PROGRAMA DE DOUTORAMENTO EM ALTERAÇÕES CLIMÁTICAS E POLÍTICAS DE DESENVOLVIMENTO SUSTENTÁVEL
TEORIAS E PRÁTICAS DO DESENVOLVIMENTO SUSTENTÁVEL

Collective action for natural resource management

The case of wildfire risk prevention through coordinated management by small forest owners

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Collective action for natural resource management

The case of wildfire risk prevention through coordinated management by small forest owners

1. **Collective action definition and types**
2. **Benefits. Public goods and scale of management**
3. **Barriers. Free-riding and transaction costs**
4. **Key-factors: social capital, governance, public support**
5. **The example of multi ownership collaboration**

Collective action

Cooperation

Collective interests

Individualism

Competition

Self-interested individuals

Is it possible?

“There is ample empirical support for assuming that the vast majority of people are at least conditional cooperators in collective action situations – that is, they are willing to cooperate given certain premises” (Jagers et al. 2020)

Mancur Olson (1965), The logic of collective action: public goods and the theory of groups

Community-based regulation

Market regulation

State regulation

Is it needed?

Invisible hand, beneficial social and economic outcomes may arise from the accumulated self-interested actions of individuals, none of whom intends to bring about such outcomes *(Adam Smith)*

Social dilema - individually reasonable behaviour leads to a situation in which everyone is worse off than they might have been otherwise

Community-based governance

State governance

Continuum of governance regimes

When is it needed?

CA for natural resource management

Ecosystem services

Private goods

Public goods

- ✓ Many ecosystem services are public goods.

Example: biodiversity, flood control, landscape fire resilience

- ✓ Distinct types of public goods.

Pure public goods, common pool resources, and club goods

- ✓ Their production or management often requires the coordination of efforts of a high number of people

Who is involved?

CA for natural resource management

Land (natural resources) property rights

Private ownership and management

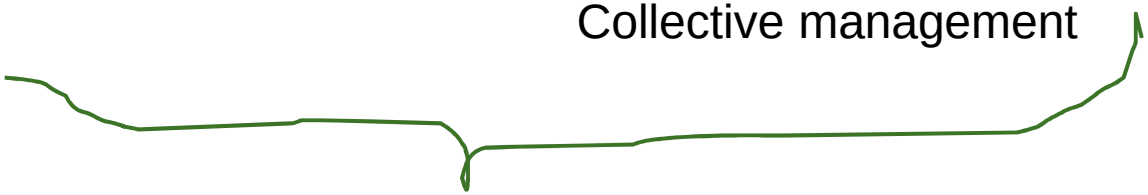
Farmers/peasants
Forest owners

Community's property

Individual/household management
Collective management

State ownership and management

State farms
State forests



Numerous owners and/or users

Elinor Ostrom (1990), Governing the commons

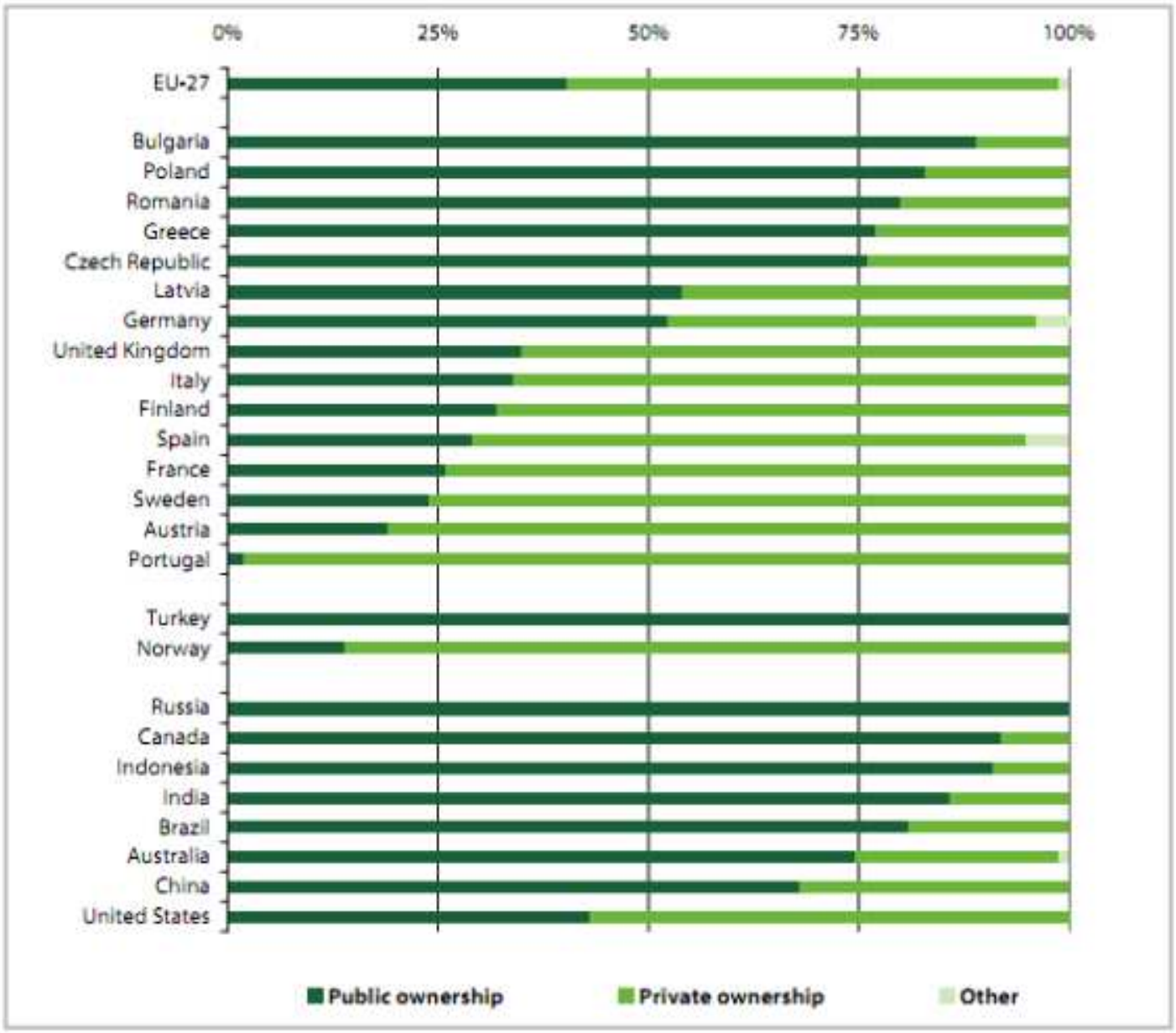


Figure 1. Forest ownership in the world 2005 (in %). Source: EUROSTAT 2011.

