

Supplementary materials

ES CLASSIFICATION	SUPPORT	REGULATING										PROVISIONING										CULTURAL				TOTAL					
TEEB, 2011	x		x	x	x		x	x	x	x		x				x	x						x	x		x					
MEA, 2005			x		x	x	x		x	x	x	x		x			x						x	x		x					
CICES (Burkhard et al., 2014)			x	x	x	x	x	x	x	x	x		x			x	x						x	x	x	x					
POTENTIAL ES MATRIX BURKHARD ET AL. 2014 VALUES <u>ORIGINAL</u>	Habitat & biodiversity																														
	SUPPORT																														
	Global climate regulation (C seq & stock)																														
	Local climate regulation																														
	Air quality regulation																														
	Water flow regulation																														
	Water purification																														
	Nutrients regulation																														
	Erosion regulation																														
	Natural hazard regulation																														
	Pollination																														
	Pest & disease control																														
	REGULATING																														
	Food (crops, fruits, vegetables)																														
	Biomass for energy																														
Fodder																															
Food (livestock)																															
Fibre																															
Timber																															
Food (fish)																															
Wild foods & resources																															
Biochemicals & medicine																															
Freshwater																															
PROVISIONING																															
Recreation & eco-tourism																															
Landscape aesthetics & inspiration																															
Knowledge systems																															
Religious & spiritual experience																															
CULTURAL																															
TOTAL																															
LAND USE CATEGORIES																															
FOREST & SEMI-NATURAL		71.4											73.4										29.7				72.1	61.7			
Grass strip		2	40.0	4	2	0	1	2	3	3	1	1	2	32.0	0	1	2	3	0	0	0	5	1	0	24.0	3	3	4	1	47.5	35.9
Grass strip with sparse trees and shrubs		3	60.0	5	5	5	3	5	5	5	4	4	4	90.0	0	1	1	0	1	5	0	5	3	0	32.0	5	5	5	3	90.0	68.0
Small woody area		4	80.0	5	5	5	3	5	5	5	4	4	4	90.0	0	1	1	0	1	5	0	5	3	0	32.0	2	3	4	1	50.0	63.0
Uncultivated area		3	60.0	4	2	0	1	2	3	3	1	1	2	32.0	0	1	2	3	0	0	0	5	1	0	24.0	3	3	4	1	47.5	40.9
Uncultivated area with spontaneous trees&shrubs ri-colonization		4	80.0	5	5	5	3	5	5	5	4	4	4	90.0	0	1	1	0	1	5	0	5	3	0	32.0	5	5	5	3	90.0	73.0
