Present state and relationships of forest functions and ecosystem services in Slovakia



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Forest categories in Slovakia

commercial forests (71.55 %)
protective forests (17.16 %)
forests with special purpose (11.29 %)



Non-productive forests

- Protective forests declared on extraordinarily unfavourable sites, in high mountainous locations, in the zone of dwarf pine for securing soil protection or others, according to site typification
- Special purpose forests fulfil primarily social or environmental requirements such as recreational, medicinal-curative, nature protective, air pollutants control or educational-research
- the forests with prevailing non-production functions are being designated inter alia to provide protection of infrastructure and natural resources against injurious agents

Categories and functional types of forests

Category of	Forest function	Proportion of timber land		
forest	Forest function	ha	%	
Commercial	Wood producing	1 389 504	71.55	
Protective	Erosion control	257 365	13.25	
	Water management	71 962	3.71	
	Avalanche control	1 454	0.07	
	Streamside protection	452	0.02	
	Deflation control	2 176	0.11	
Special purpose	Water purification	12 501	0.64	
	Recreation	24 970	1.29	
	Spa & wellness	2 244	0.12	
	Nature conservation	35 643	1.84	
	Air pollution mitigation	43 245	2.23	
	Game management	22 280	1.15	
	Education & research	31 862	1.64	
	Conservation of gene resources	10 810	0.56	
	State defence	35 524	1.82	

Function combinations

- every forest is assigned the one of the 69 specific function combinations in a Program of Forest Care
- the most frequent is combination erosion controlwood producing (cca 35 %)
- "only" wood producing forests cover cca 6%
- System of functionally integrated forestry in Slovakia



Constantly changing situation...

- the area of commercial forests has had an increasing tendency since 2011 (1.1 %)
- air pollution mitigation function (functional type) was cancelled in 2005 but changing climate condition...
- decreasing and eliminating of clearcuttings
- non-productive forests are often very old, regeneration is not sufficient = weakening of original functions
- using of selective cutting



The links between Ecosystem Services and Human Well-being (after MEA, 2005)



MA categories	A categories TEEB categories		CICES v4.3 group [†]		
			Biomass (Nutrition)		
Food (fodder)	Food		Biomass (Materials from plants, algae and		
			animals for agricultural use)		
F 1			Water (for drinking purposes) [Nutrition]		
Fresh water	Water	Provisioning	Water (for non-drinking purposes) [Materials]		
Fibura Airaban	Dave Matariala	services	Biomass (fibres and other materials from plants,		
Fibre, timber	Raw Materials		algae and animals for direct use and processing)		
Genetic resources	Genetic resources		Biomass (genetic materials from all biota)		
Riochemicals			Biomass (fibres and other materials from plants,		
טוטנוופוווונמט			algae and animals for direct use and processing)		
Ornamental resources	Ornamental resources		Biomass (fibres and other materials from plants,		
			algae and animals for direct use and processing)		
		1	Biomass based energy sources		
			Mechanical energy (animal based)		
Air quality regulation	r quality regulation Air quality regulation		[Mediation of] gaseous/air flows		
			Mediation [of waste, toxics and other nuisances]		
Water purification and water	Waste treatment (water		by biota		
treatment	purification)		Mediation [of waste, toxics and other nuisances]		
			by ecosystems		
Water regulation	Regulation of water flows		[Mediation of] liquid flows		
	Moderation of extreme events	Regulating			
Erosion regulation	Erosion prevention	services (TEEB)	[Mediation of] mass flows		
Climate regulation	Climate regulation		Atmospheric composition and climate regulation		
Soil formation	Maintenance of soil fertility	Regulating and	Soil formation and composition		
(supporting service)	- tanter aree of boil fertility	supporting			
Pollination	Pollination	Services (MA)	Lifecycle maintenance, habitat and gene pool protection		
Pest regulation		Regulating and			
Disease regulation	Biological control	maintenance	Pest and disease control		
		services (CICES)	Lifecycle maintenance, habitat and gene pool		
	Maintenance of life cycles of		protection		
Primary production migratory species (incl. nursery			Soil formation and composition		

(after Maes et al., 2013)

Importance of Action 5 in relation to other supporting Actions under Target 2 and to other Targets of the EU Biodiversity Strategy (EC, 2012)



Ecosystem Functions and Services vs. Forest Functions



The relationship between Biodiversity, Ecosystem Function and Human Well-being (Haines-Young et Potchin, 2010)

Ecosystem functions are defined as the capacity or the potential to deliver ecosystem services.