Extracted from Pulla et al. 2013

An example

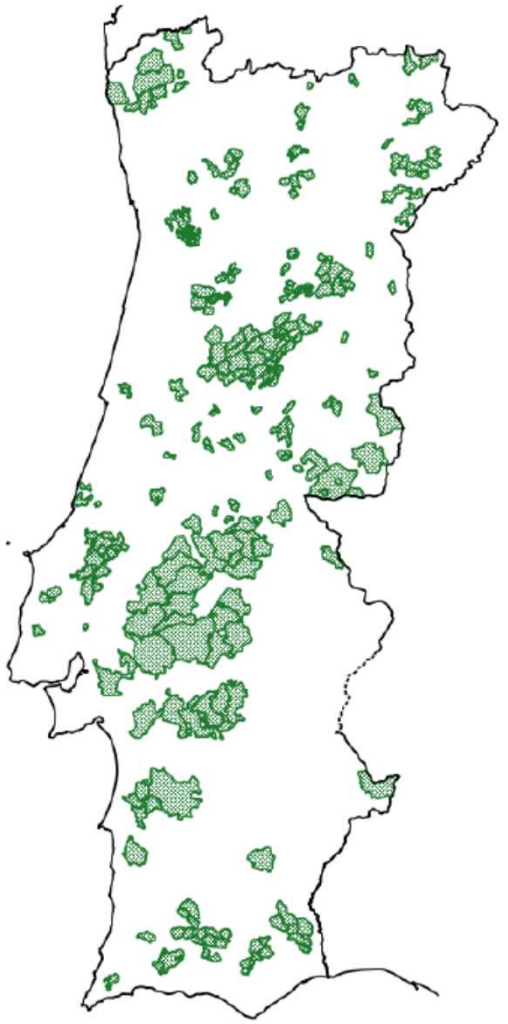
CA for natural resource management

Multi-ownership cross-boundary collaboration

Forest Intervention Zones (FIZ) (2005)

A contiguous surface of mainly forest cover, encompassing several owners, with a Managing Body responsible for drawing up a single Forest Management Plan for the whole area, which is approved by the Owners' Assembly and the National Forest Authority

- ✓ 235 ZIF and 27276 owners;
- ✓ Number of owners per FIZ = average, 116; maximum, 904



Source: extracted from ICNF, 2020

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Collective action

Collective action (CA)

= action taken by a group to achieve common interests

= action taken by a group in pursuit of members perceived shared interests

- ✓ either directly or on its behalf through an organisation;
- ✓ common interests or perceived shared interests

Important key-words

- ✓ group action
- ✓ common / shared interests

Source: Olsen, 1971; OCDE, 2013

Collective action

Group members:

- ✓ resource owners (water, forest or land-owners; private, common ownership),
- ✓ resource managers/users (farmers, fishers, hunters, shepherds, tourism operators, other enterprises)
- ✓ other stakeholders (government, municipalities, associations, visitors, tourists)

Common interests: in the

- ✓ application of integrated crop protection;
- ✓ management of irrigation systems
- ✓ use of community pasture
- ✓ use of hunting resources
- ✓ management for wildfire risk reduction
- ✓ biodiversity management
- ✓ management of water quality for human consumption
- ✓ management of fishery resources (in river, lake or marine waters)

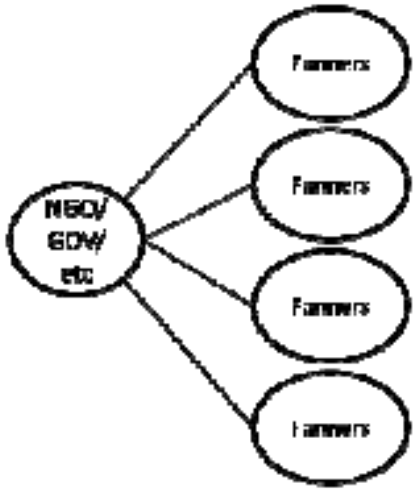
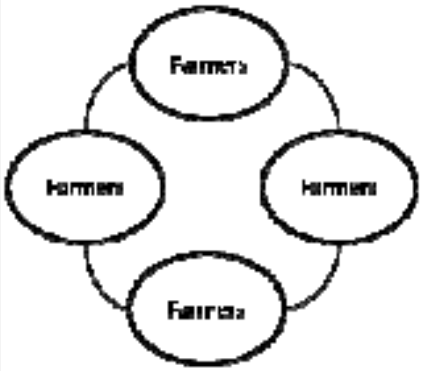
Purposes of the action

Examples of different goals of collective action among private forest owners

Information / advice	Landowners members share information, techniques, experiences and advice with one another, but generally operate independently in the management of their land. Political representation of private forest owners interests.
Equipment / machinery	Members share equipment and machinery for harvesting, road building and access, but manage their lands independently of one another.
Financial / Market	Members organize primarily based upon the collective marketing of wood products in an effort to achieve a more advantageous position in the marketplace. Political representation of private forest owners interests.
Forest or natural resources management	Landowners manage cooperatively on a spatial and temporal scale, making integrated management decisions and implementing them in the context of their surrounding natural, cultural and economic resources.

Source: Kittredge (2005)

Types of collective actions

Type 1: Organisation style collective action	Type 2: External agency led collective action	Type 3: Non-organisation style collective action
Farmers and other participants form organisations and act collectively as members.	External agencies (NGOs, governments, etc) organise farmers (usually in the same geographical area) and act collectively.	Farmers collaborate with other farmers (and non-farmers), but do not form independent organisations.
		
