

Forest or agricultural management	STRATEGY CHANGING		SEQUESTRATION POTENTIAL			Study area and up-scalability	Limits of results	RISKS, BARRIERS AND SYNERGIES			LAWS AND POLITICAL SUPPORT ALREADY APPLIED	AREAS WHERE CAN BE PROMOTED
	Current land use and management	Land use and management changing	Carbon in field (RMU)	Carbon in products	Fossil fuel substitution			Environmental effects	Economic effects	Social impacts		
Forest management	Commercial forest 100% spruce Rotation period 100 years, medium low thinning, clear cut	Rotation period 80 years, intensive crown thinning	🙄	🙄	🙄	Plots in Schwaben (Southern Bavaria, Germany) No regional upscaling	Natural risks not included, soil dynamics not included, ground vegetation not included, clearcut as a simplification of real regeneration cuttings	Soil conservation: lower risk of natural damage → improved soil protection Nitrate percolation: maybe increase (depending on soil characteristics) Other: increase in structural diversity	Land owner: less storm damage, less harvesting costs, higher timber quality → higher timber price, more early and severe income → more profit  Other economic stakeholders: constant supply with high quality timber → improved conditions for timber industry	Turistic and recreational activities: increase by higher structural diversity and less forest damages Landscape: increase by higher structural diversity and less forest damages Other: saved employment in forestry and timber industry	Frilii Venezia Giulia: none Veneto: none Hungary: the clearcuts is limited to 5 ha and banned in exposed locations, no political supports Bavaria: yes, but mixture with other tree species and long term regeneration phase. In the transaction plan simplification to 100% spruce stands and clearcut Slovenia: forest management plans support conversion to mixed forests. No political supports Greece: none Croatia: Forest Management Rulebook states that minimal rotation period for spruce forests is 80 years. Intention is to convert artificially planted pure spruce forests to mixed forests of autochthonous tree species (Croatian Forestry Strategy, Croatian Forest Law). No political supports	
		Rotation period 120 years, extensive low thinning, clear cut	😊	🙄	🙄			Soil conservation: higher risk of natural damage → reduction in soil protection Water management: decrease (higher proportion of areas damaged by storms and insects)	Land owner: more storm damage, more harvesting costs, less timber quality → less timber price, late and unsave income → less profit, less and risky income Other economic stakeholders: less constant supply with high quality timber → less favourable conditions for timber industry	Turistic and recreational activities: decrease because of high forest damages Landscape: decrease through high proportion of forest damages Other: fluctuating working conditions	Frilii Venezia Giulia: none Veneto: none Hungary: the clearcuts is limited to 5 ha and banned in exposed locations. No political supports Bavaria: no, because of high risk and reduced income. No political supports Slovenia: forest management plans support conversion to mixed forests. No political supports Greece: none Croatia: none	Frilii Venezia Giulia: mountain areas but without clearcut, that is forbidden by law Veneto: mountain areas but without clearcut, that is forbidden by law Hungary: not applicable Bavaria: not recommended Slovenia: not applicable Greece: mountain areas Croatia: not applicable
		Ex-commercial forest, no harvest, left to natural evolution	🙄	🙄	🙄			Biodiversity: increase Soil conservation: maybe decrease by break down of large forest areas Water management: serious problems when large areas break down Nitrate percolation: increase on windthrown areas Fauna: increase diversity Other: high pest outbreaks risk in commercial stands	Land owner: no income, high costs for reduction of damages on infrastructure  Other economic stakeholders: no timber supply → timber industry recession	Turistic and recreational activities: less recreation areas in the forest due to damages and risks for human health, less tourists because of damaged landscapes Landscape: loss of traditional landscapes Other: less employment in forestry, no employment in timber industry	Frilii Venezia Giulia: none Veneto: none Hungary: none Bavaria: no, because of high risk, no income for landowner and loss of timber industry. No political supports Slovenia: none Greece: none Croatia: none	Frilii Venezia Giulia: forests with quite high wilderness Veneto: forests with quite high wilderness Hungary: Not applicable Bavaria: Restricted only to conservation areas Slovenia: not applicable Greece: mountain areas Croatia: not applicable
