Supplementary Material

for

Forest Biodiversity, Carbon Sequestration, and Wood Production: Modelling Synergies and Trade-Offs for Ten Forest Landscapes across Europe

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Supplementary Table 1: Additional characteristics of the case study landscapes (complementing Table 1). For details of the Koeppen-Geiger climate classification system see Peel et al. (2007)

(Country code) Name	Koeppen-Geiger Climate Class	Koeppen-Geiger Climate Name	Most important Soil moisture class / Productivity level	Most important stand type(s)	Dominant Disturbances	Current Management Strategy / Area % managed for Timber
(SWE) Kronoberg county	Dfb	Humid Continental Mild Summer, Wet All Year	Mesic / Low, Medium	Even aged stands of Picea abies, and Pinus sylvestris	Wind, Pest	Clear felling, Shelter wood/ 80%
(LTU) Telšiai	Dfb	Humid Continental Mild Summer, Wet All Year	Dry, Moist / Medium	Even aged mixed stands of Picea abies, Pinus sylvestris, and Betula spp.	Wind, Pest, Fire	Clear felling, Shelter wood / 84 %
(SVK) Podpolanie	Dfb/Dfc	Humid Continental Mild Summer, Wet All Year / Subarctic With Cool Summers And Year Around Rainfall (high mountains)	Mesic / Medium, High	Even aged monospecific and mixed stands of Fagus sylvatica and Picea abies	Wind, Pest, Fire	Non-uniform shelter wood / 82 %
(IRL) Barony of Moycullen	Cfb	Temperate Oceanic Climate	Wet / Medium	Even aged monospecific stands of Picea sitchensis and Pinus contorta	Wind, Pest, Fire	Clear felling / 85 %
(ITA) Veneto	Cfa	Humid Subtropical Climate	Moist / Low	Mixed deciduous stands (Quercus robur, Ulmus campestre, Quercus ilex), even aged stands of Pinus pinea	Fire	Selective cutting / 50 %
(PRT) Sousa Valley	Csb	Warm-Summer Mediterranean Climate	Sub xeric, Sub mesic / Medium, High	Even aged Eucalyptus globulus stands, partly mixed with Pinus pinaster	Fire	Clear felling, Coppice systems / 97 %
(GER) Augsburg Western Forests (AWF)	Cfb	Temperate Oceanic Climate	Mesic / High	Even aged Picea abies stands, partly mixed with Fagus sylvatica	Wind, Pest	Shelter wood, Selective cutting, Clear felling / 95 %
(GER) Lieberose – Schlaubetal, Neuzelle (LSN)	Dfb	Humid Continental Mild Summer, Wet All Year	Dry, Mesic / Low	Even aged Pinus sylvestris stands, partly mixed with Quercus spp.	Fire	Shelter wood, Selective cutting, Clear felling / 95 %
(NLD) Netherlands	Cfb	Temperate Oceanic Climate	Medium, Moist / Medium, High	Mixed and monospecific stands of Pinus sylvestris and Quercus spp.	Wind, Pest, Fire	Shelter wood, Selective cutting / 61 %
(TUR) Gölcük	Csa	Hot-Summer Mediterranean Climate	Dry, Mesic / Low, Medium	Mixed and monospecific stands of Fagus orientalis and Castanea sativa	Fire	Shelter wood / 89 %

Supplementary Table 2. Simulation models/DSS and types, climate simulation approach, and input data per case study landscape (partly taken from Nordström et al. (2019). The model typecast includes "empirical", "mechanistic", and "hybrid" (i.e. comprising both, empirical and mechanistic elements).