+ support from non-members	+ support from others (e.g. universities etc)	+ support from others (e.g. universities etc)

Source: OECD, 2013.

Types of collective action

Examples

1. Associative hunting estates
   Forest intervention zones
   Association of irrigators (“águas de consortes” traditional system)

2. Protection of water source by a bottler enterprise (Vittel) / farmers on the 3500 ha of the catchment area / research support; farming systems changes with compensations paid to farmers

   Japanese prefectural government support collective action among farmers sharing the same drainage canals in order to raise the water level in the canals so that a fish can swim from nearby lake to paddy fields for reproduction

3. Farmers cooperation in order to manage integrated crop (informal)

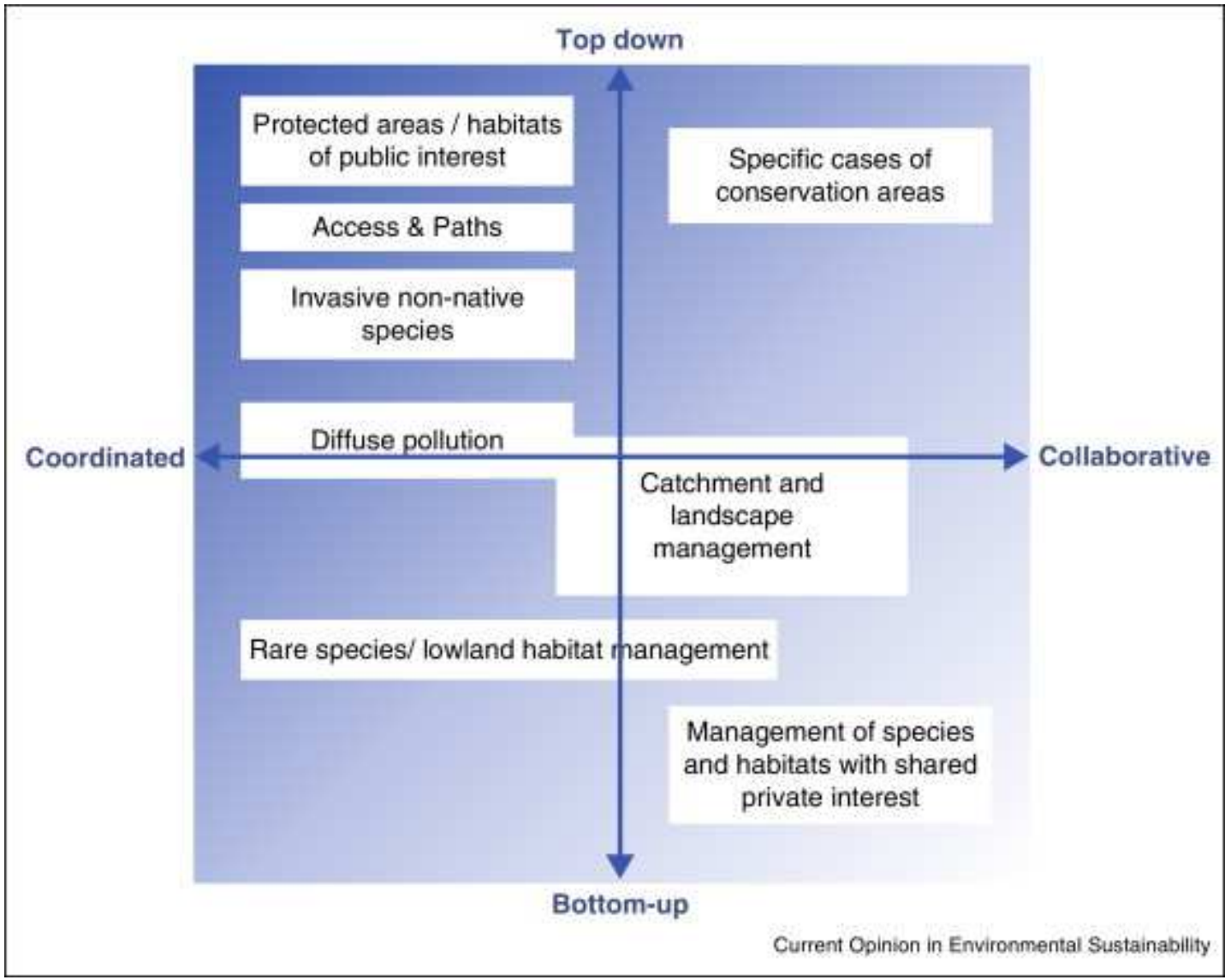
Types of collective action

Collective action (CA) types considering its emergency (Davies et al., 2004; Vanni, 2014)

- ✓ **Cooperation** – “bottom up, farmer-to-farmer CA”
- ✓ **Coordination** – “top down, agency-led CA”

Collective action types considering the degree of joint management (Boulton et al., 2012 in Prager, 2015)

- ✓ **Collaboration** – “land managers meet, work together and maintain a dialogue”
- ✓ **Coordination** – “land managers working towards the same objective but in isolation”



Fonte: Prager, 2015

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Public goods

- ✓ Many ecosystem services are public goods.

Example: biodiversity, flood control, landscape fire resilience

- ✓ Distinct types of public goods.

