

Multi-stakeholder dialogue and simulated scenario planning to change forest management practices in Alentejo



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FINAL CONFERENCE
12 – 13 OCTOBER 2017
PARIS, France

Pilot Project objective

Increase **WOOD MOBILIZATION** in Alentejo

Traditional wood production species

Non-traditional wood production species



Eucalyptus globulus (9%)

Pinus pinaster (4%)

Quercus suber (45%)

Pinus pinea (6.5%)

Eucalyptus globulus* and *Pinus pinaster

Propose measures to increase wood availability through **forest management** using a 'sustainable intensification' concept

Quercus suber* and *Pinus pinea

Assume the use and mobilization of wood from thinning non-traditional wood production species

Pilot Project methodology

Simulate **STAKEHOLDER-DEFINED MANAGEMENT SCENARIOS**



RLL2 – Oct 2015

- SIMWOOD Presentation
- StandsSIM simulator description
- Explanation of the FMAs concept and request of stakeholder' help

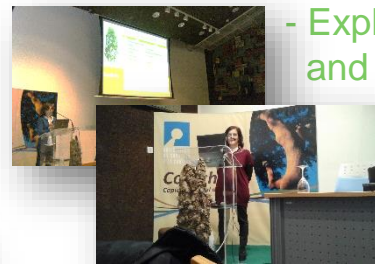
RLL4 – Mai 2017

- Presentation and discussion of the 1st simulation results
- Definition of the FMAs and scenarios



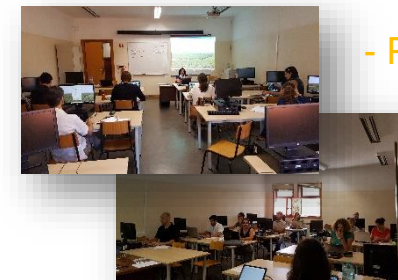
RLL1 – Oct 2014

Identify main barriers, strengths and solutions



RLL3 – Oct 2016

- StandsSIM description
- Explanation of the FMAs concept and request of stakeholders' help



Training Courses Jun & Jul 2017

- Presentation and discussion of the 1st simulation results
- Definition of the FMAs and scenarios

Pilot Project methodology

Simulate **STAKEHOLDER-DEFINED MANAGEMENT SCENARIOS**



RLL2 – Oct 2015

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RLL4 – Mai 2017

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FC2

Assess the economic impact of NWFPs and services (hunting and ecotourism)

RLL1 – Oct 2014

Identify main barriers, strengths and solutions



RLL3 – Oct 2016

- StandsSIM description
- Explanation of the FMAs concept and request of stakeholders' help



FS1

Quantify wood available by species its level of utilisation



Training Courses Jun & Jul 2017

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Pilot Project methodology

STAKEHOLDERS TASKFORCE

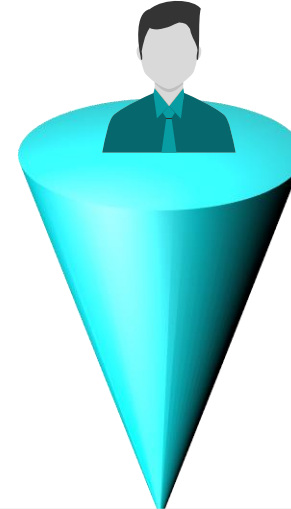
**Forest
Companies**



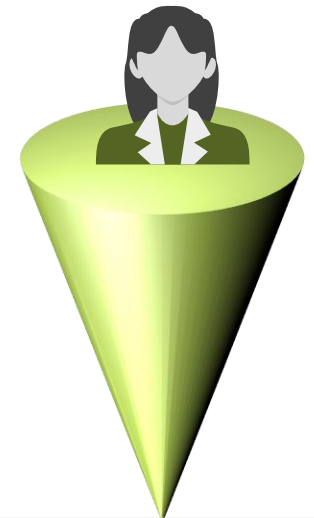
**Land Owners
Associations**



**Public
administration**

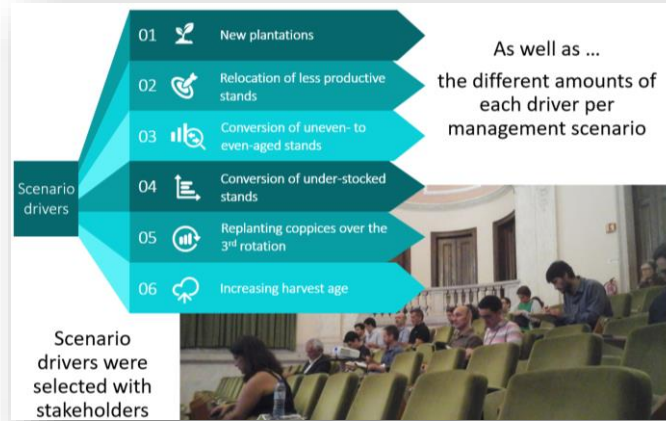
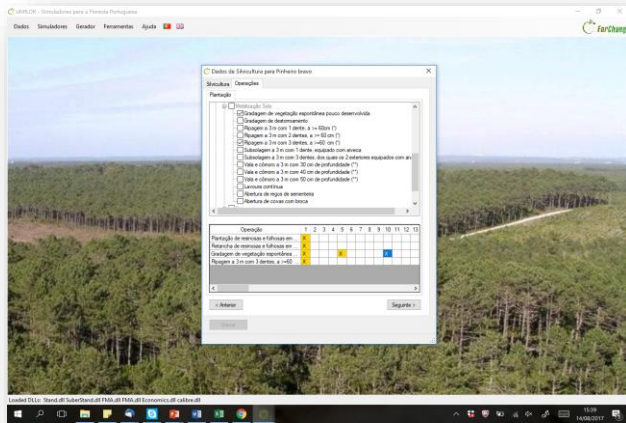


Research



Pilot Project methodology

<http://www.isa.ulisboa.pt/cef/forchange/fctools/en/home>



Improved the simulator and the user-friendly interface



Prepared the prescriptions, scenarios and run the simulations



Made StandsSIM available on FCTools website (*description of the tool available*)



... To evaluate the impact of the PP on forest managers' attitudes



Simulations outline



Alentejo
Pilot Project



StandsSIM.md
and SUBER
simulators



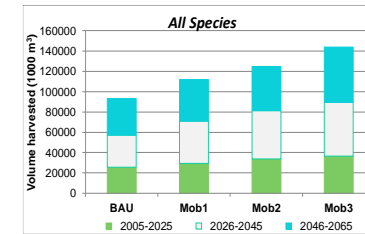
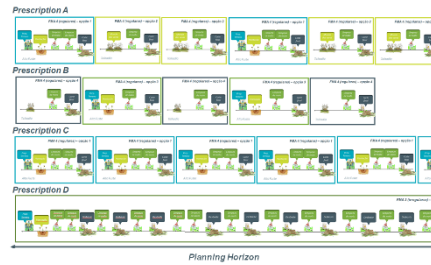
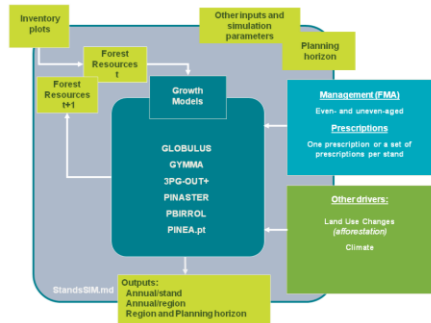
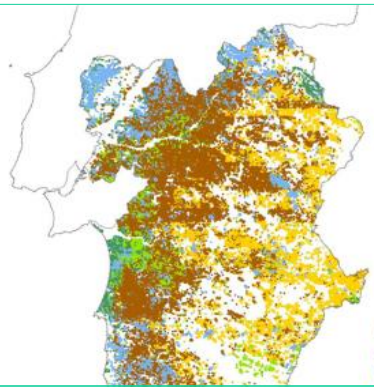
Stakeholders
and
management
scenarios