Wood		5	100.0	5	5	5	3	5	5	5	4	4	4	90.0	0	1	1	0	1	5	0	5	3	0	32.0	5	5	5	3	90.0	78.0
Woody belt		4	80.0	5	5	5	3	5	5	5	4	4	4	90.0	0	1	1	0	1	5	0	5	3	0	32.0	5	5	5	3	90.0	73.0
AGRICULTURAL		50.0											32.5										25.3				31.9	34.9			
Apple		3	60.0	2	2	2	2	1	2	2	2	5	3	46.0	4	1	0	0	0	2	0	0	2	0	18.0	3	2	2	0	35.0	39.8
Arboriculture		3	60.0	5	5	5	3	5	5	5	4	4	4	90.0	0	1	1	0	1	5	0	5	3	0	32.0	5	5	5	3	90.0	68.0
Crop field		1	20.0	1	3	1	1	0	1	0	1	1	2	22.0	5	1	2	0	4	0	0	1	3	0	32.0	1	1	2	0	20.0	23.5
Crop field in rotation		2	40.0	1	3	1	1	0	1	0	1	1	2	22.0	5	1	2	0	4	0	0	1	3	0	32.0	1	1	2	0	20.0	28.5
Hazelnut		3	60.0	2	2	2	2	1	2	2	2	5	3	46.0	4	1	0	0	0	2	0	0	2	0	18.0	3	2	2	0	35.0	39.8
Horticultural		2	40.0	1	2	1	2	0	1	0	1	1	2	22.0	5	5	5	0	5	0	0	1	3	0	48.0	1	1	2	0	20.0	32.5
Leguminous		2	40.0	1	3	1	1	0	1	0	1	1	2	22.0	5	1	2	0	4	0	0	1	3	0	32.0	1	1	2	0	20.0	28.5
Permanent grassland		4	80.0	4	2	0	1	2	3	3	1	1	2	32.0	0	1	5	5	0	0	0	2	0	0	26.0	3	3	4	1	47.5	46.4
Rice field		1	20.0	0	2	1	1	0	1	0	0	1	1	14.0	5	1	2	0	0	0	0	0	0	0	16.0	1	1	2	0	20.0	17.5
Rice field in rotation		3	60.0	0	2	1	1	0	1	0	0	1	1	14.0	5	1	2	0	0	0	0	0	0	0	16.0	1	1	2	0	20.0	27.5
Rice field organic		3	60.0	0	2	1	1	0	1	0	0	1	1	14.0	5	1	2	0	0	0	0	0	0	0	16.0	1	1	2	0	20.0	27.5
Walnut		3	60.0	2	2	2	2	1	2	2	2	5	3	46.0	4	1	0	0	0	2	0	0	2	0	18.0	3	2	2	0	35.0	39.8
HYDRIC		90.0											35.0										27.0				72.5	56.1			
Water bodies		5	100.0	1	2	0	5	2	3	0	3	0	3	38.0	0	1	0	0	0	0	3	4	0	5	26.0	5	4	4	2	75.0	59.8
Riverbed		4	80.0	0	1	0	3	3	3	0	3	0	3	32.0	0	2	0	0	0	0	3	4	0	5	28.0	4	4	4	2	70.0	52.5
ARTIFICIAL		20.0											12.4										0.8				25.0	14.6			
Agricultural buildings		1	20.0	0	0	0	0	0	0	1	0	1	1	6.0	1	0	0	0	0	0	0	0	0	0	2.0	3	2	2	2	45.0	18.3
Industrial		0	0.0	0	0	0	0	0	0	2	0	0	1	6.0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0	0	0.0	1.5
Other services		0	0.0	0	0	0	0	0	0	0	2	0	1	6.0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0	0	0.0	1.5
Private green areas		3	60.0	2	2	2	2	2	2	2	1	2	2	38.0	0	0	0	0	0	0	0	0	0	0	0.0	3	3	1	0	35.0	33.3
Residential buildings		1	20.0	0	0	0	0	0	0	1	0	1	1	6.0	1	0	0	0	0	0	0	0	0	0	2.0	3	2	2	2	45.0	18.3

Figure S1. The reference ES matrix built on local scale land use types, which were matched with: 1. Burkhard's study reported values for provisioning, regulating and cultural ES delivering capacity (Burkhard et al. 2014); 2. Literature references on support ES delivering capacity (see Table B1).