Pure public goods, common pool resources, and club goods

- ✓ What distinguishes them

Rivalry (subtractability) and Excludability

Public goods

Classification

Table 1.2. Classification of public goods associated with agriculture[1]

Excludability	Rivalry (subtractability): Low	Rivalry (subtractability): High
Difficult	*Pure public goods* • Landscape • Biodiversity, wildlife (non-use value[4]) • Flood control • Soil conservation • Landslide prevention	*Common pool resources*[2] • Biodiversity, wildlife (use-value[3]) • Community irrigation systems (if difficult to exclude) • Catchments
Easy	*Club goods* • Biodiversity, wildlife (if exclusive to club members) • Irrigation systems (if exclusive to club members) • Community gardens (if exclusive to club members)	*Private goods* • Agricultural commodities

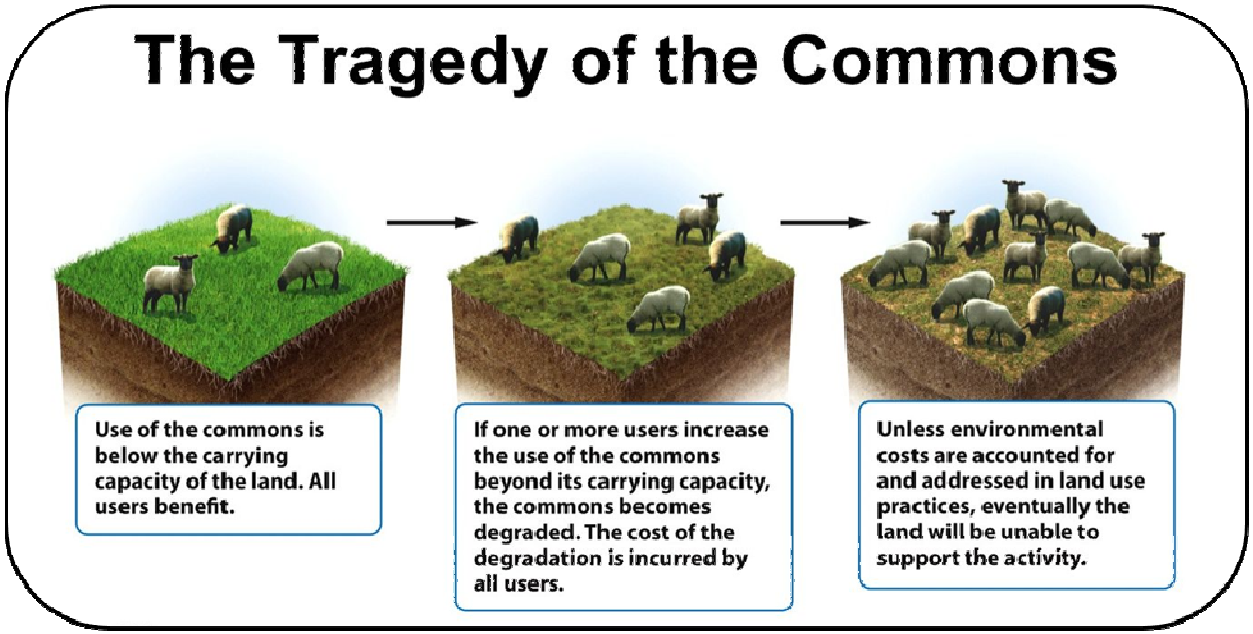
Fonte: OECD, 2013

Public goods

Common pool resources

- ✓ non-excludable and rival (subtractable)
- ✓ the “tragedy of the commons” (Garrett Hardin)
- ✓ problem of over-exploitation
- ✓ use of / carrying capacity (levels of consumption or pollution that can be maintained without the ecosystem experiencing high levels of change)
- ✓ social trap – the individual is tempted with an immediate benefit that produces a cost shared by all

Fonte: Kollock, 1998



Public goods

Pure public goods

- ✓ non-excludable and non-rival
- ✓ provision - resource from which all may benefit, regardless of whether they have provided the good
- ✓ free-riding - temptation to enjoy the good without contributing to its creation
- ✓ social fence - the individual is faced with an immediate cost that produces a benefit shared by all
- ✓ production of / production function
- ✓ problem of under-investment

