GEF-Satoyama Study:
Knowledge Co-production for Mainstreaming Biodiversity in Socio-ecological Production Landscapes and Seascapes (SEPLS)

23 August 2018

IGES-NRE

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Institute for Global
Environmental Strategies

Study objectives

- Co-produce knowledge to help mainstream biodiversity and enhance human well-being in SEPLS

Describe the local communities' perception of the **values** of SEPLS

Document **traditional & local knowledge** on biodiversity in SEPLS

Describe basic elements of the **governance** of respective SEPLS –e.g. policies and customary laws

- Main audience: policy makers and practitioners on SEPLS

Full report outline

1. Executive Summary
2. Introduction
   - ► Background; general description of GEF-Satoyama Project; research objectives; and report outline
3. Methodologies
   - ► Analytical framework: Values; traditional & local knowledge; governance; and their interplay
   - ► Methods: Online survey; field survey; Indicators of Resilience Assessment; and synthesis
4. Results and discussions
   - ► Ten project case studies: Values; traditional & local knowledge; Governance; and their interplay
   - ► Synthesis: Values, traditional & local knowledge, governance on SEPLS and their interplays
5. Conclusions
6. Reference list

Overall process for the report production

Aug	Consolidation WS
	- Discuss with grantees and experts
	- Identify messages for policy makers and practitioners
Sep	Elaborate draft full report
	Prepare a summary report
Oct	Report the progress to IPSI-7
	Review by grantees and experts
	Finalise, layout and print
Nov	Distribute the summary report and present PPT at CBD COP-14

Today's presentation outline

1. Setting the scene
   - Analytical frame and methods
   - SEPLS profile

2. Values of SEPLS

3. Traditional & local knowledge on SEPLS

4. Governance of SEPLS

5. Values – knowledge – governance interplay

6. Points for discussion

1. Setting the scene
   - Analytical frame and methods
   - SEPLS profile
2. Values of SEPLS
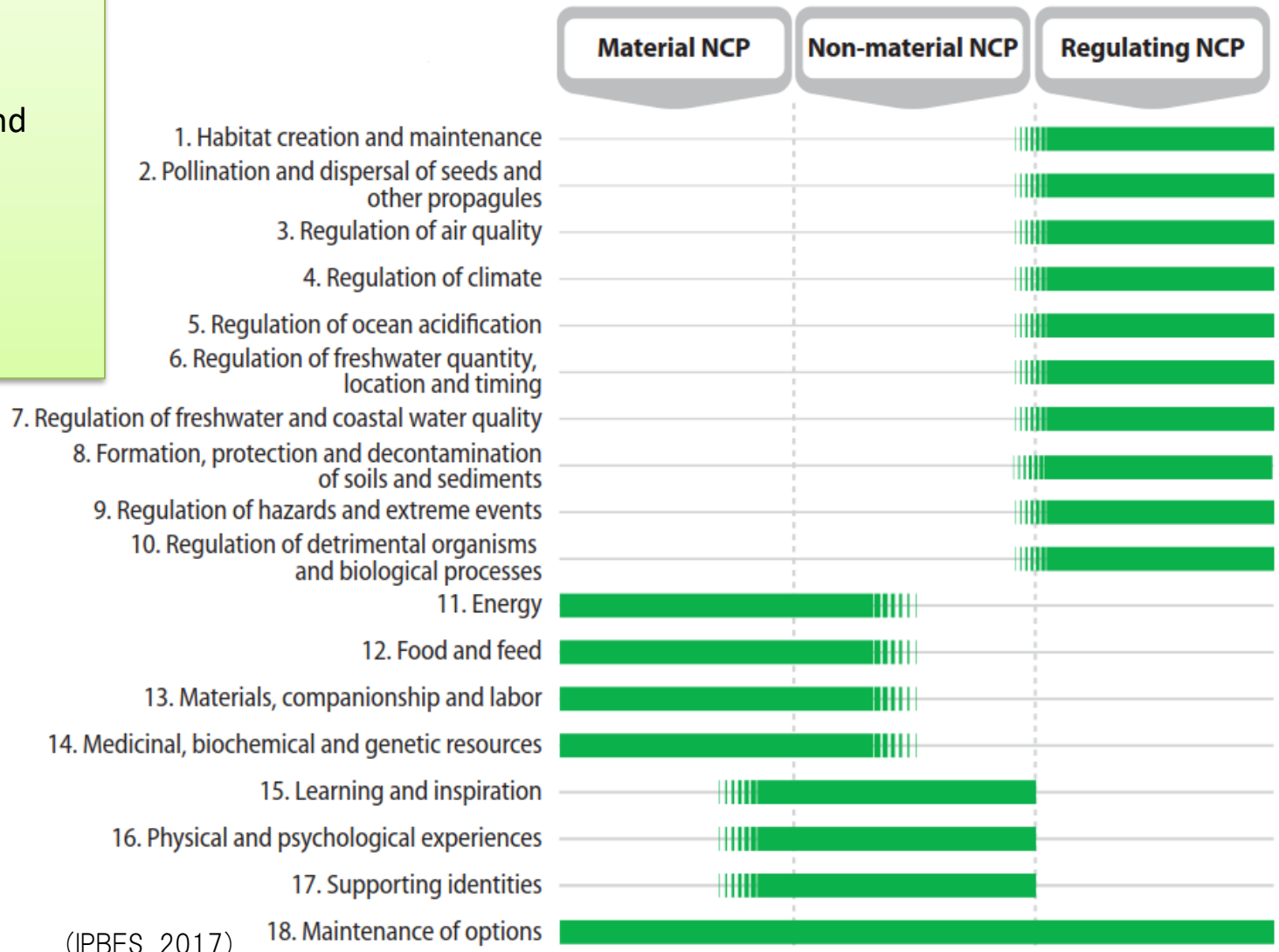3. Traditional & local knowledge on SEPLS
4. Governance of SEPLS
5. Values – knowledge – governance interplay
6. Points for discussion