Simulation
results



Final remarks
and
future steps



01 Alentejo study area



Alentejo Pilot Project



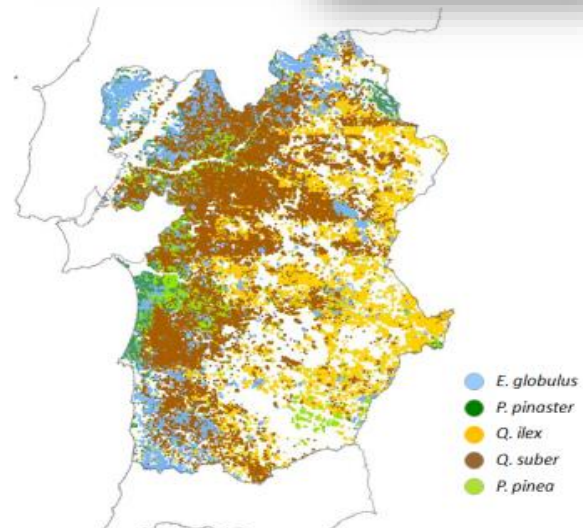
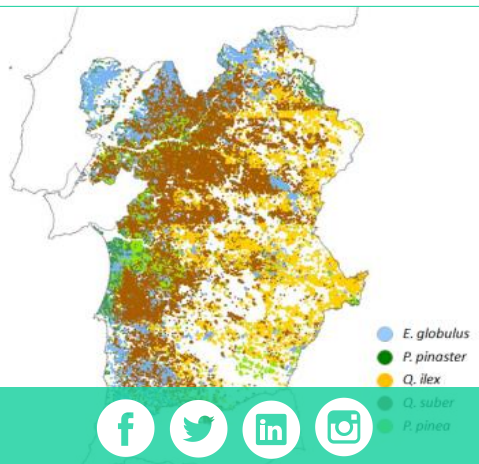
Alentejo region:

- Reduced population density (*19 habitantes/km²*)
- Aged population (*25% older 65 years*)
- Most forest owners are farmers and some do not have technical knowledge
- 97% land is private property

INE, 2011a,b

- Changes due to severe forest fires 2003 and 2005
- 44.74 % forest cover

- mainly managed as agro-forestry systems
- *forest cover: 9% E. globulus, 4% P. pinaster*



01 Comparison between NFI4 and NFI5

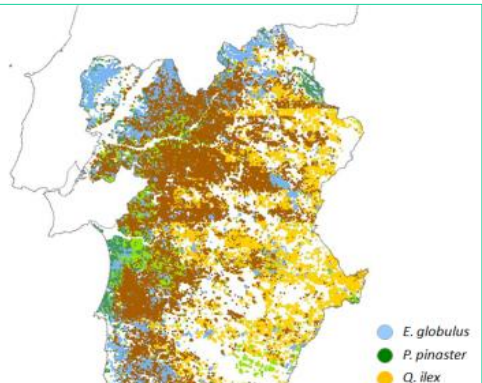
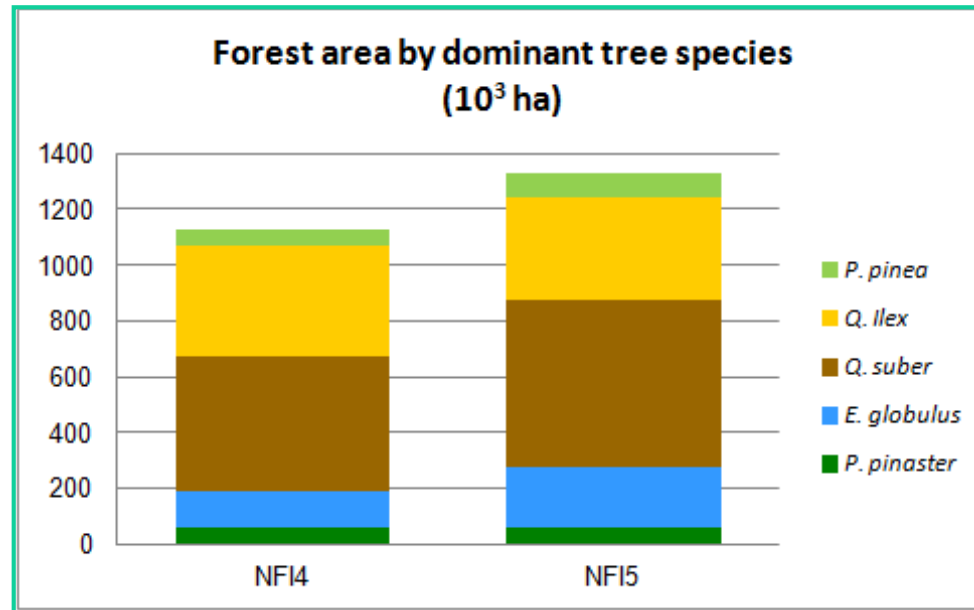
NFI4 (1995-1997)

NFI5 (2005-2006)



Alentejo Pilot Project

Increase in **forest area** (*Q. suber*, *E. globulus*, *P. pinea*)



01 Comparison between NFI4 and NFI5

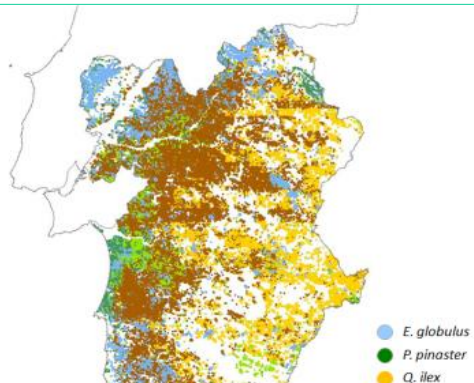
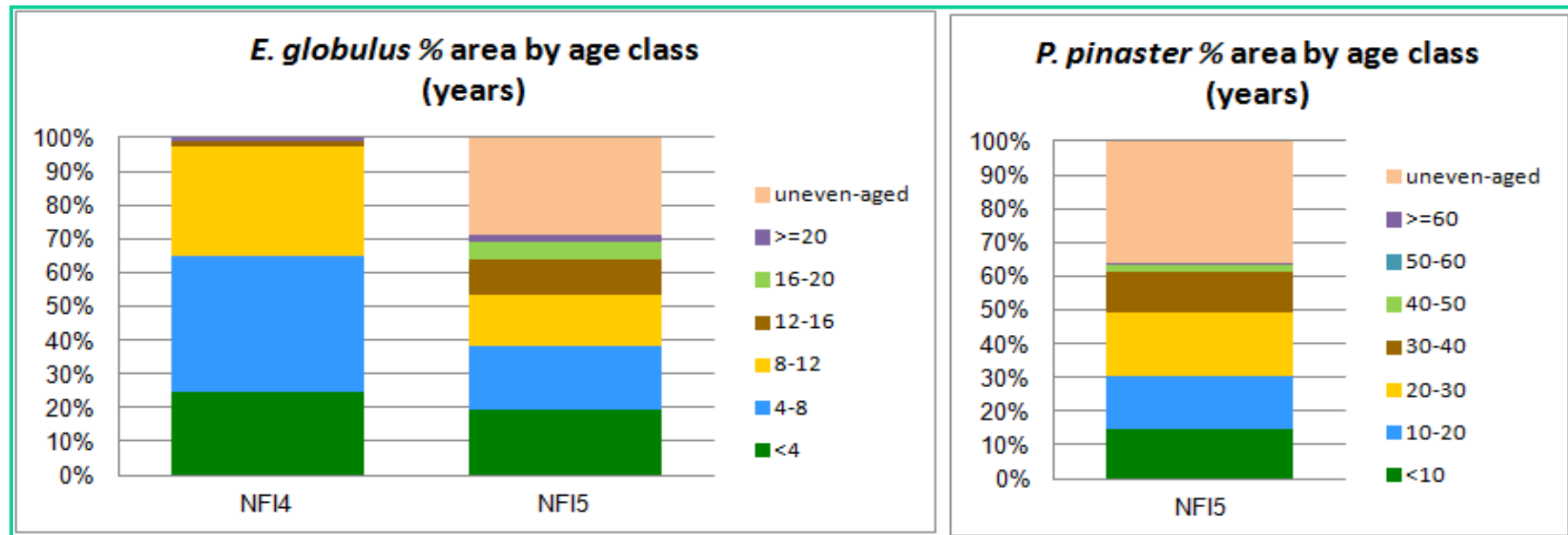
NFI4 (1995-1997)