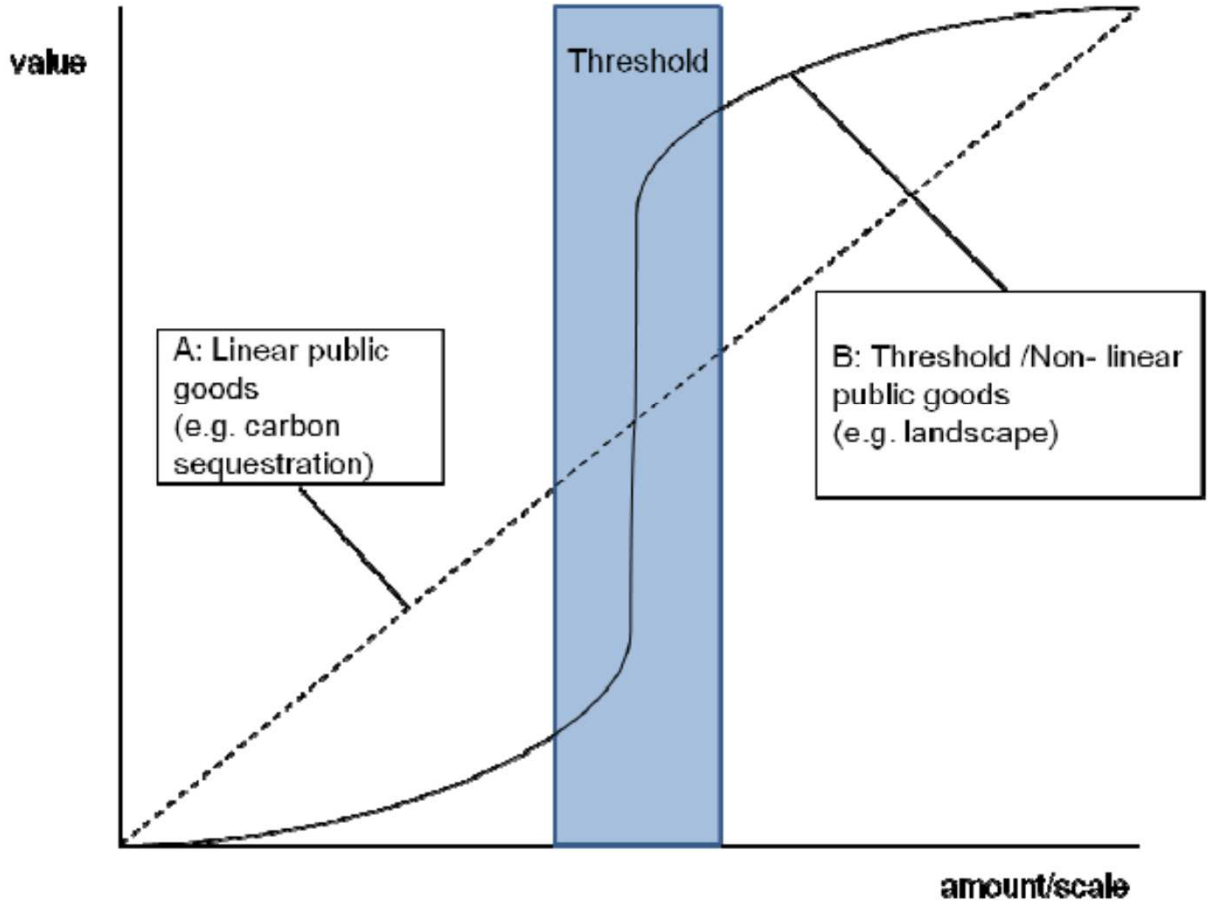
Fonte: Kollock, 1998

Example: enjoy a rural landscape without supporting its management

Public goods and scale

Production function

Figure 2.2. Stylised model of linear/non-linear public goods



OCDE; 2013

Public goods

Example of a non-linear public good: Landscape fire resilience

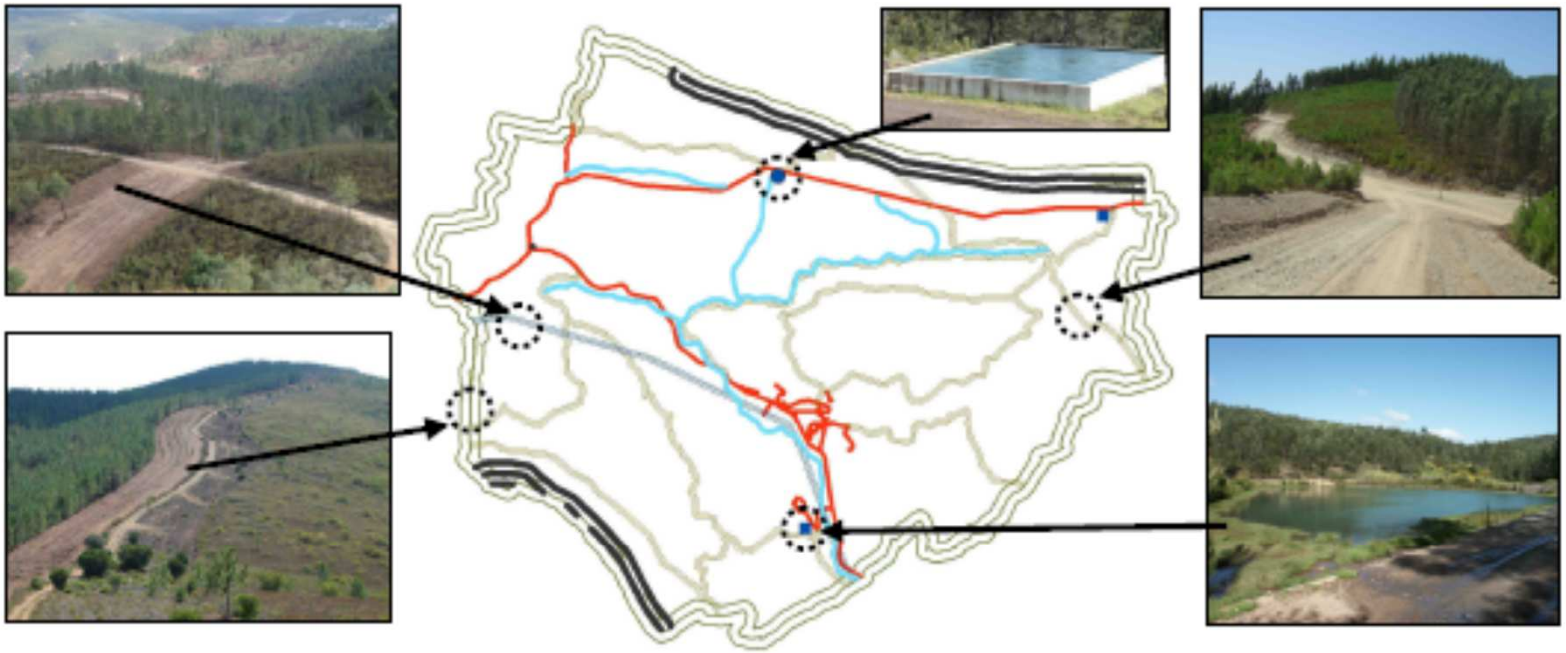


Figura 6 – Plano Especifico de Intervenção Florestal

Fonte: Aflomação, 2010

Benefits of collective action

Geographical and ecological scale merits

- ✓ Deliver public goods characterised by a large geographical scale, that could not be provided or protected by a single farmer / landowner.

Cost-saving

- ✓ Provide public goods at lower cost because of economies of scale (cost advantages due to increased size of production) and economies of scope (cost advantages by producing two or more products concurrently)
- ✓ Resources (skills, assets) sharing

Increasing capacity

- ✓ Share knowledge and information at a lower cost
- ✓ Create knew knowledge through the innovation that arises from the collaboration of various participants

Tackling local issues

- ✓ Regulations and market-based instruments, which may cover the whole country, do not necessary tackle local conditions into account

