world's forests. *Science* 320(5882):1460–62. doi:10.1126/science.1155369.

Andersson, K. 2006. Understanding decentralized forest governance: An application of the institutional analysis and development framework. *Sustainability: Science, Practice and Policy* 2(1): 25–35. doi:10.1080/15487733.2006.11907975.

Baptista, F. 2010. *O Espaço Rural: declínio da Agricultura.* 1st ed. 213. Lisboa, Portugal: Celta Editora.

Beires, R., J. Amaral, and P. Ribeiro. 2013. O Cadastro e a Propriedade Rústica em Portugal*, 265.* Lisboa, Portugal: Fundação Francisco Manuel Dos Santos e Rodrigo Sarmento de Beires. http://ffms.pt/upload/docs/dfdc203f-4cf5-409a-97dc-3794db794530.pdf (accessed August 29, 2019).

Biernacki, P., and D. Waldorf. 1981. Snowball sampling: Problems and techniques of chain referral sampling. *Sociological Methods and Research* 10(2):141–63. doi:10.1177/004912418101000205.

Bowler, D., L. Buyung-Ali, J. Healey, J. Jones, T. Knight, and A. Pullin. 2012. Does community forest Management provide global environmental benefits and improve local welfare? *Frontiers in Ecology and the Environment* 10(1):29–36. doi:10.1890/110040.

Brouwer, R. 1995. Baldios and common property resource management in Portugal. *Unasylva* 45(1):180. http://www.fao.org/docrep/v3960e/v3960e00.htm#Contents.

Bullock, R., and K. Hanna. 2007. Community forestry: Mitigating or creating conflict in British Columbia? *Society & Natural Resources* 21(1):77–85. doi:10.1080/08941920701561007.

CEABN. 2017. Avaliação de gestão das áreas florestais comunitárias portuguesas de acordo com as orientações da FAO: VGGT e CBF. http://www.isa.ulisboa.pt/ceabn/projecto/1/91/avalia-cce-dil-atilde-o-de-gest-atilde-o-das-aacute-reas-florestais-comunit-aacute-rias-portuguesas-de-acordo-com-as-orienta-ccedil-otilde-es-da-fao-vggt-e-cbf (accessed October 29, 2018).

CNVTC. 2010. Relatorio da Comissão Nacional para a Valorização dos Territórios Comunitários, 2. MADRP. AFN. Lisboa.

Colfer, C.J., and D. Capistrano. 2005. *The politics of decentralization.* 1st ed. London: Routledge.

Devy-Vareta, N. 2003. O Regime Florestal em Portugal através do século XX (1903–2003). *Revista da Faculdade de Letras – Geografia* XIX(1):447–55. http://ler.letras.up.pt/uploads/ficheiros/328.pdf.

Diàrio da Repùblica (DR). 2015. Estratégia Nacional para as Florestas. *Diário da República* 1a(24):1–92. https://www.portugal2020.pt/Portal2020/Media/Default/Docs/Legislacao/Nacional/ResCM_6B_2015.pdf.

Duguma, L. A., J. Atela, A. N. Ayana, D. Alemagi, M. Mpanda, M. Nyago, P. A. Minang, J. M. Nzyoka, D. Foundjem-Tita, and C. N. Ntamag-Ndjebet. 2018. Community forestry frameworks in sub-Saharan Africa and the impact on sustainable development. *Ecology and Society* 23(4): 21. doi:10.5751/ES-10514-230421.

FAO. 2012a. Conflict management. http://www.fao.org/forestry/conflict/en/ (accessed September 29, 2018).

FAO. 2012b. *Voluntary guidelines on the responsible governance of tenure of land, fisheries and forests in the context of National Food Security*, ed. P. Sörös, R. Dziewas, E. Manemann, I.K.