NFI5 (2005-2006)

Increase in the proportion of **uneven-aged** and old stands (*older than 16*)



Alentejo
Pilot Project



- *E. globulus*
- *P. pinaster*
- *Q. ilex*
- *Q. suber*
- *P. pinea*



01 Comparison between NFI4 and NFI5

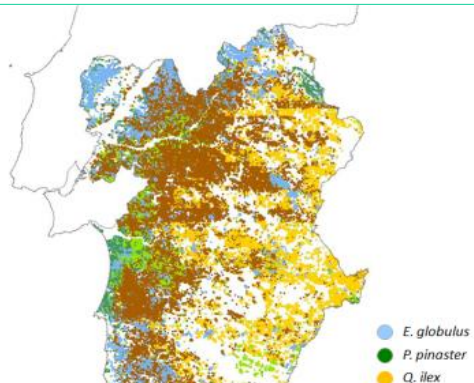
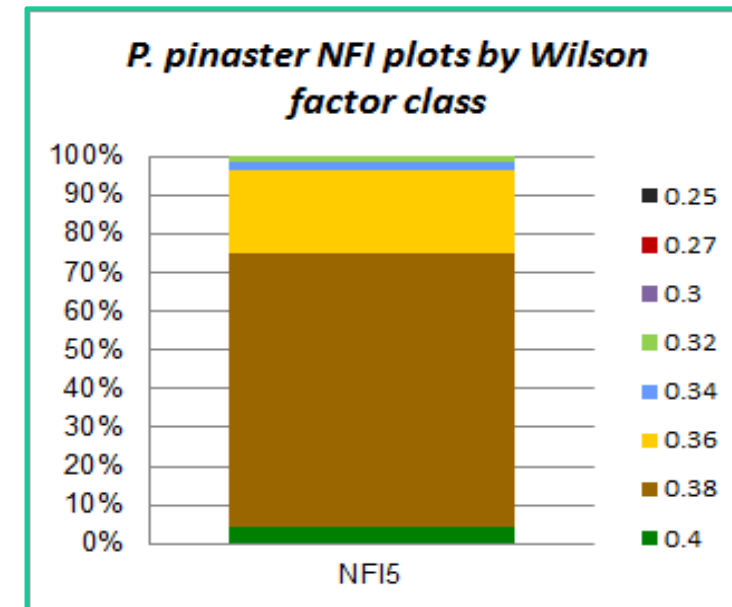
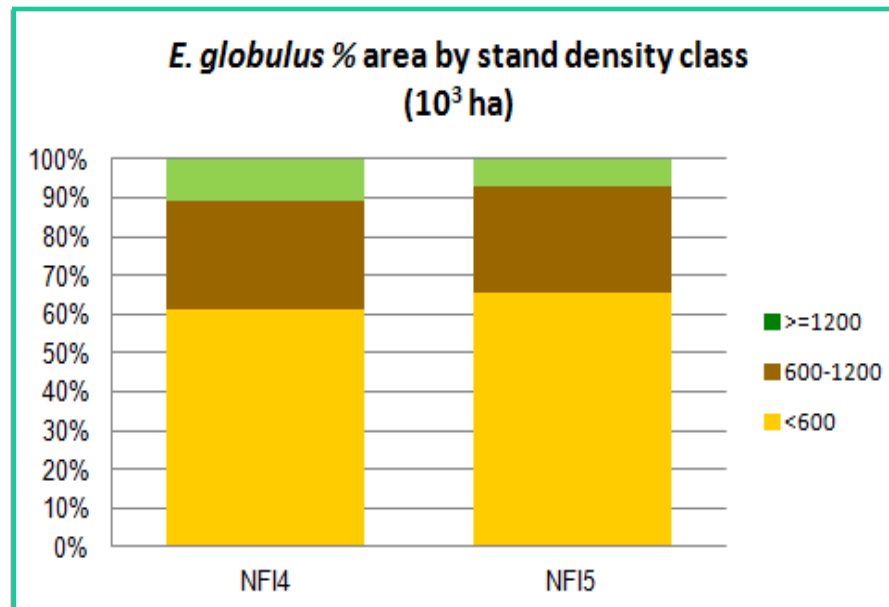
NFI4 (1995-1997)

NFI5 (2005-2006)

Slight increase in the proportion of **under-stocked** stands (*trees dbh < 5 cm disregarded*)