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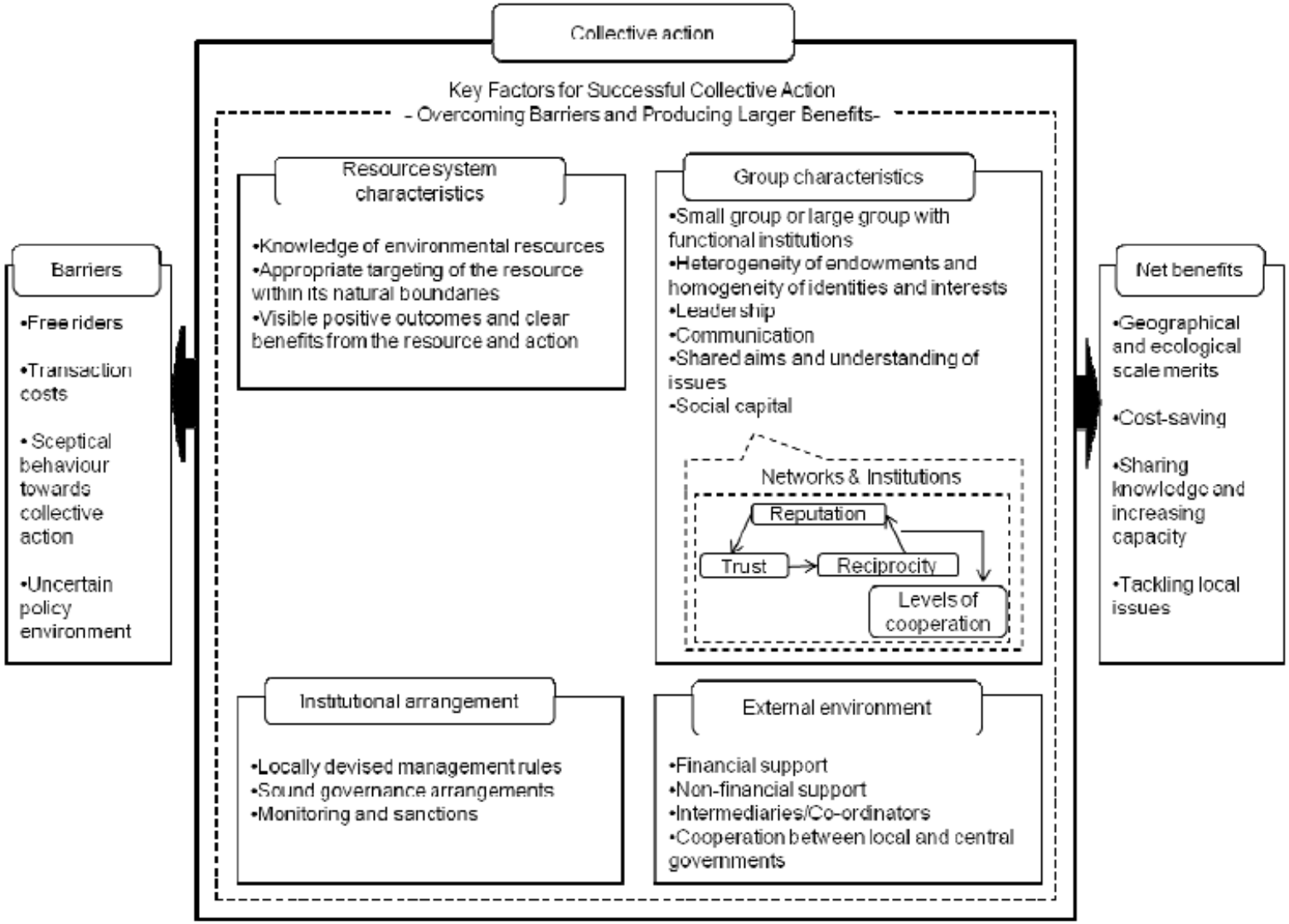
Barriers, benefits, and key-factors



Fonte: OCDE, 2013

Barriers to collective action

The free-riding problem

- ✓ Temptation to enjoy the good without contributing to its creation; one who cannot be excluded from the benefits of a collective good has little incentive to make a voluntary contribution to the provision of that good
- ✓ “Tragedy of the commons” (Hardin, 1968)

Transaction costs

- ✓ Compared with individual activities, additional costs especially at the initial stage of its implementation

Sceptical behaviour towards collective action

- ✓ Individualistic attitudes
- ✓ Inertia, awareness and willingness to accept the evidence of ecological impacts

Uncertain policy environment

- ✓ Changing funding sources and objectives of policies
- ✓ Lack of policy continuity can work against the provision of long-term benefits

Transaction costs

The costs of the resources used to:

- ✓ define, establish, maintain, use and change institutions and organisations;
- ✓ and define the problems that these institutions and organisations are intended to solve.

Source: Marshall, 2013

Transaction Costs	Explanation	Examples
Search costs	Cost incurred in identifying possibilities for mutual gain	• Costs of identifying relevant participants • Costs of gathering information • Costs of identifying funding sources for collective action
Bargaining costs	Cost associated with negotiating an agreement	• Time spent at meetings • Effort expended in verbal and written communications • Costs of acquiring support from external agencies
Monitoring and enforcement costs	Cost involved in making sure all parties keep to the agreement	• Time and effort spent monitoring others • Employment of an external monitor • Costs of enforcing sanctions

Source: OECD, 2013

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Key-factors for successful collective action

1) Resource system characteristics	2) Group characteristics
Knowledge of environmental resources	Social capital
Appropriate targeting of the resource within its natural boundaries	Small group or large group with functional institutions
Visible positive outcomes and clear benefits from the resource and action	Heterogeneity of endowments and homogeneity of identities and interests
	Leadership
	Communication
	Shared aims and understanding of issue
3) Institutional arrangement	**4) External environment**
Locally devised management rules	Financial support
Sound governance arrangements	Non-financial support
Monitoring and sanctions	Intermediaries and co-ordinators
	Co-operation between local and central governments

Fonte: extraído de OECD, 2013; Ratner et al. 2013; Poteete and Ostrom, 2007

Key-factors for successful CA

Group characteristics

group size, heterogeneity of endowments, homogeneity of identities and interests, leadership, communication among members, shared aims and understanding of issues, social capital

(OCDE, 2013).