(Country code) Name	DSS/Model Name	Model Type	Way of Climate Simulation	Input Data
(SWE) Kronoberg county	Heureka[1]	empirical	Climate influences stand growth (by species)	Terrestrial raster inventory plots from Swedish Forest Agency's survey, complemented with remote sensing data
(LTU) Telšiai	Kupolis[2]	empirical	Productivity and mortality have to be manually adjusted to cover the climate effects	Stand level forest state cadastre data provided by Lithuanian State Forest Service (GIS-based stand delineation)
(SVK) Podpolanie	Sibyla[3]	hybrid	Climate influences single tree growth potential (by species)	Stand-level non-raster data obtained by exhaustive terrestrial survey (provided by the Slovak National Forest Centre).
(IRL) Barony of Moycullen	Growfor[4] Remsoft[5]	empirical	Climate influences stand growth (by species)	Stand-level GIS data from multiple sources
(ITA) Veneto	InVEST[6] VALE	empirical	Climate influences stand growth (by species)	Stand-level GIS data from multiple sources
(PRT) Sousa Valley	StandSim[7] SADfLOR[8]	suite of empirical and mechanistic models	Climate influences stand growth (by species), fuel accumulation effects are also covered	Stand-level data derived from terrestrial raster inventory plots and GIS based landscape classification using orthophoto maps
(GER) Augsburg Western Forests (AWF)	SILVA[9]	hybrid	Climate influences single tree growth potential (by species)	Terrestrial raster inventory plots (single-tree resolution) from national forest inventory and federal country forest services
(GER) Lieberose – Schlaubetal, Neuzelle (LSN)	SILVA[9]	hybrid	Climate influences single tree growth potential (by species)	Terrestrial raster inventory plots (single-tree resolution) from national forest inventory and federal country forest services
(NLD) Netherlands	EFISCEN-space[10]	empirical	Climate influences stand growth (by species)	Dutch national forest inventory (plot level data, terrestrial, raster based) Geo datasets covering climate, soil conditions, from multiple sources)
(TUR) Gölcük	ETFOP[11]	empirical	Productivity and mortality have to be manually adjusted to cover the climate effects	Stand level data derived from forest inventory plots and GIS data provided by the Turkish General Directorate of Forestry

[1]Wikström et al. (2011); [2] Petrauskas and Kulieðis (2004); [3]Fabrika (2005); Fabrika and Durský (2006); [4]Purser and Lynch (2012); [5]Walters (1993); [6]Kareiva et al. (2011); [7]Barreiro et al. (2016);[8]Marto et al. (2019); [9]Pretzsch (2009); Pretzsch et al. (2002);[10]Schelhaas et al. (2018a), Schelhaas et al. (2018b); [11]Kadıoğulları et al. (2018)

Supplementary Table 3. Annual harvest volumes and annual final felling areas averaged over the whole simulation period. Empty fields indicate combinations of forest management (second column) and frame scenarios (Reference, EU Bioenergy, Global Bioenergy) that were not calculated. Final felling area fields marked with a "-" indicate scenarios where such an area could not be meaningfully reported due to fine-grained spatial dispersal of final felling. Note that this table is structured in a way to make it straightforwardly readable together with Table 2 in the main text.

		Reference		EU Bioenergy		Global Bioenergy	
Country	**Forest management scenario name (see Table 2)**	**Mean Annual Harvest Volume (m^3/ha)**	**Annual Final Felling Area (ha)**	**Mean Annual Harvest Volume (m^3/ha)**	**Annual Final Felling Area (ha)**	**Mean Annual Harvest Volume (m^3/ha)**	**Annual Final Felling Area (ha)**
Sweden	High wood production					7.0	6611
	More diverse forest management (EU version)			6.0	5073		
	More diverse forest management (Reference version)	6.3	6036				
Lithuania	Adaptive rotation ages	6.3	790	6.2	790	6.1	790
	Care for deciduous	5.8	873	5.7	873	5.6	873
Ireland	Environmentally constrained profit maximisation	4.5	128	4.5	123	4.7	133
Netherlands	Reference gfdl	2.2	-				
	Reference hdgem	2.2	-				
	Wood			2.4	-		
	Bioenergy gfdl					2.8	-
	Bioenergy hdgem					2.8	-
Germany (case study AWF)	Multifunctional	12.1	-	12.4	-	12.0	-
	Production	17.6	-	18.1	-	17.2	-
	Setaside	0.0	-	0.0	-	0.0	-
Germany (case study LSN)	Multifunctional	5.8	-	5.9	-	5.9	-
	Production	6.6	-	6.6	-	6.6	-
	Setaside	0.0	-	0.0	-	0.0	-
Slovakia	Conservative	4.3	-	5.6	-	5.2	-
	Liberalized	4.6	-	5.7	-	5.2	-
Italy	Recreation & habitat selectivity	1.5	-	1.6	-	1.8	-
	Uniform shelterwood and coppice	2.0	-	2.1	-	2.2	-
Portugal	Combination of eucalypt, pine, broadleaf, cork oak and riparian forest management	6.7	746	6.6	746	6.5	746
Turkey	Continuous Cover Forestry	2.2	212	2.2	213	2.2	215

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