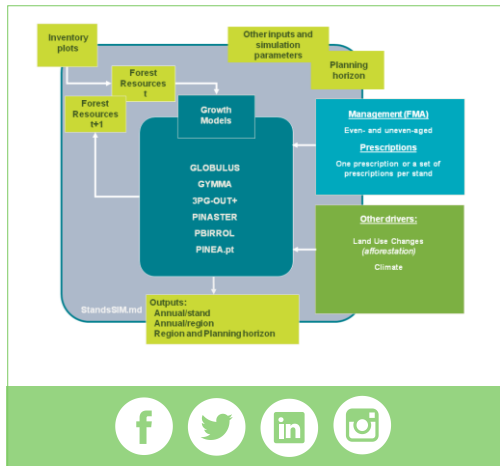
Alentejo
Pilot Project



02 How StandsSIM.md and SUBER work



StandsSIM.md
and SUBER
simulators

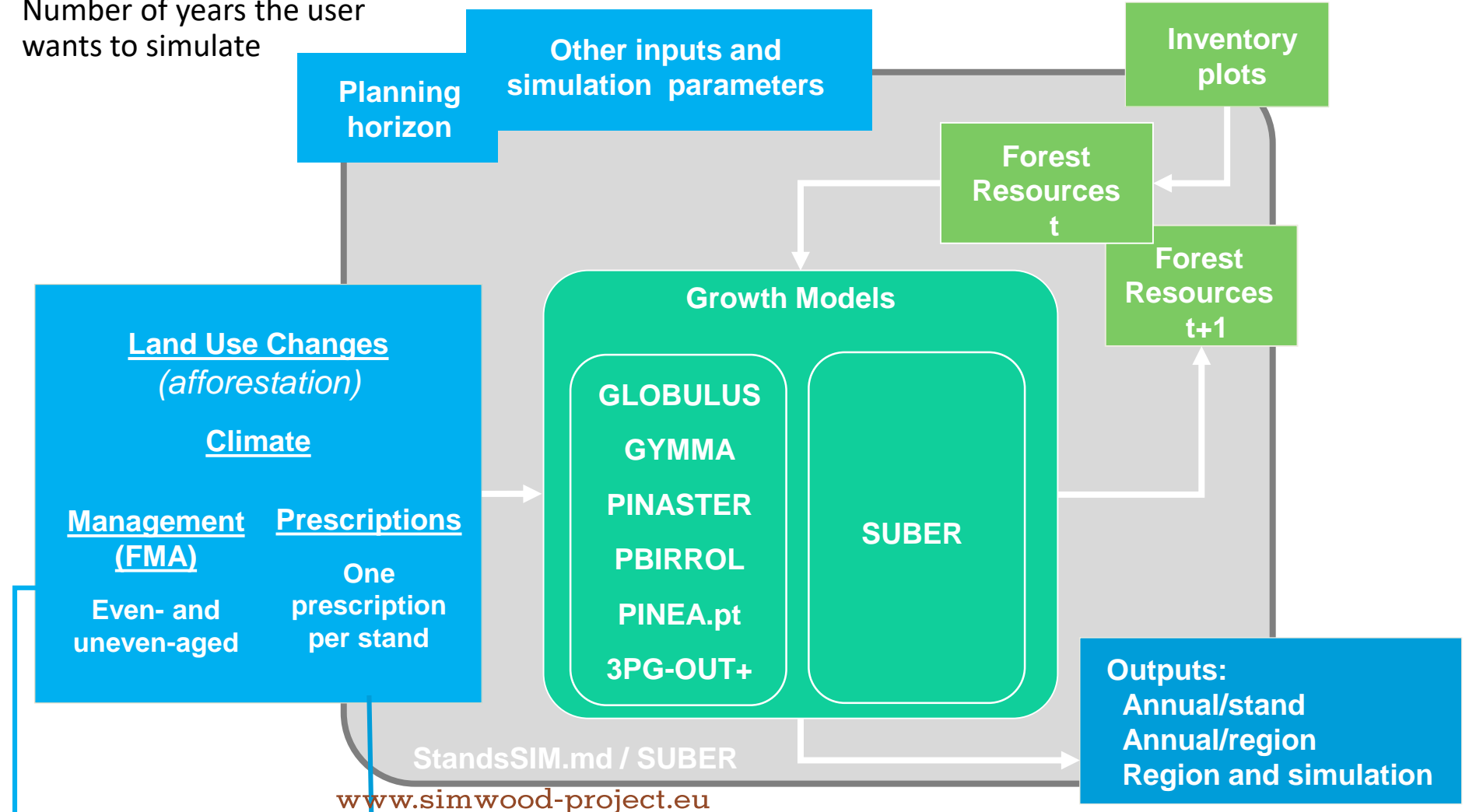


Planning horizon:

Number of years the user wants to simulate

Forest stands input:

Data from forest inventory and site characterization



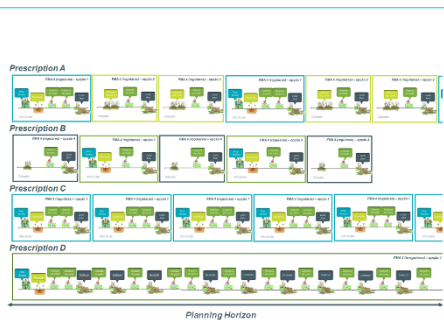
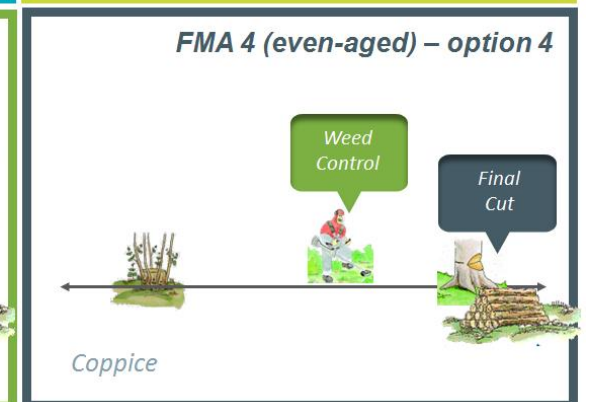
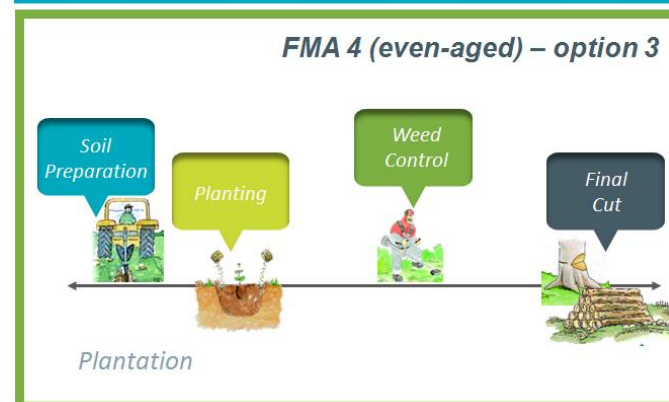
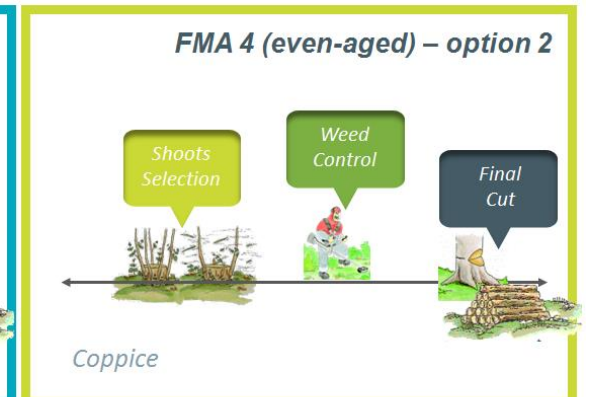
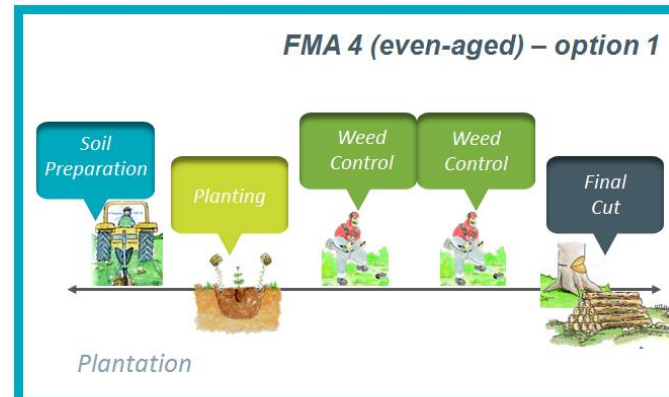
03 StandsSIM.md and SUBER management inputs

- Forest management approach (**FMA**):