Teismann, and B. Lütkenhöner, 1059–61. Rome, Italy: UN Food and Agriculture Organization (FAO).
FAO. 2016. In *Forty years of community-based forestry: A review of its extent and effectiveness*, ed. D. Gilmour, 140. Rome, Italy: FAO. http://www.fao.org/3/a-i5415e.pdf.
FAO. 2017. *Community-based forestry extent, effectiveness and potential*. Rome, Italy: FAO. http://www.fao.org/3/i8372en/I8372EN.pdf.
Fernandes, P., C. Loureiro, N. Guiomar, G. Pezzatti, F. Manso, and L. Lopes. 2014. The dynamics and drivers of fuel and fire in the Portuguese public forest. *Journal of Environmental Management* 146:373–82. doi:10.1016/j.jenvman.2014.07.049.
Floyd, D.W., R.H. Germain, and K. Horst. 1996. A model for assessing negotiations and mediation in forest resource conflicts. *Journal of Forestry* 94 (5):29–33.
Germano, A. 2000. *Regime Florestal. Um século de existência.* Estudos e Informação n° 319, Direcção-Geral das Florestas, Lisboa.
Germano, A. 2013. Áreas públicas e comunitárias. Uma floresta diferente. In *7° Congresso Florestal Nacional "Florestas – Conhecimento e Inovação"*, ed. J. Bento, J. Lousada, and M. Sameiro Patrício, 184–99. Vila Real and Bragança, Portugal: Kluwer.
Gomes, P. 2009. Posse, gestão e uso de recursos em regime de propriedade comum – Os Baldios do Norte de Portugal. Diss., University of Lisbon. http://hdl.handle.net/10400.5/2521.
Gomes, P. 2017. Gestão e medição de conflitos de limites em áreas communitárias. Paper presented at 2017 Conferência Nacional dos Baldios, Vila Real, Portugal.
Gralheiro, J. 2018. Dos Baldios, até à Lei 75/2017. *De 17 De Agosto*, ed. E. Esgotadas, p. 302.
Hajjar, R.F., R.A. Kozak, and J.L. Innes. 2012. Is decentralization leading to "real" decision-making power for forest-dependent communities? Case studies from Mexico and Brazil. *Ecology and Society* 17(1):12. doi:10.5751/ES-04570-170112.
Jeanrenaud, S. 2001. *Communities and forest management in Western Europe*. Cambridge: Ford Foundation
Küchli, C., and J. Blaser. 2012. Forests and decentralization in Switzerland: A sampling. In The *politics of decentralization*: Forests, *people and power*, translated by Colfer CJP and Capistrano D, 152–65. Sterling, VA: Earthscan. http://www.cifor.org/publications/pdf_files/events/documentations/interlaken/papers/chapter-8-Christian-Jurger.pdf.
Kumar, S., and S. Kant. 2003. Community-based forest management in bureaucratic organizations: Are they compatible? Paper presented at XII World Forestry Congress, Quebec city, Canada. http://www.fao.org/docrep/ARTICLE/WFC/XII/0277-C1.HTM.
Lopes, L.F., J.M.R. dos Santos Bento, A. Cristovão, A. Correia, and F. Baptista. 2013. Institutionalization of common land property in Portugal: Tragic trends between "Commons" and "Anticommons. *Land Use Policy* 35:85–94. doi:10.1016/j.landusepol.2013.05.007.
Luz, A. 2017. Entre subsídios e turismo: Instituições e poder na gestão dos Baldios do Parque Nacional da Peneda-Gerês. *Finisterra* 52(105):7–27. doi:10.18055/Finis9824.
MA, (Ministério da Agricultura). 1939. *Reconhecimento dos baldios do continente. Junta de Colonização Interna*, 3022. Vol. I e II. Lisboa, Portugal: Ministério da Agricultura.
Mahanty, S., J. Guernier, and Y. Yasmi. 2009. A fair share? Sharing the benefits and costs of collaborative forest management. *International Forestry Review* 11(2):268–80. doi:10.1505/ifor.11.2.268.
Mathison, S. 1988. Why triangulate? *Educational Researcher* 17(2):13–17. doi:10.3102/0013189X017002013.
Means, K., C. Josayma, E. Nielsen, and V. Viriyasakultorn. 2002. *Community-based forest resource conflict management*, 11. Rome, Italy: FAO. Available at http://www.fao.org/3/a-y4300e.pdf.
Milupi, I., M.J. Somers, and W. Ferguson. 2017. A review of community-based natural resource management. *Applied Ecology and Environmental Research* 15(4):1121–43. doi:10.15666/aeer/1504_11211143.
Moeliono, M., E. Wollenberg, and G. Limberg. 2008. Between state and society: Decentralization in indonesia. Paper presented at The Decentralization of Forest Governance: Politics, Economics and the Fight for Control of Forests in Indonesian Borneo, 328, London, Sterling, VA. http://www.cifor.org/ard/documents/The Decentralization of Forest Governance_2009.pdf.