ES CLASSIFICATION			SUPPORT	REGULATING										PROVISIONING										CULTURAL				TOTAL				
TEEB, 2011			x		x	x	x		x	x	x	x		x			x	x		x					x	x		x				
MEA, 2005					x		x	x	x		x	x	x	x		x			x			x				x	x		x			
CICES (Burkhard et al., 2014)					x	x	x	x	x	x	x	x	x		x			x	x		x					x	x	x	x			
POTENTIAL ES MATRIX BURKHARD ET AL. 2014 VALUES <u>CORRECTED ON ACTUAL</u> <u>PROVISIONING SERVICES</u>			Habitat & biodiversity		Global climate regulation (C seq & stock)	Local climate regulation	Air quality regulation	Water flow regulation	Water purification	Nutrients regulation	Erosion regulation	Natural hazard regulation	Pollination	Pest & disease control	REGULATING	Food (crops, fruits, vegetables)	Biomass for energy	Fodder	Food (livestock)	Fibre	Timber	Food (fish)	Wild foods & resources	Biochemicals & medicine	Freshwater	PROVISIONING	Recreation & eco-tourism	Landscape aesthetics & inspiration	Knowledge systems	Religious & spiritual experience	CULTURAL	TOTAL
			SUPPORT																													
LAND USE CATEGORIES																																
FOREST & SEMI-NATURAL				71.4											73.4										19.4					72.1	59.1	
Grass strip			2	40.0	4	2	0	1	2	3	3	1	1	2	32.0	0	0	2	0	0	0	0	5	1	0	16.0	3	3	4	1	47.5	33.9
Grass strip with sparse trees and shrubs			3	60.0	5	5	5	3	5	5	5	4	4	4	90.0	0	0	1	0	1	1	0	1	1	0	10.0	5	5	5	3	90.0	62.5
Small woody area			4	80.0	5	5	5	3	5	5	5	4	4	4	90.0	0	1	1	0	1	5	0	3	2	0	26.0	2	3	4	1	50.0	61.5
Uncultivated area			3	60.0	4	2	0	1	2	3	3	1	1	2	32.0	0	1	2	0	0	0	0	5	1	0	18.0	3	3	4	1	47.5	39.4
Uncultivated area with spontaneous trees&shrubs ri-colonization			4	80.0	5	5	5	3	5	5	5	4	4	4	90.0	0	2	1	0	1	1	0	1	1	0	14.0	5	5	5	3	90.0	68.5
Wood			5	100.0	5	5	5	3	5	5	5	4	4	4	90.0	0	1	1	0	1	5	0	3	2	0	26.0	5	5	5	3	90.0	76.5
Woody belt			4	80.0	5	5	5	3	5	5	5	4	4	4	90.0	0	1	1	0	1	5	0	3	2	0	26.0	5	5	5	3	90.0	71.5
AGRICULTURAL				50.0											32.5										20.5					31.9	33.7	
Apple			3	60.0	2	2	2	2	1	2	2	2	5	3	46.0	4	0	0	0	0	2	0	0	0	0	12.0	3	2	2	0	35.0	38.3
Arboriculture			3	60.0	5	5	5	3	5	5	5	4	4	4	90.0	0	1	1	0	1	5	0	0	0	0	16.0	5	5	5	3	90.0	64.0
Crop field			1	20.0	1	3	1	1	0	1	0	1	1	2	22.0	5	0	1	0	1	0	0	0	1	0	16.0	1	1	2	0	20.0	19.5
Crop field in rotation			2	40.0	1	3	1	1	0	1	0	1	1	2	22.0	5	1	2	0	2	0	0	1	1	0	24.0	1	1	2	0	20.0	26.5
Hazelnut			3	60.0	2	2	2	2	1	2	2	2	5	3	46.0	4	0	0	0	0	2	0	0	0	0	12.0	3	2	2	0	35.0	38.3
Horticultural			2	40.0	1	2	1	2	0	1	0	1	1	2	22.0	5	5	5	0	5	0	0	1	2	0	46.0	1	1	2	0	20.0	32.0
Leguminous			2	40.0	1	3	1	1	0	1	0	1	1	2	22.0	5	1	2	0	2	0	0	1	1	0	24.0	1	1	2	0	20.0	26.5