	Mixed forest with beech, spruce, silver fir	Ex-commercial forest, no harvest, left to natural evolution	😊	🙄	🙄	Plots in 3 mountain areas in Friuli Venezia Giulia (Italy). Yes, to all mixed forests with beech, spruce, silver fir in Friuli Venezia Giulia Region.	Only above-ground biomass not included. Natural risks not included.	Biodiversity: increase caused by the increment of dead wood Soil conservation: positive Fauna: positive (less disturbance) Other: less polluting emissions	Land owner: no income Other economic stakeholders: no wood → no harvesting activities → no wood market	Turistic and recreational activities: increase in naturalistic and scientific tourism	Frilii Venezia Giulia: none Veneto: none Hungary: none Bavaria: no, because of high risks, no income for landowner and loss of timber industry. No political supports Slovenia: political support for implementation of Natura 2000 network Greece: none Croatia: there is political support for proclaiming certain forest areas as protected areas (Nature parks, Strict reserves, Special reserves). Nature Protection Act prescribes allowed human activities in such areas.	Frilii Venezia Giulia: forests with quite high wilderness Veneto: forests with quite high wilderness Hungary: not decided Bavaria: restricted only to conservation areas in mountain and subalpine regions Slovenia: forest areas with high conservation values Greece: not applicable Croatia: applicable for forests in submontane and montane areas
		Assigned to timber production	Increasing annual cut up to 75% of annual increment, in 2020	😊	👍	👍	All Slovenia Yes, to all Slovenian high forests	Included only above-ground biomass and below-ground biomass	No significant changes	Land owner: positive, more income  Other economic stakeholders: potential for employment in rural areas, intensified wood market, better supply of industrial wood to industry	No significant changes	Frilii Venezia Giulia: none Veneto: none Hungary: none Bavaria: not applicable, because almost 100% of annual increment is already used Slovenia: Slovenian Forest Action plan and FM plans define the allowable cut; additional support from wood processing industry Greece: none Croatia: According Forest Management Rulebook it is allowed to cut max. 100% of the periodic increment, provided that the forest structure is close to "normal". Depending on relationship between real forest and "normal" growing stock, it is allowed to cut less or slightly more (rare cases) than the periodic increment.
	Artificial forest most covered by the specie <i>Pinus brutia</i> No thinning	Thinning	🙄	😊	🙄	Suburban forest of Thessaloniki (Kedrinis Hill) Yes, to all Mediterranean forests	Included only above-ground and below-ground tree biomass	Soil conservation: increase Other: positive for fire prevention	Land owner: no income	Turistic and recreational activities: increase	Frilii Venezia Giulia: none Veneto: none Hungary: none Bavaria: not applicable, because of Mediterranean tree species Slovenia: none Greece: thinning forbidden by law in Mediterranean forests. No political supports Croatia: none	Frilii Venezia Giulia: not applicable Veneto: not applicable Hungary: not applicable Bavaria: not applicable, because of Mediterranean tree species Slovenia: not applicable Greece: Mediterranean forest (but forbidden by law) Croatia: not applicable
		Spruce and fir high forest The 100% of the increment is cut	The 150% of the increment is cut (more forestry)	🙄	😊	🙄	Plots in the alpine forest in province of Belluno (Veneto, Italy)  Yes, to all the Spruce and fir forest in the Italian dolomite area	Included above-ground tree biomass and default value for below-ground biomass	Biodiversity: decrease Soil conservation: more hydro-geologic risk Water management: hydro-geologic risk Fauna: more disturbance and less presence	Land owner: higher profit from timber production Other economic stakeholders: more job opportunities, higher profit	Turistic and recreational activities: more disturbance, less turistic activities Landscape: less dense forest	Frilii Venezia Giulia: none Veneto: forest plans do not allow to cut more than the current annual increment, no political supports Hungary: none Bavaria: support depends on silvicultural treatment, restricted to submountain and mountain areas Slovenia: forest management plans prescribe levels of available cut. In general allowable cut can reach maximum up to 75% of increment. No political supports Greece: none Croatia: according Forest Management Rulebook, in fir-spruce un-evenaged forest it is not allowed to cut in single cut more than 30% of present growing stock. Also, it is allowed to cut max 100% of the periodic increment, provided that the forest structure is close to "normal". Exception is forest dieback when all dead trees are removed. No political support
	The 10% of the increment is cut (no forestry)		😊	🙄	🙄	Biodiversity: increase, higher pest risk Soil conservation: less hydro-geologic risk Water management: less hydro-geologic risk Fauna: less disturbance			Land owner: less profit from timber production Other economic stakeholders: less job opportunities and no profit from timber production, more timber import	Turistic and recreational activities: less antropic disturbance, maybe tourism opportunities Landscape: expansion of the forest	Frilii Venezia Giulia: none Veneto: none Hungary: none Bavaria: no, because of high risks, no income for landowner and loss of timber industry. No political supports Slovenia: in some areas of Natura 2000 and if defined Forest Management Plans mainly in protective forest areas Greece: none Croatia: there is political support for proclaiming certain forest areas as protected areas (Nature parks, Strict reserves, Special reserves). Nature Protection Act prescribes allowed human activities in such area	Frilii Venezia Giulia: forests with quite high wilderness Veneto: forests with quite high wilderness Hungary: not decided Bavaria: restricted only to conservation areas in mountain and subalpine regions Slovenia: forest areas with high conservation values and in protective forests in high mountain areas Greece: forests with quite high wilderness Croatia: forest areas with high conservation values and in protective forests in high mountain areas