Montagne, C., A. Niedzwiedz, and J. Peyron. 2014. *Connaitre les communes forestieres de l'Europe A25, 125. Nancy, France*.

Montiel-Molina, C. 2003. Origen y evolución de la propiedad forestal colectiva en España. *Cuadernos De La Sociedad Española De Ciencias Forestales* 16:285–90. doi:10.31167/csef.v0i16.9385.

Moreira, F., F.C. Rego, and P.G. Ferreira. 2001. Temporal (1958-1995) pattern of change in a cultural landscape of northwestern Portugal: Implications for fire occurrence. *Landscape Ecology* 16(6):557–67. doi:10.1023/A:1013130528470.

Nunes, A. 2012. Regional variability and driving forces behind forest fires in Portugal an overview of the last three decades (1980–2009). *Applied Geography* 34:576–86. doi:10.1016/j.apgeog.2012.03.002.

Ostrom, E. 1990. *Governing the commons: The evolution of institutions for collective action*, 271. Cambridge, UK: Cambridge University Press.

Ostrom, E. 1999. *Self-governance and forest resources*, 15. Bogor, Indonesia: CIFOR. https://www.cifor.org/library/536/.

Pagdee, A., Y. Kim, and P.J. Daugherty. 2006. What makes community forest management successful: A meta-study from community forests throughout the world. *Society & Natural Resources* 19(1):33–52. doi:10.1080/08941920500323260.

Persha, L., A. Agrawal, and A. Chhatre. 2011. Social and ecological synergy: Local rulemaking, forest livelihoods, and biodiversity conservation. *Science* 331(6024):1606–8. doi:10.1126/science.1199343.

Rego, F. 2001. *Florestas públicas*, 105. *MADRP.DGF.CNEFF*. Lisbao: MADRP.DGF.CNEFFCELPA.

Skutsch, M. 2000. Conflict management and participation in community forestry. *Agroforestry Systems* 48(2):189–206. doi:10.1023/A:1006328403023.

Stevens, C., R. Winterbottom, J. Springer, and K. Reytar. 2014. *Securing rights, combating climate change: How strengthening community forest rights mitigates climate change*, 64. Washington, DC: World Resource Institute. doi:10.1016/j.vetpar.2008.08.008.

Valente, S., C. Coelho, C. Ribeiro, and J. Soares. 2013. Forest intervention areas (ZIF): A new approach for non-industrial private forest management in Portugal. *Silva Lusitana* 21(2):137–61. http://www.scielo.mec.pt/pdf/slu/v21n2/v21n2a01.pdf).

Verkerk, P. J., I. Martinez De Arano, and M. Palahí. 2018. The bio-economy as an opportunity to tackle wildfires in Mediterranean forest ecosystems. *Forest Policy and Economics* 86:1–3. doi:10.1016/j.forpol.2017.10.016.

Weiss, G., Lawrence, A. Lidestav, G. Feliciano, D. Teppo, H. Zuzana, S. Zuzana, and D. Ivana. Ž. 2018. Research trends: Forest ownership in multiple perspectives. *Forest Policy and Economics*. 99:1–8. https://www.sciencedirect.com/science/article/pii/S1389934118302570#bb0205. doi:10.1016/j.forpol.2018.10.006.

Živojinović, I., G. Weiss, G. Lidestav, D. Feliciano, T. Hujala, D. Zuzana, L. Anna, and N. Erlend. 2015. Quiroga Sonia & Schraml Ulrich. In *Forest land ownership change in Europe. COST Action FP1201 FACESMAP Country Reports. COST Action FP1201 FACESMAP Coutry Reports*, 693. https://core.ac.uk/download/pdf/29465881.pdf.