Permanent grassland			4	80.0	4	2	0	1	2	3	3	1	1	2	32.0	0	1	5	5	0	0	0	2	0	0	26.0	3	3	4	1	47.5	46.4
Rice field			1	20.0	0	2	1	1	0	1	0	0	1	1	14.0	5	0	1	0	1	0	0	0	0	0	14.0	1	1	2	0	20.0	17.0
Rice field in rotation			3	60.0	0	2	1	1	0	1	0	0	1	1	14.0	5	1	2	0	2	0	0	0	1	0	22.0	1	1	2	0	20.0	29.0
Rice field organic			3	60.0	0	2	1	1	0	1	0	0	1	1	14.0	5	1	2	0	2	0	0	0	1	0	22.0	1	1	2	0	20.0	29.0
Walnut			3	60.0	2	2	2	2	1	2	2	2	5	3	46.0	4	0	0	0	0	2	0	0	0	0	12.0	3	2	2	0	35.0	38.3
HYDRIC				90.0											35.0										16.0					72.5	53.4	
Water bodies			5	100.0	1	2	0	5	2	3	0	3	0	3	38.0	0	0	0	0	0	0	3	0	0	4	14.0	5	4	4	2	75.0	56.8
Riverbed			4	80.0	0	1	0	3	3	3	0	3	0	3	32.0	0	2	0	0	0	0	3	0	0	4	18.0	4	4	4	2	70.0	50.0
ARTIFICIAL				20.0											12.4										0.8					25.0	14.6	
Agricultural buildings			1	20.0	0	0	0	0	0	0	1	0	1	1	6.0	1	0	0	0	0	0	0	0	0	0	2.0	3	2	2	2	45.0	18.3
Industrial			0	0.0	0	0	0	0	0	0	2	0	0	1	6.0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0	0	0.0	1.5
Other services			0	0.0	0	0	0	0	0	0	0	2	0	1	6.0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0	0	0.0	1.5
Private green areas			3	60.0	2	2	2	2	2	2	2	1	2	2	38.0	0	0	0	0	0	0	0	0	0	0	0.0	3	3	1	0	35.0	33.3
Residential buildings			1	20.0	0	0	0	0	0	0	1	0	1	1	6.0	1	0	0	0	0	0	0	0	0	0	2.0	3	2	2	2	45.0	18.3

Figure S2. The local scale reference ES matrix corrected on actual provisioning ES for the local agricultural landscapes under study.

SITE: D	SUPPORT		REGULATING										PROVISIONING										CULTURAL			TOTAL						
	Habitat & biodiversity	SUPPORT	REGULATING										PROVISIONING										CULTURAL									
			Global climate regulation (C seq & stock)	Local climate regulation	Air quality regulation	Water flow regulation	Water purification	Nutrients regulation	Erosion regulation	Natural hazard regulation	Pollination	Pest & disease control	REGULATING	Food (crops, fruits, vegetables)	Biomass for energy	Fodder	Food (livestock)	Fibre	Timber	Food (fish)	Wild foods & resources	Biochemicals & medicine	Freshwater	PROVISIONING	Recreation & eco-tourism		Landscape aesthetics & inspiration	Knowledge systems	Religious & spiritual experience	CULTURAL		
LAND USE CATEGORIES																																
NATURAL SUBSYSTEM			42.4											39.2											20.0				37.7	34.8		
Grass strip			1	20.0	2	1	0	1	1	1	2	1	0	1	16.0	0	0	2	0	0	0	0	5	1	0	16.0	1	2	2	0	23.8	18.9
Small woody area			2	46.1	3	3	3	2	3	3	3	2	2	2	51.8	0	1	1	0	1	5	0	3	2	0	26.0	1	2	2	1	28.8	38.2
Uncultivated area			2	30.0	2	1	0	1	1	1	2	1	0	1	16.0	0	1	2	0	0	0	0	5	1	0	18.0	1	2	2	0	23.8	21.9