	Common oak mixed commercial forest Rotation period: 140 years, natural vegetation and regeneration, thinning every 10 years	Use of forest biomass as firewood Harvest slash, tiny branches included	🙄	😊	👍	Jastrebarsko, Zagrebacka županija, Croatia Yes, to Regional level	Included only above-ground biomass and soil	Biodiversity: low level of impact Soil conservation: slightly negative due to prolonged presence in forest (workers, machinery) Fauna: slightly negative due to prolonged presence in forest (workers, machinery) Other: increase in damage to remaining trees, nutrient depletion due to additional removal of biomass, but removal of the remaining biomass can help in reducing risk of pest outbreaks	Land owner: more income Other economic stakeholders: new job opportunities in rural areas, decrease in dependency on fossil fuels	Turistic and recreational activities: increase in assessability, more recreation areas Landscape: possibility of negative effects on site of biomass processing plant	Frilii Venezia Giulia: none Veneto: none Hungary: none Bavaria: biomass use supported. Support restricted to sustainable silvicultural treatment and biomass use without reduction of soil fertility Slovenia: yes in general in National biomass action plan. No support to use tiny branches from forests as fuel Greece: none Croatia: yes	Frilii Venezia Giulia: oak forests are very rare Veneto: oak forests are very rare Hungary: in all commercial forests Bavaria: application depending on silvicultural treatment Slovenia: in all commercial forests Greece: application depending Croatia: in all commercial forests
		Beech forest Coppices	Managed as high forest for timber production	👍	😊	🙄	Plots in the sub montane forest in province of Vicenza (Veneto, Italy)  Yes to all the submontane beech forest in the regional area of Veneto (Italy)	Included above-ground tree biomass and default value for below-ground biomass	Biodiversity: increase Other: decrease in energy substitution effect, more carbon stored in the products	Land owner: less profit in the short period Other economic stakeholders: higher timber production, increase of firewood price	Turistic and recreational activities: maybe more space for turistic activities Landscape: change in the structure of the forest	Frilii Venezia Giulia: regional forest law favours the substitution of coppices with high forest Veneto: regional forest law favours the substitution of coppices with high forest Hungary: none Bavaria: no beech coppice → no political objectives Slovenia: Slovenian Forest act and Forest Management plans favour conversion of beech- and other coppice forests into high forests with political supports Greece: none Croatia: Croatian forest law and Forest Management Rulebook favour conversion of beech- and other coppice forests into high forests and there are political supports
	Recently assigned to timber production and managed as high forest		😊	🙄	🙄	Biodiversity: decrease Other: decrease of energy substitution effect, more carbon stored in the products	Land owner: less profit in the short period Other economic stakeholders: increase of firewood price	Turistic and recreational activities: maybe more space for turistic activities Landscape: change in the structure of the forest	Frilii Venezia Giulia: regional forest law supports the substitution of coppices with high forest Veneto: regional forest law supports the substitution of coppices with high forest Hungary: none Bavaria: no beech coppice → no political objectives Slovenia: Slovenian Forest act and Forest Management plans favour conversion of beech and other coppice forests into high forests with political supports Greece: none Croatia: Croatian forest law and Forest Management Rulebook favour conversion of beech- and other coppice forests into high forests and there are political supports	Frilii Venezia Giulia: mountain area with timber market Veneto: mountain area with timber market Hungary: not decided Bavaria: no beech coppice → not applicable Slovenia: in stands on good site conditions but not in protective forest areas Greece: mountain area with high forests Croatia: mountain region with timber market		
	Agricultural management	Managed grassland Mowed two times a year Without fertilization	Fertilization with 50kgN/ha	🙄	🙄	🙄	Nyugat Dunántúl, Hungary No upscaling	Nitrate percolation: increase Other: increase in weed	Land owner: more production → more income	None	Frilii Venezia Giulia: none Veneto: none Hungary: none Bavaria: managed grassland without fertilization mostly contain endangered species → no political support for fertilization Slovenia: not available Greece: no subsidies, agricultural use depending on the land owner Croatia: not available	