They are constituted by different combinations of natural processes, traits and structures. Ecosystem services are derived from ecosystem functions and represent the realized flow of services (or goods) for which there is demand.

We argue that although forest functions and ecosystem functions are both understood as "functions" some forest functions are in fact ecosystem services.

Cross-walk table between CICES v4.3 ecosystem classes and forest categories and respective functions.

CICES version 4.3				Category of forest	Forest function
Section	Division	Group	Class		
Provisioning	Nutrition	Biomass	Cultivated crops		NA
			Reared animals and their outputs		NR
			Wild plants, algae and their outputs		NR
			Wild animals and their outputs	Special purpose	Game management
			Plants and algae from in- situ aquaculture		NA
			Animals from in-situ aquaculture		NA
		Water	Surface water for drinking	Protective	Water management
				Special purpose	Water purification
			Ground water for drinking		NA
	Materials	Biomass	Fibres and other materials from plants, algae and animals for direct use or processing	Commer-cial	Timber production
			Materials from plants, algae and animals for agricultural use		NA
			Genetic materials from all		NR

NA – ESS provided by agriculture, aquaculture or water ecosystems therefore not applicable. NR – ESS may be provided by forest ecosystems but are not recognised by the existing forest functions.

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	Regulation & Maintenan- ce	Mediation of waste, toxics and other nuisances	Mediation by biota	Bio-remediation by micro- organisms, algae, plants, and animals	Special purpose	Air pollution mitigation	
/		Mediation of flows		Filtration/sequestration/stor age/accumulation by micro-organisms, algae, plants, and animals		NR	
			Mass flows Liquid flows	Mass stabilisation and control of erosion rates	Protective	Erosion control	
				Buffering and attenuation of mass flows		NR	
				Hydrological cycle and water flow maintenance		NR	
				Flood protection	Protective	Streamside protection	
			Gaseous / air flows	Storm protection	Protective	Deflation control	
				Ventilation and transpiration		NR	
		Maintenan L -ce of g physical, g chemical, f biological a conditions g	Lifecycle maintena n-ce, habitat and gene pool protection	Pollination and seed dispersal		NR	
				Maintaining nursery populations and habitats	Special purpose	Nature conservation Conservation of	
					-prostal parpooo	gene	
			Pest and disease control	Pest control		NA	

Cultural	Physical and intellectua I interaction s with biota, ecosyste ms, and land- /seascape s [environ- mental settings]	Physical and experienti al interactio ns	Experiential use of plants, animals and land- /seascapes in different environmental settings	Special purpose	Recreation	
			Physical use of land- /seascapes in different environmental settings	Special purpose	Spa & wellness	
		Intellectu al and represent ative interactio ns	Scientific	Special purpose	Education & research	
			Educational	Special purpose	Education & research	
			Heritage, cultural		NR	
			Entertainment		NR	
			Aesthetic		NR	
	Spiritual, symbolic and other interaction s with biota, ecosyste ms, and	Spiritual and/or emblemat ic	Symbolic		NR	

Conclusions

The forest categories and functions may provide a good base for mapping and assessment of forest ecosystem services. They are based on a sound knowledge of local natural conditions and socioeconomic needs and bond to mapped forest stands.

However, there still exist several challenges for linking forest functions and ecosystems services due to missing ESS in the forest function classification.

In addition, the ESS concept foresees regular monitoring of ecosystems services, their monetary valuation, accounting and reporting.

Practical implementation of ESS into forest management will also require a trade-off analysis of different ESS and establishing a balanced and just payment system for ESS.

Thank you!



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