Uncultivated area with spontaneous trees&shrubs ri-colonization			2	34.3	2	2	2	1	2	2	2	2	2	2	38.6	0	2	1	0	1	1	0	1	1	0	14.0	2	2	2	1	38.6	31.4
Wood			4	81.8	4	4	4	2	4	4	4	3	3	3	73.6	0	1	1	0	1	5	0	3	2	0	26.0	4	4	4	2	73.6	63.8
AGRICULTURAL SUBSYSTEM			37.9											24.1											20.3				23.0	26.3		
Crop field			1	12.3	1	2	1	1	0	1	0	1	1	1	13.5	5	0	1	0	1	0	0	0	1	0	16.0	1	1	1	0	12.3	13.5
Crop field in rotation			2	33.8	1	3	1	1	0	1	0	1	1	2	18.6	5	1	2	0	2	0	0	1	1	0	24.0	1	1	2	0	16.9	23.3
Horticultural			2	36.9	1	2	1	2	0	1	0	1	1	2	20.3	5	5	5	0	5	0	0	1	2	0	46.0	1	1	2	0	18.5	30.4
Apple			2	42.9	1	1	1	1	1	1	1	1	4	2	32.9	4	0	0	0	0	2	0	0	0	0	12.0	2	1	1	0	25.0	28.2
Hazelnut			2	42.9	1	1	1	1	1	1	1	1	4	2	32.9	4	0	0	0	0	2	0	0	0	0	12.0	2	1	1	0	25.0	28.2
Walnut			2	42.9	1	1	1	1	1	1	1	1	4	2	32.9	4	0	0	0	0	2	0	0	0	0	12.0	2	1	1	0	25.0	28.2
Permanent grassland			4	74.3	3	1	0	1	1	2	3	1	0	1	29.7	0	1	5	5	0	0	0	2	0	0	26.0	2	3	3	0	44.1	43.5
Rice field			1	16.9	0	2	1	1	0	1	0	0	1	1	11.8	5	0	1	0	1	0	0	0	0	0	14.0	1	1	2	0	16.9	14.9
HYDRIC SUBSYSTEM			#RIFI											####											#RIFI				###	#RIFI		
ANTHROPIC SUBSYSTEM			10.6											4.7											1.0				16.2	8.1		
Agricultural buildings			1	12.8	0	0	0	0	0	0	1	0	1	1	3.8	1	0	0	0	0	0	0	0	0	0	2.0	2	1	1	1	28.8	11.9
Industrial			0	0.0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0	0	0.0	0.0
Private green areas			1	18.5	1	1	1	1	1	1	1	0	1	1	11.7	0	0	0	0	0	0	0	0	0	0	0.0	1	1	0	0	10.8	10.2
Residential buildings			1	11.2	0	0	0	0	0	0	0	1	0	1	3.4	1	0	0	0	0	0	0	0	0	0	2.0	2	1	1	1	25.2	10.4

Figure S3. The local scale reference ES matrix for temperate alluvial agricultural landscapes applied to D site local scale: (a) current state; (b) agroforestry-based design scenario.

SITE: G	SUPPORT		REGULATING										PROVISIONING										CULTURAL			TOTAL				
	Habitat & biodiversity	SUPPORT	REGULATING										PROVISIONING										CULTURAL							
			Global climate regulation (C seq & stock)	Local climate regulation	Air quality regulation	Water flow regulation	Water purification	Nutrients regulation	Erosion regulation	Natural hazard regulation	Pollination	Pest & disease control	REGULATING	Food (crops, fruits, vegetables)	Biomass for energy	Fodder	Food (livestock)	Fibre	Timber	Food (fish)	Wild foods & resources	Biochemicals & medicine	Freshwater	PROVISIONING	Recreation & eco-tourism	Landscape aesthetics & inspiration	Knowledge systems	Religious & spiritual experience	CULTURAL	
LAND USE CATEGORIES																														