Set of silvicultural operations from stand regeneration until final harvest



Stakeholders
and
management
scenarios

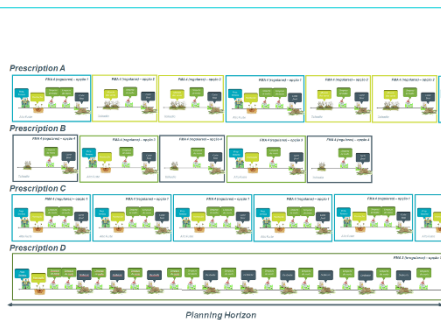


03 StandsSIM.md and SUBER management inputs



Stakeholders
and
management
scenarios

- Forest management approach (**FMA**):
Set of silvicultural operations from stand regeneration until final harvest
- Prescription
Sequence of FMAs throughout the planning horizon



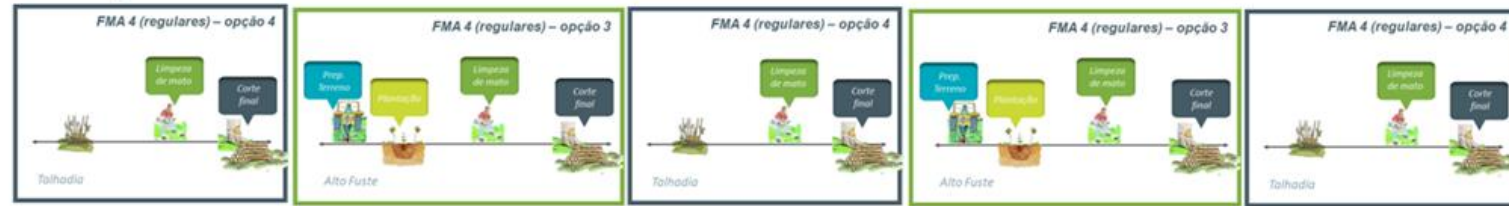
03 StandsSIM.md and SUBER management inputs

- Forest management approach (**FMA**):

Prescription A



Prescription B



Prescription C



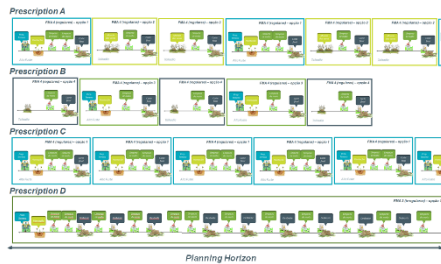
Prescription D



Planning Horizon



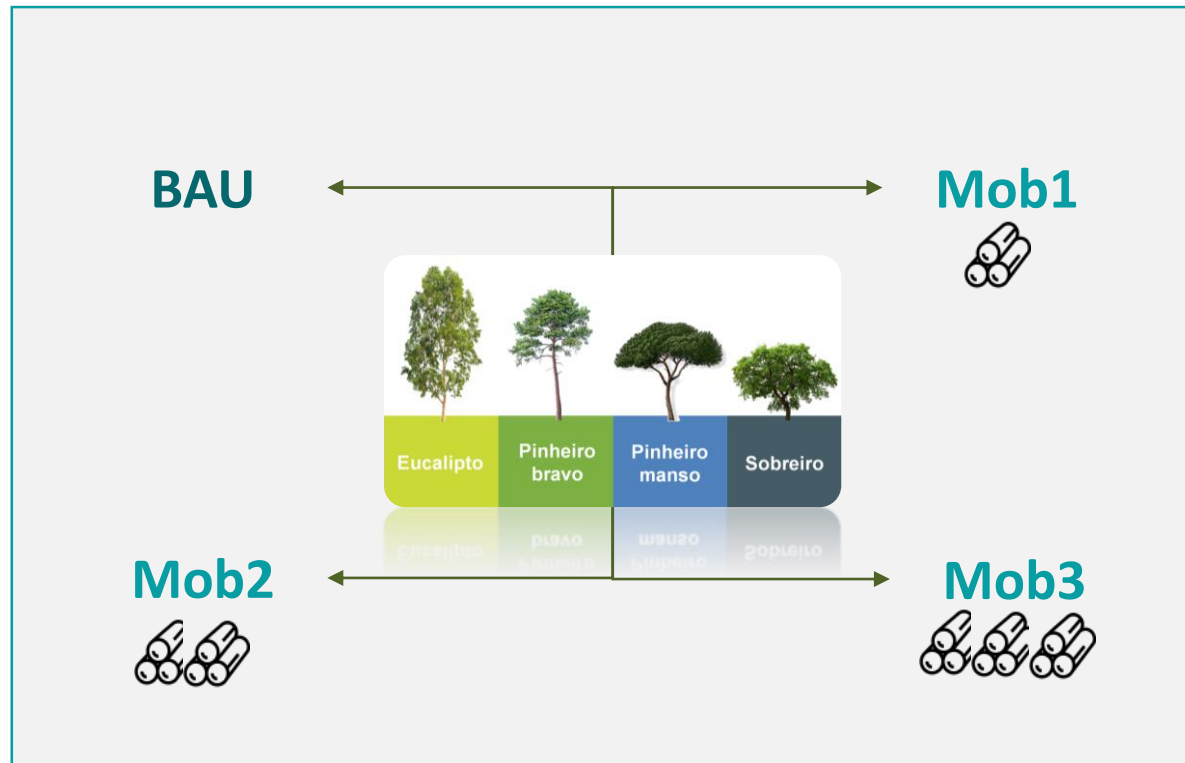
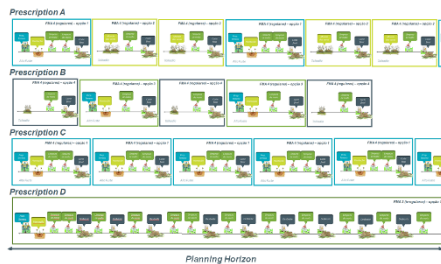
Stakeholders and management scenarios



03 Scenarios' definition



Stakeholders and management scenarios



BAU

Business as usual scenario reflecting the current forest management

Mob's

Scenarios reflecting increasing levels of management intensification

Scenario **drivers** were selected based on the NFI data analysis and discussed with stakeholders helped defining FMAs, prescriptions and the total amount of each driver for characterizing the 4 scenarios

03 Scenarios' definition



Stakeholders
and
management
scenarios

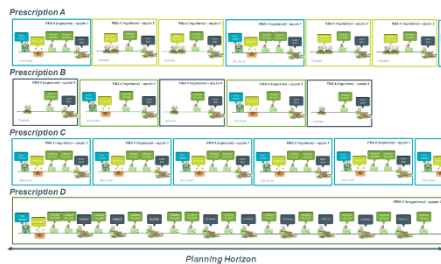


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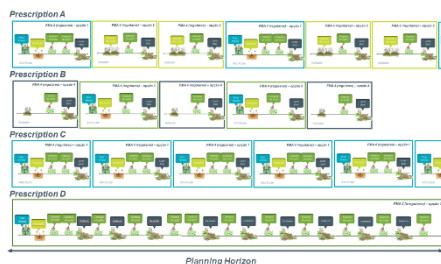
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03 Scenarios' definition



Stakeholders and management scenarios



THE DRIVERS

A set of different prescriptions (*one per plot*) was assigned to each scenario

<p>1 </p> <p>Increase area of new plantations</p>	<p>2 </p> <p>Relocate less productive stands</p>	<p>3 </p> <p>Convert to even-aged stands</p>
<p>4 </p> <p>Convert to well-stocked stands</p>	<p>5 </p> <p>Re-plant old coppices (>3rd rot)</p>	<p>6 </p> <p>Increase harvest age</p>

THE SIMULATION

Planning horizon: 60 years (from 2005 to 2065 by 20-yrs period)