Permanent grassland		Ash mixed stand due to natural secondary succession	😊	😊	😊	Plots in prealps area in north-east part of Friuli-Venezia-Giulia Region Yes, to Prealpine area of south side of the alps.	Biodiversity: increase Soil conservation: less erosion Water management: improvement Nitrate percolation: decrease	Land owner: lost of profits without subsidies	None	Frilii Venezia Giulia: regional forest law favours to recover the agricultural lands abandoned in some cases Veneto: Rural Development Plan Hungary: none Bavaria: afforestation and reforestation restricted by forest and environmental laws. Political support by forestry Slovenia: none Greece: no subsidies, agricultural use depending on the land owner Croatia: Croatian Forest Law allows increase of forested areas. In situations when forest spreads on abandoned grassland, the owner of land must report the change in land category (pasture-forest) to appropriate institution (Cadastral) in prescribed time. Generally no political support	Frilii Venezia Giulia: the agricultural lands abandoned far from villages Veneto: rural areas Hungary: not applicable Bavaria: principally yes, but application depends on afforestation allowance and site conditions favourable for ash Slovenia: not applicable Greece: urban areas with agricultural land Croatia: not available	
Maize or other herbaceous species		Broadleaved forest plantation	😊	😊	👍	Plots in Padanian plane Friuli-Venezia-Giulia Region Yes, to whole Padanian Plane in Italy	Only above-ground biomass is included	Biodiversity: increase Soil conservation: less erosion Water management: improvement Nitrate percolation: decrease Fauna: positive (less disturbance, new habitat)	Land owner: lost of profits without subsidies  Other economic stakeholders: positive for end users due to pollution decreasing, biodiversity and landscape improvement	Turistic and recreational activities: recreatives areas Landscape: differentiation in agricultural landscape	Frilii Venezia Giulia: Rural Development Plan Veneto: Rural Development Plan Hungary: none Bavaria: afforestation and reforestation restricted by forest and environmental laws. Political support by forestry Slovenia: none Greece: no subsidies, agricultural use depending on the land owner Croatia: none	Frilii Venezia Giulia: plane rural areas Veneto: plane rural areas Hungary: not applicable Bavaria: principally yes, but application depends on afforestation allowance Slovenia: not applicable Greece: rural/urban areas Croatia: not applicable
		Conventional tillage	Poplar plantation	👍	😊	😊	Plots in Padanian plane Friuli-Venezia-Giulia Region Yes, to whole Padanian Plane in Italy	Only above-ground biomass is included	Biodiversity: increase Soil conservation: less erosion Water management: improvement Fauna: creation of a new habitat	Land owner: more income Other economic stakeholders: increase in harvesting activities → wood market	Turistic and recreational activities: creation of new recreatives areas Landscape: differentiation in agricultural landscape	Frilii Venezia Giulia: Rural Development Plan Veneto: Rural Development Plan Hungary: none Bavaria: afforestation and reforestation restricted by forest and environmental laws. Political support by forestry Slovenia: none Greece: no subsidies, agricultural use depending on the land owner Croatia: none
Maize Conventional winter tillage		1 year of <i>Medicago sativa</i>	😊	🙄	🙄	Plots in Padanian plane Friuli-Venezia-Giulia Region Yes, to whole Padanian Plane in Italy	Only one year of measurements. More years are needed	Soil conservation: less erosion Water management: improvement Nitrate percolation: decrease	Land owner: lost of profits without subsidies	None	Frilii Venezia Giulia: Rural Development Plan Veneto: Rural Development Plan Hungary: none Bavaria: no subsidies, agricultural use depending on the land owner Slovenia: none Greece: no subsidies, agricultural use depending on the land owner Croatia: none	Frilii Venezia Giulia: agricultural areas Veneto: agricultural areas Hungary: agricultural areas Bavaria: agricultural areas Slovenia: agricultural lands Greece: agricultural areas Croatia: agricultural areas
		Continuous maize with annual spring tillage	🙄	🙄	🙄	Plots in Padanian plane Friuli-Venezia-Giulia Region Yes, to whole Padanian Plane in Italy	Only one year of measurements. More years are needed	Soil conservation: less erosion	None	None	Frilii Venezia Giulia: none Veneto: none Hungary: none Bavaria: no subsidies, agricultural use depending on the land owner Slovenia: none Greece: no subsidies, agricultural use depending on the land owner Croatia: none	
		Cropland Annual winter tillage	No tillage	😊	🙄	🙄	Plots in Padanian plane Friuli-Venezia-Giulia Region Yes, to whole Padanian Plane in Italy	Only one year of measurements. More years are needed	Soil conservation: less erosion	Land owner: decreasing in production costs.	None	Frilii Venezia Giulia: none Veneto: none Hungary: none Bavaria: no subsidies, agricultural use depending on the land owner Slovenia: none Greece: no subsidies, agricultural use depending on the land owner Croatia: none