NATURAL SUBSYSTEM		40.6										40.9										19.4					39.8	35.2		
Grass strip		1	20.0	2	1	0	1	1	1	2	1	0	1	16.0	0	0	2	0	0	0	5	1	0	16.0	1	2	2	0	23.8	18.9
Grass strip with sparse trees and shrubs		1	25.7	2	2	2	1	2	2	2	2	2	38.6	0	0	1	0	1	1	0	1	1	0	10.0	2	2	2	1	38.6	28.2
Small woody area		2	46.1	3	3	3	2	3	3	3	2	2	51.8	0	1	1	0	1	5	0	3	2	0	26.0	1	2	2	1	28.8	38.2
Uncultivated area		2	30.0	2	1	0	1	1	1	2	1	0	1	16.0	0	1	2	0	0	0	5	1	0	18.0	1	2	2	0	23.8	21.9
Uncultivated area with spontaneous trees&shrubs ri-colonization		2	34.3	2	2	2	1	2	2	2	2	2	38.6	0	2	1	0	1	1	0	1	1	0	14.0	2	2	2	1	38.6	31.4
Wood		4	81.8	4	4	4	2	4	4	4	3	3	73.6	0	1	1	0	1	5	0	3	2	0	26.0	4	4	4	2	73.6	63.8
Woody belt		2	46.1	3	3	3	2	3	3	3	2	2	51.8	0	1	1	0	1	5	0	3	2	0	26.0	3	3	3	2	51.8	43.9
AGRICULTURAL SUBSYSTEM		39.7										19.9										23.3					22.6	26.4		
Arboriculture		1	23.3	2	2	2	1	2	2	2	2	2	34.9	0	1	1	0	1	5	0	0	0	0	16.0	2	2	2	1	34.9	27.3
Crop field		1	12.3	1	2	1	1	0	1	0	1	1	13.5	5	0	1	0	1	0	0	0	1	0	16.0	1	1	1	0	12.3	13.5
Crop field in rotation		2	33.8	1	3	1	1	0	1	0	1	1	18.6	5	1	2	0	2	0	0	1	1	0	24.0	1	1	2	0	16.9	23.3
Horticultural		2	36.9	1	2	1	2	0	1	0	1	1	20.3	5	5	5	0	5	0	0	1	2	0	46.0	1	1	2	0	18.5	30.4
Leguminous		2	40.0	1	3	1	1	0	1	0	1	1	22.0	5	1	2	0	2	0	0	1	1	0	24.0	1	1	2	0	20.0	26.5
Permanent grassland		4	74.3	3	1	0	1	1	2	3	1	0	1	29.7	0	1	5	5	0	0	2	0	0	26.0	2	3	3	0	44.1	43.5
Rice field		1	16.9	0	2	1	1	0	1	0	0	1	11.8	5	0	1	0	1	0	0	0	0	0	14.0	1	1	2	0	16.9	14.9
Rice field in rotation		3	60.0	0	2	1	1	0	1	0	0	1	14.0	5	1	2	0	2	0	0	0	1	0	22.0	1	1	2	0	20.0	29.0
Rice field organic		3	60.0	0	2	1	1	0	1	0	0	1	14.0	5	1	2	0	2	0	0	0	1	0	22.0	1	1	2	0	20.0	29.0
HYDRIC SUBSYSTEM		77.9										30.4										16.0					63.4	46.9		
Water bodies		4	75.9	1	2	0	4	2	2	0	2	0	28.8	0	0	0	0	0	0	3	0	0	4	14.0	4	3	3	2	56.9	43.9
Riverbed		4	80.0	0	1	0	3	3	3	0	3	0	32.0	0	2	0	0	0	0	3	0	0	4	18.0	4	4	4	2	70.0	50.0
ANTHROPIC SUBSYSTEM		10.6										4.7										1.0					16.2	8.1		
Agricultural buildings		1	12.8	0	0	0	0	0	0	1	0	1	3.8	1	0	0	0	0	0	0	0	0	0	2.0	2	1	1	1	28.8	11.9
Industrial		0	0.0	0	0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0	0	0.0	0.0
Private green areas		1	18.5	1	1	1	1	1	1	1	0	1	11.7	0	0	0	0	0	0	0	0	0	0	0.0	1	1	0	0	10.8	10.2
Residential buildings		1	11.2	0	0	0	0	0	0	1	0	1	3.4	1	0	0	0	0	0	0	0	0	0	2.0	2	1	1	1	25.2	10.4

Figure S4. The local scale reference ES matrix for temperate alluvial agricultural landscapes applied to G site local scale: (a) current state; (b) agroforestry-based design scenario.