- ✓ **Group size** is one of the most debated (Olson, 1971; Kollock, 1998; Poteete and Ostrom, 2008).
- ✓ Small groups and homogeneity of identities and interests are usually considered more appropriate since these can more easily prevent free-riding and allow face-to-face communication, reducing transaction costs.
- ✓ Likewise, the small-size, and well defined boundaries are seen as favourable attributes of the resource along with clear benefits from the resource and the action (Ostrom, 2003; Ratner et al., 2013).
- ✓ On the other hand, it is also acknowledged that larger groups can cover larger geographic areas and bring greater environmental benefits (OCDE, 2013).
- ✓ For larger groups, sound governance arrangements and well devised rules are crucial (Ishiara and Pascual, 2009; López-Gunn, 2012).

Social capital

Conceived as shared social attributes and aspects of social relationships that are conducive to achieving individual and/or collective goals

Social capital (SC) usually refers to

- ✓ **social structures** such as networks, associations, institutions and rules
- ✓ and **more intangible elements** such as attitudes and norms, shared values, reciprocity and trust

(Grootaert and Bastelar, 2002).

Participation in associations and informal networks increases information availability and lowers its circulation cost

(López-Gunn, 2012; Ishiara and Pascual, 2009).

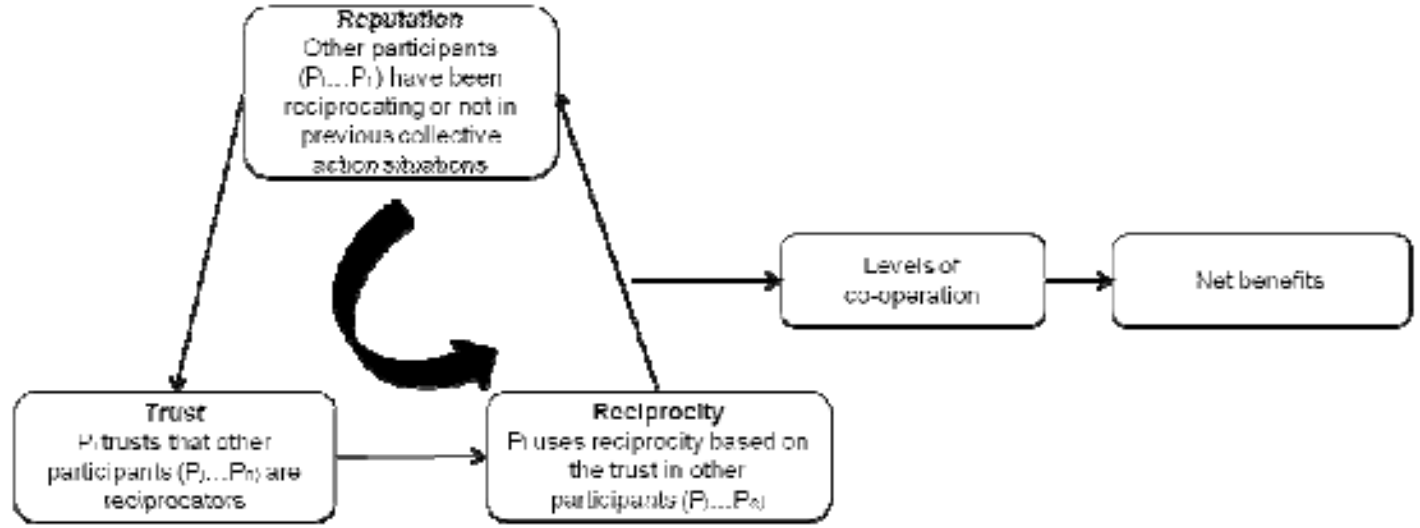
Attitudes of mutual trust make CA decisions and implementation easier

(Grootaert and Bastelar, 2002).

Source: Canadas *et al*., 2014

Social capital

Cycle of reputation, trust and reciprocity



Source: Adapted from Ostrom (2007).

- ✓ Mutual **trust** can reduce transaction costs by avoiding the need to monitor others
- ✓ **Reciprocity** is a set of norms that induces individuals to undertake positive actions if they expect others to do the same
- ✓ **Reputation** favors the respect of mutual obligations, bad reputation deters cooperation

Social capital

Bonding SC

generated by members of a relatively homogeneous group / people who tend to know each other well and have strong ties to other people in their community / intracommunity ties / shared social identity / generalized reciprocity (norms of behaviour) and social cohesiveness

Bridging SC

necessary to get ahead bolstered by the strength of weak ties / interaction between different groups, which are often not homogeneous / social diversity and heterogeneity triggers innovation by exposure to a wider range of information and resources / intercommunity ties / strong lateral ties between individuals and organisations / the creative part of social capital.

Linking SC

Broader relations, normally vertically between individuals or groups that are in formal power or authority (financial, political) allow people to access to resources, ideas and information from those in power / bridges the informal power aspects of bonding social capital (trust, reciprocity) with social networks, towards institutionalized formal power

Source: López-Gunn, 2012

Public support

Collective action types considering its emergency (Davies et al., 2004)

- ✓ **Cooperation** – “bottom up, farmer-to-farmer” CA
- ✓ **Coordination** – “top down, agency-led” CA

Some collective actions do not need support from public policies (the action achieves a **Pareto improvement** – the participants gain compared to the status quo without making anyone worse off) while others need support

The role of the State (government) can be

- ✓ providing knowledge, technical expertise, mediation, financial assistance (**facilitation** of collective action)
- ✓ forcing to undertake collective action (**coercion** of it)

Among 25 OECD case studies most cases are bottom-up collective actions with no-coercive support (but with encouragement or facilitation) from governments

Public support

Technical assistance

- ✓ Can reduce transaction costs (search, bargaining, and monitoring and enforcement costs)
- ✓ Data provision, scientific research support, technical advice and assistance, guidelines for and provision of conflict resolution services, education services
- ✓ In the 2 cases without financial support from the government, the water company pays farmers to change their farming practices to ensure water quality

Financial support

- ✓ Policies that target collective action. Initial costs and running costs
- ✓ Differs depending on the characteristics of public goods

Strategic combination of financial and non-financial support

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Forest owners surveys in contexts of small-scale predominance