Forest simulators:

StandsSIM

SUBER

Growth models:

GLOBULUS3
GYMMA

PINASTER
PBIRROL

PINEA.pt

SUBER

Nr Stands simulated:

E. globulus
(330)

P. pinaster
(189)

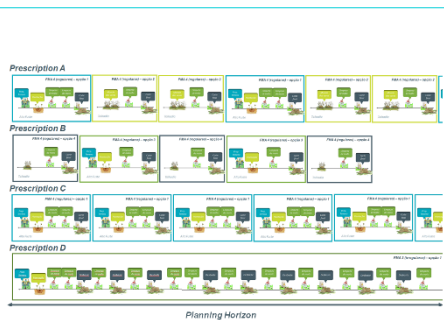
P. pinea
(153)

Q. suber
(1142)

03 Scenarios' definition *(Example for E.globulus)*



Stakeholders and management scenarios



Simulation years	2005-2065		2005-2065		2005-2065		2005-2065	
Mobilization drivers	BAU		Mob1		Mob2		Mob3	
New plantations (ha yr ⁻¹)	0	0	0	0	0	0	0	0
Relocated plantations (ha yr ⁻¹)	0%		0%		0%		15% (stands with S <14)	
Replant rotations >3	Information on stand structure, stand composition and S were used to set probabilities for each stand being managed over the 3 rd rotation and a different percentage of stands going over the 3 rd rotation was defined for each scenario							
	30% (4 th , 5 th rotations)		20% (4 th , 5 th rotations)		10% (4 th rotation)		0% (3 rd rotation)	
Convert uneven- to even-aged stands	No conversion to even-aged stands considered		Conversion to even-aged stands is considered: priority is given to stands over 200 m ³ , the remaining stands are randomly selected for harvest throughout the planning horizon					
Convert un-stocked to well-stocked stands	No conversion to well-stocked stands considered. (Replanting after the maximum rotation with 1100 trees ha ⁻¹)		1) Stocking levels were analysed based on information on site index and stand density: stands considered under-stocked if S>18 and N<800 or if S<10 and N<400 2) Conversion applied to even- and uneven-aged stands 3) Replanting immediately after harvest regardless of coppice rotation. Harvest takes place when harvest age is met (even-aged) or randomly throughout the planning horizon (uneven-aged) 4) Planting densities vary according to S class:					
			[0-18[1100 trees ha ⁻¹ [18-22[1250 trees ha ⁻¹ [22-26[1250 trees ha ⁻¹		[0-18[1100 trees ha ⁻¹ [18-22[1250 trees ha ⁻¹ [22-26[1400 trees ha ⁻¹			
Increase rotation age	Uneven-aged stands with volume >200 m ³ are harvested while those with lower volumes are randomly selected for conversion to even-aged throughout the planning horizon; whereas for even-aged stands harvest ages vary according to S class:							
	[0-10[: 12 yrs [10-14[: 11 yrs [14-18[: 10 yrs [18-22[: 9 yrs [22-26[: 8 yrs		[0-10[: 14 yrs [10-14[: 13 yrs [14-18[: 12 yrs [18-22[: 11 yrs [22-26[: 10 yrs		[0-10[: 16 yrs [10-14[: 15 yrs [14-18[: 14 yrs [18-22[: 13 yrs [22-26[: 12 yrs			

04 Simulation results

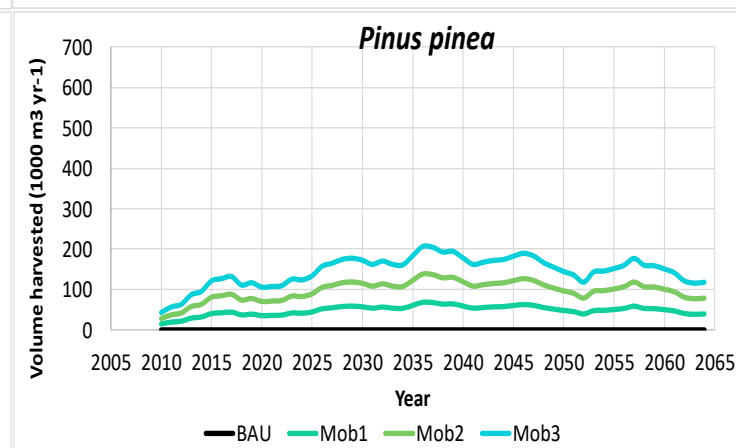
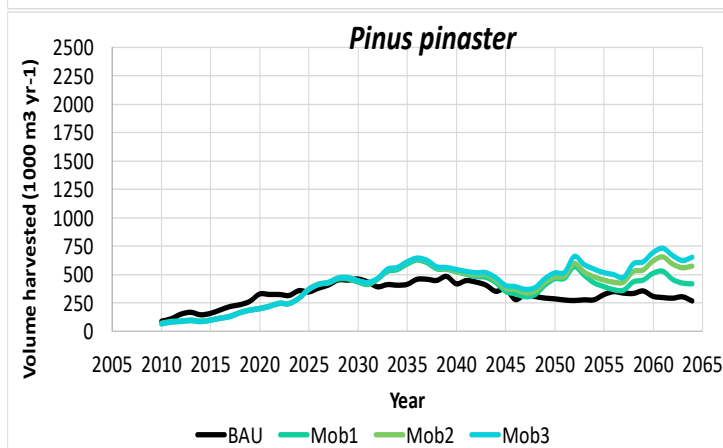
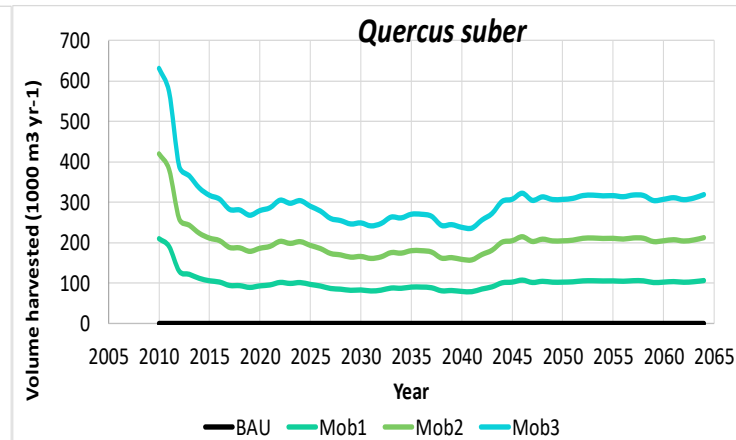
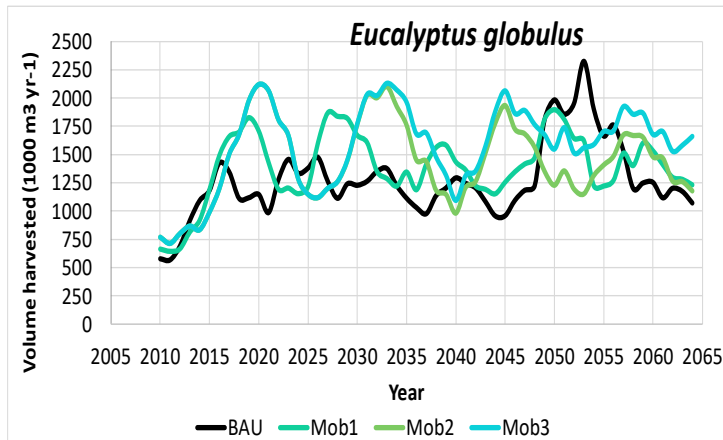
Volume harvested:

E. globulus = final harvest

P. pinaster = final harvest + thinning

Q. suber, *P. pinea* = thinning

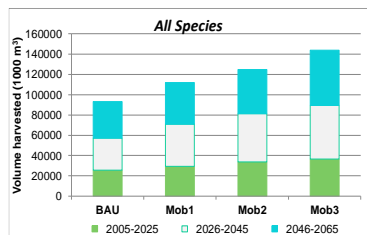
Harvested volume (5 yrs moving averages)



- Substantial contribution of **eucalyptus** for increasing wood availability when compared to the other species
- Increase in wood availability from **BAU** towards **Mob3**



Simulation results



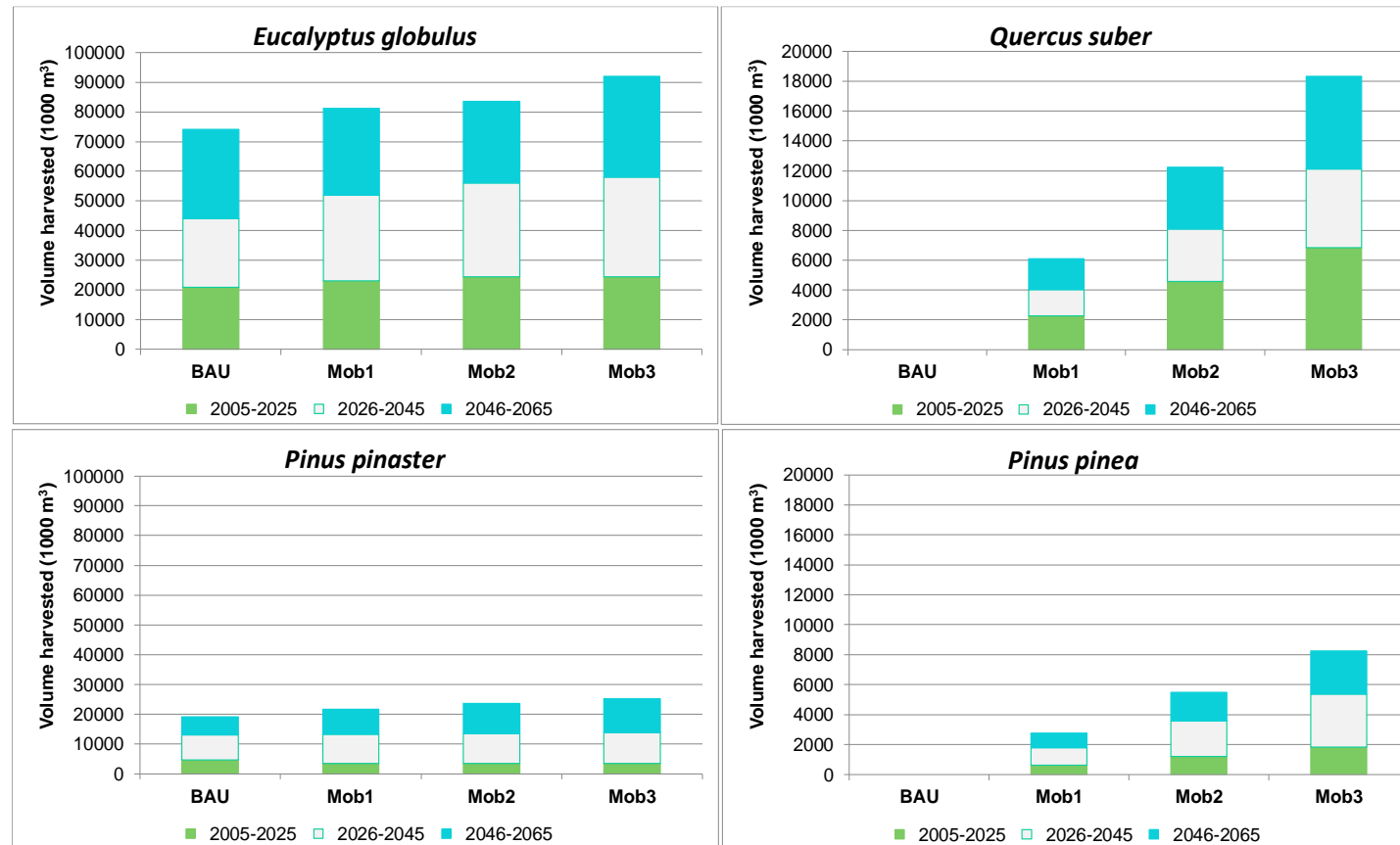
04 Simulation results



Simulation results

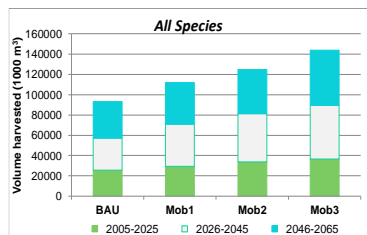
Harvested volume by 20 yrs period

% of thinned volume used:
0% 25% 50% 75%




E. globulus

In the 1st 20-yr no substantial differences among scenarios were detected, becoming evident over the next years

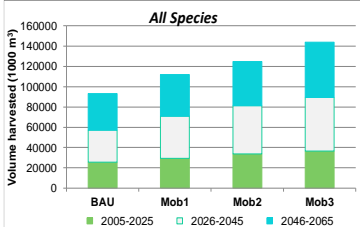


Non-traditional wood production species - if considered, an increase over 18 million m³ could be expected in Mob3


