

CASE STUDY AREA: Vale do Sousa, Portugal

Case study description

The Zonas de Intervenção Florestal (ZIF) Paiva and Entre-Douro e Sousa (ZIF_VS) are located in Northwest Portugal in a rural area that extends over 14,832 ha and was classified into 2182 stands. It is dominated by eucalypt (*Eucalyptus globulus* Labill) pure stands and mixed stands of eucalypt and Maritime pine (*Pinus pinaster* Ait.) – about 66% and 33% of the ZIF_VS area, respectively. The remaining area is occupied by hardwoods.

Eucalypt pulpwood and Maritime pine fuelwood and sawlogs rank very high in the list of ecosystem services provided by ZIF_VS. The area further provides recreation services, hardwood volume and carbon storage.

Trade-offs	Ecosystem Services Tradeoffs	Eucalypt pulpwood	Mpine Sawlogs	Chestnut wood	Carbon stock
	Eucalypt pulpwood		Neutral	Neutral	Competitive
	Mpine Sawlogs	Neutral		Competitive	Competitive
	Chestnut wood	Neutral	Competitive		Competitive
	Carbon stock	Competitive	Competitive	Competitive	

KEY DRIVERS

- Risk of fires
- Pine nematode
- Certification procedures
- Conflict of legislation
- Lack management
- Lack of knowledge
- Afforestation vs new plantations

POSSIBLE FUTURE DEVELOPMENTS

Scenario

S1: Eucalyptus spontaneously expansion to former burned forest areas increased

- Rural rangers patrolling kept unchanged (almost nonexistent)
- Forest biomass demand unchanged
- Fire prevention effort increased
- Forest management costs unchanged
- Higher reach of FOA counselling services
- Forest biomass demand increased
- Fire prevention effort unchanged
- Higher forest management costs
- Reach of FOA counselling services unchanged
- Higher ecosystem services value
- Increased ZIFs forest policies' eligibility
- Ecosystem services value unchanged
- ZIFs forest policies eligibility unchanged
- Ecosystem services value unchanged
- ZIFs forest policies eligibility unchanged
- Range of forest fires range unchanged
- Range of forest fires range increased
- Range of forest fires range diminished
- Range of forest fires range increased

Scenario 1 Scenario 3 Scenario 2 Scenario 4

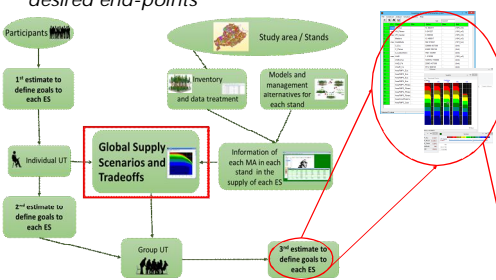
Scenario effects on

Ecosystem services	Scen1	Scen2	Scen3	Scen4
Eucalypt pulpwood	Increases	Increases	Increases	Increases
Recreation	Unchanged	Unchanged	Unchanged	Unchanged
Harwood timber	Unchanged	Increases	Increases	Unchanged
Carbon storage	Unchanged	Unchanged	Unchanged	Unchanged

Scenarios	Volume of ending inventory (2098) (m³)		54 years period (2044-2098)				Avg Carbon (Mg) (Year)	
	1 and 4	2 and 3	1 and 4	2 and 3	1 and 4	2 and 3	1 and 4	2 and 3
Eucalypt pulpwood	70,6 x 10 ⁴	69,7 x 10 ⁴	42,3 x 10 ⁴	43 x 10 ⁴	34,6 x 10 ⁵	37,4 x 10 ⁵	204,2 x 10 ³	202,1 x 10 ³
Maritime pine sawlogs	21,7 x 10 ⁴	30,1 x 10 ⁴	53,3x 10 ⁴	31,1 x 10 ⁴	5,89 x 10 ⁵	4,65 x 10 ⁵	41,6 x 10 ³	59,9x 10 ³
Chestnut sawlogs	1,4 x 10 ⁴	3,8x 10 ⁴	3,55 x 10 ⁴	1,46 x 10 ⁵	0	0	6,4 x 10 ³	17,6 x 10 ³

DESIRED COMMON FUTURE

- Two sequential participatory workshops (PW).
- 1st PW in September involving 11 participants (environmentalists (1), forest owner associations (3), Municipality (1), Paper pulp industry (1) and Integral researchers (5) aiming at setting the ecosystem services desired end-points
- 2nd PW in November, aiming at the elicitation of robust policies, involving 20 participants representing several sector as: central government (2), environment (2), forest owner association (2), Municipalities (2), Pulp industry (2), Pine industry (1), and Integral researchers (4)
- Policies pool elicitation in two parallel sections each with a different scenario background (scenario 1 and 4), followed by a plenary section for robust policies identification