Parish / Year / Nb. Owners	Relevant results
Ventosa (Vouzela) 2013 / 50	FIZ members preference for internal decision criteria (%) *One person, one vote* ..... *48* *Other (including "According to the owner share of FIZ área")* *52*
Aguiar de Sousa (Paredes) / 2014 / 112	Owners willingness-to-coordinate (%) *Not willing* ..... *21* *Willing under informal agreement* ..... *40* *Willing under formal agreement* *39*
Alvares (Góis) / 2018 / 221	Choice between alternative management options (%) *Individually managing the land* ..... *33* *Delegating management to a FIZ* ..... *39* *Land renting to a paper company* ..... *13* *Land selling* *15*

Fonte: Canadas et al. 2014; Canadas & Novais 2019; Martins et al. 2022

Owners' preferences towards multi-ownership collaboration

- ✓ A considerable percentage of owners chose owners' collaboration in both samples in Aguiar and Alvares
- ✓ and ownership size was not relevant to distinguish owners' preferences in both cases
- ✓ But that percentage was considerable lower in Relíquias (Odemira) were ownership size is much larger in average

Membership of multi-ownership collaboration

- ✓ Ownership size of FIZ members are in average larger than local forest ownership average
- ✓ FIZ have progressed faster where large-scale ownership prevails

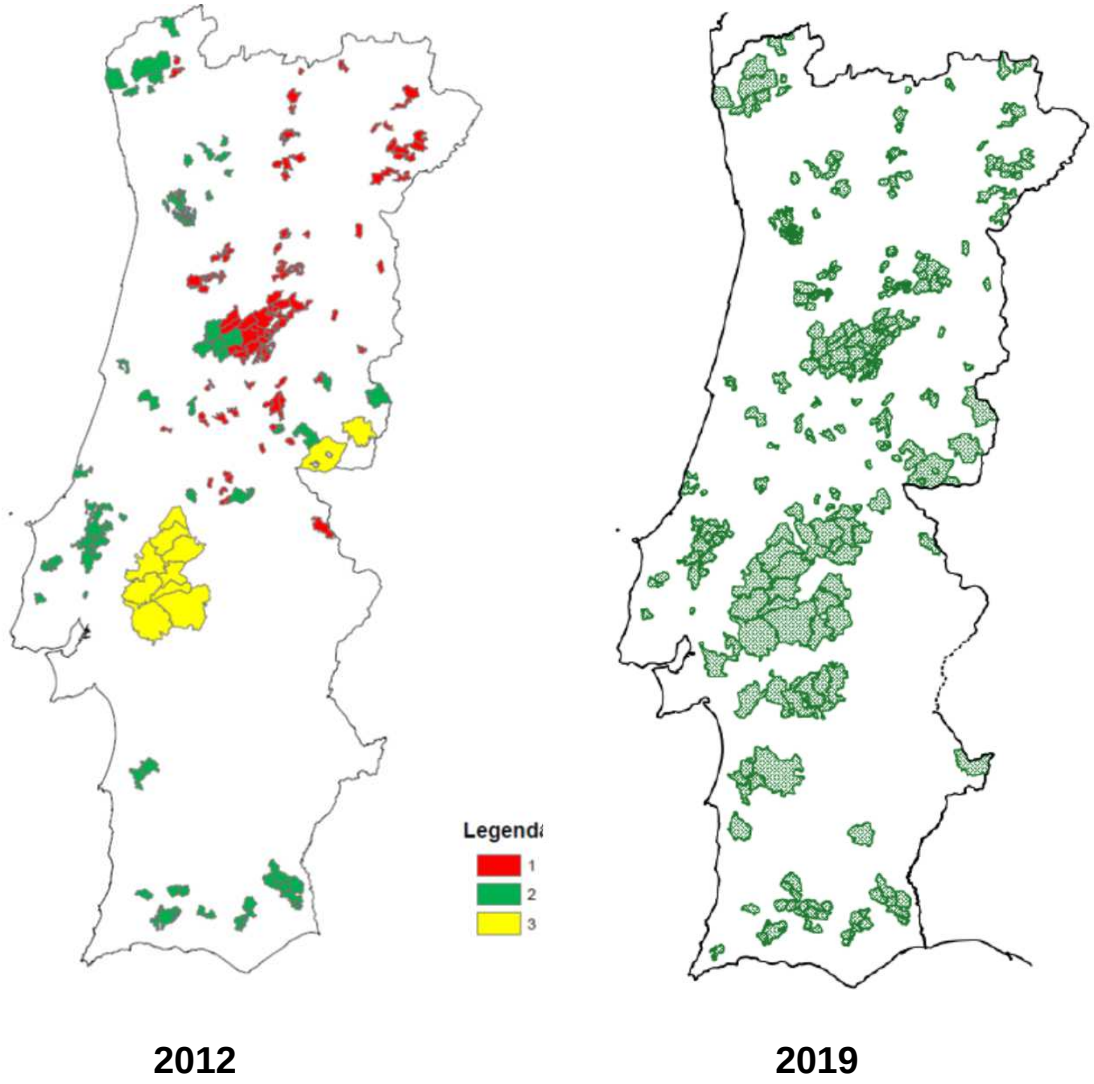
Apparent contradiction ?

- ✓ Public funding criteria for the establishment and functioning of FIZ, which are directly proportional to ZIF area (and exclude proportionality to the number of owners), create an huge inequity among ZIFs considering the level of that funding per owner.

- ✓ A considerable part of public funding goes to FIZs with lower fire hazard (slope), lower transaction costs (< owners' number; land registry), > forest profitability (cork oak and eucalyptus) and > access to other public funding (CAP); therefore it is possible to carry out the interventions proposed in FM Plans with lower levels of financial support.

- ✓ In settings where FIZ establishment is more difficult (> number of owners, absence of land registry) and interventions proposed in FM Plans are less profitable, public levels of support may be insufficient.

Fonte: Canadas et al. 2016



2012 2019

- ✓ FIZ progress faster where large-scale ownership prevails
- ✓ Public funding criteria for the establishment and functioning of FIZ help explaining that tendency.

Fonte: Canadas et al. 2016; ICNF, 2020

Internal governance (decision criteria) and external support (land registry and funding criteria) help explaining that apparent contradiction

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