04 Simulation results



Simulation results

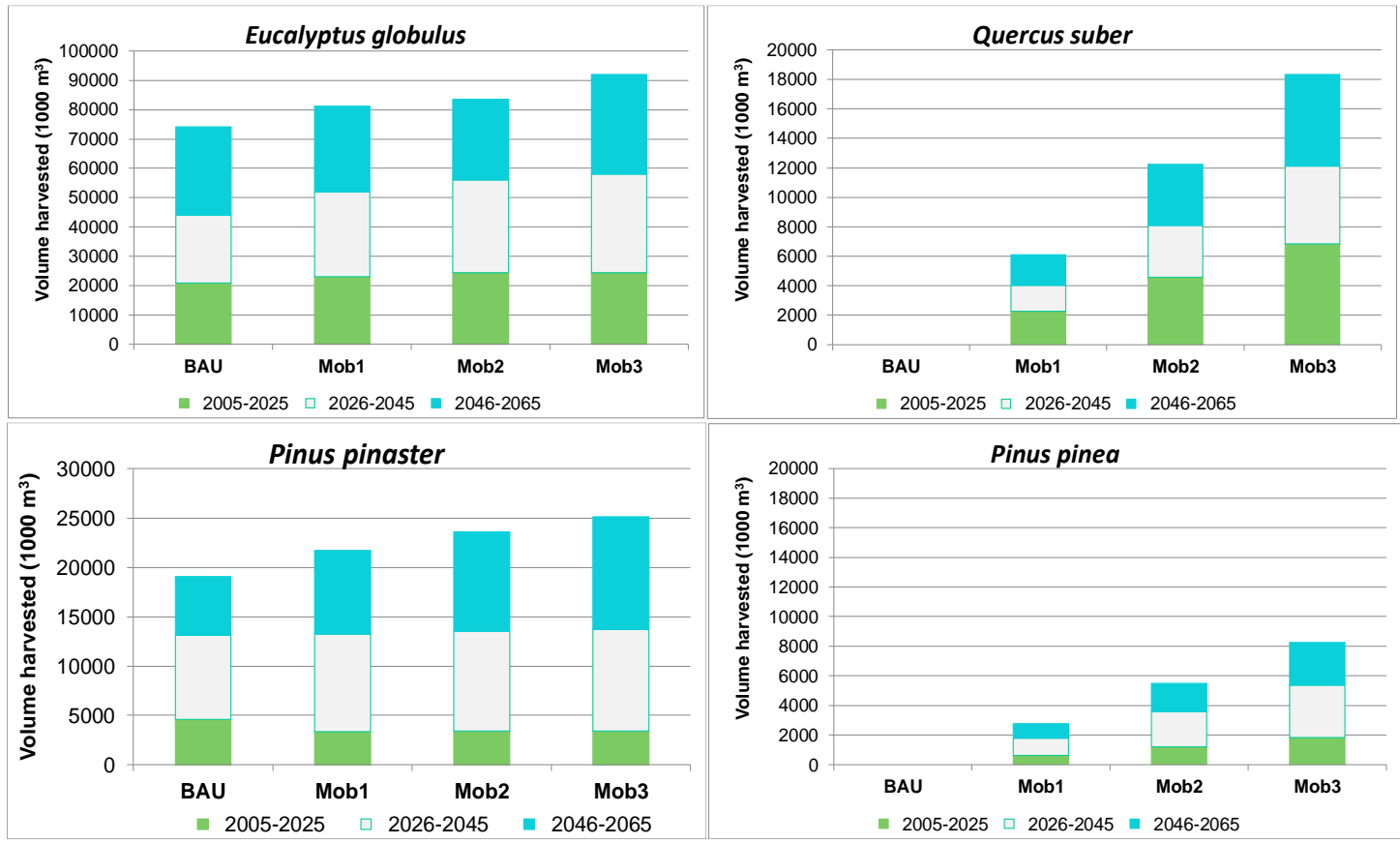


All Species



% of thinned volume used:
0% 25% 50% 75%

Harvested volume by 20 yrs period



E. globulus
In the 1st 20-yr no substantial differences among scenarios were detected, becoming evident over the next years

P. pinaster
The BAU scenario has higher wood availability in the short term (all stands harvested at 35 yrs), but less wood available in the long run

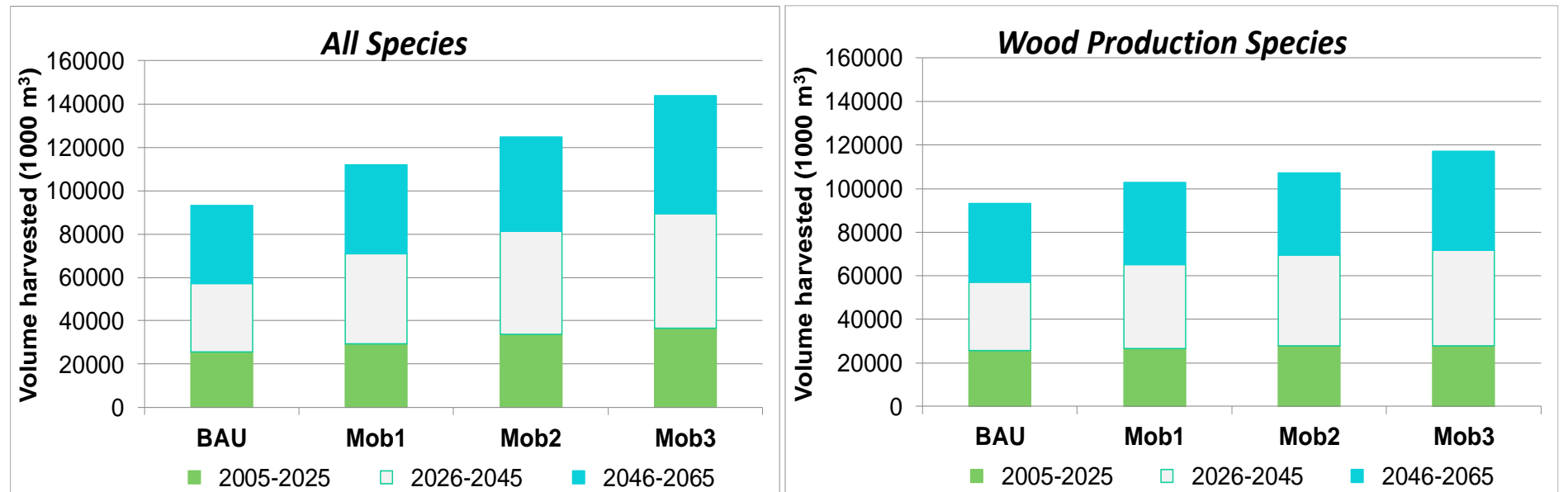
Non-traditional wood production species - if considered, an increase over 18 million m³ could be expected in Mob3

04 Simulation results

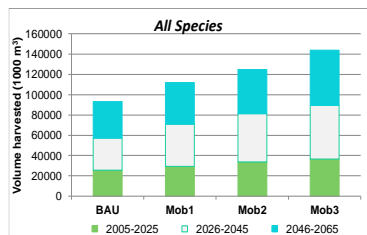


Simulation results

Harvested volume



These results disregard the occurrence of hazards.
Extrapolations for long-term analysis should be carefully done.



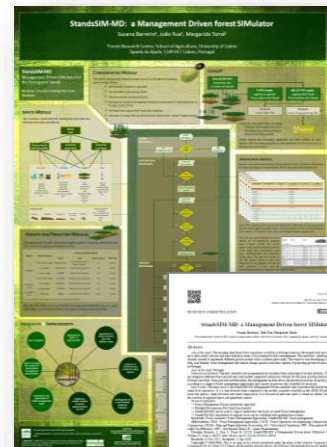
05 Final remarks and future steps

CONCLUSIONS

StandsSIM.md/SUBER were able to **simulate** the impact of different **FMA/prescriptions**, therefore can be used by forest managers in **decision making**

DISSEMINATION

FORESTERRA ERA-NET
FINAL CONFERENCE



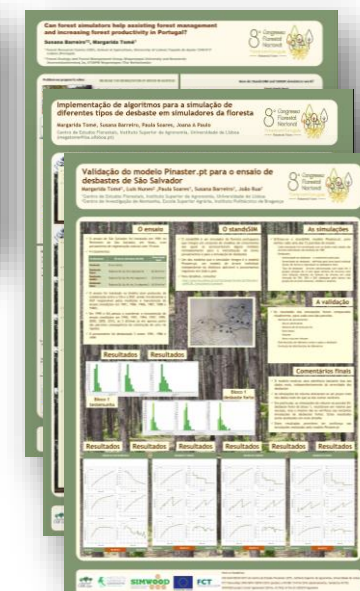
CAFÉ COM CIÊNCIA, FOREST
RESEARCH CENTRE



IUFRO 125TH ANNIVERSARY
CONGRESS 2017



8º CONGRESSO
FLORESTAL NACIONAL



FCTools
WEBPAGE



CASO DE ESTUDO
SOBRE OS INCÊNDIOS
DE GÓIS, FREGUESIA
DE ALVARES



Host a PhD student running simulations for Mediterranean plantations who wants to use StandsSIM.md and test the Stakeholder-defined FMAs

Project application to produce a web-version of the stand level StandsSIM.md for users (certification purposes)



Final remarks and future steps



THANK YOU!



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