Ecosystem Services	2014-2104 End-points	
	Units	End-points
Pulp wood	m ³	145 x 10 ⁵
Pine timber	m ³	2,04 x 10 ⁵
Chestnut wood	m ³	3,43 x 10 ⁵
Carbon stock	Mg/ye ar	585 708

Management Programs	As is	Scen 1	Scen2	Scen3	Scen 4	Goals
1 - Mixed forest maritime pine (<i>Pinus pinaster</i>) and blue gum (<i>Eucalyptus globulus</i>), dominance of maritime pine, incipient management	16.0%	5.6%	6.3%	6.3%	5.6%	3.2%
2 - Mixed forest maritime pine (<i>Pinus pinaster</i>) and blue gum (<i>Eucalyptus globulus</i>), incipient management, dominance of eucalypt species	17.0%	21.3%	20.6%	20.6%	21.3%	5.3%
3 - Plantation of sweet chestnut and cherry trees orchards in ancient agricultural fields	0.7%	1.1%	3.9%	3.9%	1.1%	8.9%
4 - Blue gum (<i>Eucalyptus globulus</i>) plantations (short rotation) for short wood production	66.0%	72.1%	69.2%	69.2%	72.1%	82.5%
Total	100%	100%	100%	100%	100%	100.0%

RECOMMENDATIONS FOR ACTIONS

Scenario 1 Parallel Section

Results: Policies	Obstacles/Opportunities	ES services affected
Policy financial incentives to biomass production	Increasing forest biomass demand	All, but particularly biomass
New laws and regulation of forest biomass markets		
Incentives to ZIFs associated forest management		
Review policies for estate inheritance		
Supply ZIFs entities with more policy management resources	Management scale too small economically	
Entire ZIFs entities with added territorial intervention power		
Improve ZIFs capacity to reinvest		
Increase direct property taxes (to promote scale and better management)	Ongoing forest ownership cadastre works	
Expand forest fire fighters		
Create public forest fire fighters corps	Increasing levels of forest fire prevention effort	All
Promote forest fire fighters professional status		
Reinforce forest fire prevention laws and regulations		
Create new juridical regime for rural tenancies	Simplification of rural tenancy contracting and registering procedures with the new juridical regime	
Impose restrictions to eucalyptus stands management	Separation of eucalyptus stands areas	
Expand number of rural guards (GNE)	Insufficient rural patrolling by guard forces	
Create specific public utility for forest technical advising to forest owners	Dismantling of Governmental Forestry Services	
Introduce specific public financial incentives to intangible forest ecosystem services	Absence of public or market incentives to intangible forest ecosystem services	Carbon storage
Ensure continuity of policy financial incentives to ZIFs	Ineffectiveness of Forest Intervention Zones (ZIFs)	All
Promote ZIFs members awareness of major advantages of ZIFs		

Scenario 4 Parallel Section

Policies	Obstacles & Opportunities	ES services affected
Adjust and reinforce fire prevention activity plans	Increasing forest fires Low levels of forest fire prevention effort	All
Implement forest sector follow-up platform	Eucalyptus wood market price declining Excessive complexity of forest licensing procedures	Paper pulp
Reactivate Forest Sector Code ("Código Florestal")		All
Implement phytosanitary plans	Excessive incidence of forest pests and diseases	All
Simplify organic phytosanitary protection regulation (eucalypt)		All
Made available online public free access to all public planning instruments information	Difficult public access to forest licensing rules and procedures information	All
Availability of public online information on forest planning instruments		All
Add to Regional Plans ZIFs' eligibility to policies as single autonomous entities and adjust laws and regulations accordingly	Non eligibility of ZIF (Forest Intervention Zones) as autonomous entities to forest or other policies	All
Include forestry technical advising incentives in the national Plan for Rural Development	Absence of field technical advice to forest owners and producers	All
Update and complete forest ownership cadastre	Absence of a complete and updated forest ownership cadastre	All

Plenary Section Results:

Actions	Responsibility	Type of action	Time frame	Influences
Expand/enhance forest fire prevention activities	Government (ICNF), municipalities, forest owners' association	Mixed financial, laws and regulations, and governmental services	5 to 30 years	National government, local Forest Owners' association,
Supply of technical advice to forest owners and producers	Government (ICNF), forest owners' association	reorganization with added costs		
Enhance ZIFs' effectiveness as collective forest management entities	Government			

Conclusions and Discussion:

- Participants without necessary skills and information to reliably discuss and decide preferred ecosystem services targets, major obstacles and opportunities for targets, and needed policies;
- Problem partially overcome supplying participants with a decision support tool such as the Pareto Frontier one, as we did;
- Even with participants with right skills and information, length of time of a two day session (end-points setting + back casting) too little to arrive at reliable results;
- Methodological option of retaining only policies elicited simultaneously in all scenario discussions put aside policies that might be also relevant, as acknowledged by participants;
- What if policies advocated by participants were not consistent with the scenario itself, as was the case for the carbon stock payments policy? An implication is that the earlier factors and manifestations identification stages should not include forest policies.

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