Analytical frame -values

Unit of analysis
- Species
- Natural/protected forest
- Managed/resource forest
- Grassland/rangeland
- Freshwater
- Coastal ecotone
- Sea
- Farmland
- Settlement/urban

	Material NCP	Non-material NCP	Regulating NCP
1. Habitat creation and maintenance			●●●●
2. Pollination and dispersal of seeds and other propagules			●●●●
3. Regulation of air quality			●●●●
4. Regulation of climate			●●●●
5. Regulation of ocean acidification			●●●●
6. Regulation of freshwater quantity, location and timing			●●●●
7. Regulation of freshwater and coastal water quality			●●●●
8. Formation, protection and decontamination of soils and sediments			●●●●
9. Regulation of hazards and extreme events			●●●●
10. Regulation of detrimental organisms and biological processes			●●●●
11. Energy	●●●●		
12. Food and feed	●●●●		
13. Materials, companionship and labor	●●●●		
14. Medicinal, biochemical and genetic resources	●●●●		
15. Learning and inspiration		●●●●	
16. Physical and psychological experiences		●●●●	
17. Supporting identities		●●●●	
18. Maintenance of options	●●●●●●●●●●●●		

(IPBES, 2017)

Analytical frame –traditional & local knowledge

Definition: "Traditional ecological knowledge" (Berkes, 2010)

"*cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living being (including humans) with one another and with environment*"

Key questions:

- How traditional and local knowledge contribute to biodiversity and human well-being in SEPLS?

- What are the major drivers undermining these contributions?

- What policy responses, measures and processes exist?

World view

Social institutions

Land and resource management system

Local knowledge of land, animals, plants, soils and landscape

Analytical frame –governance

Stakeholder structure:

- Owner
- Land and resource managers and users
- Other major stakeholders

Drivers of biodiversity changes:

- Direct drivers: land use and land cover change; urbanization and infrastructure development; over-exploitation; pollution; invasive alien species; climate change
- Indirect drivers: demographic; economic; socio-cultural; science & tech; and policies, governance system and institutions

Policies and measures:

- Regulations (e.g. command and control)
- Market and incentives (e.g. PES, tax exemptions, subsidies)
- Voluntary agreements
- Information and education

Methods

Online survey

- Major questions –status and trend of nature, values, traditional & local knowledge, threats to biodiversity, governance
- Perfect response from 10 grantees by 30 April 2018 –Thank you!!

Field survey

- Indo-Burma: IMPECT project, Thailand (2017/5/18-29)
- Tropical Andes: UIS project, Columbian Andes (2017/6/5-14)
- Madagascar and Indian Ocean Islands: EPCO project, Mauritius (2017/6/19-28)

Data extraction from project documents

- Project proposals
- Annual reports
- Highlight reports
- Resilience Indicator assessment reports

Grantees' review
–Thanks for dedicated support!!

SEPLS profile

	NAF	MAF	GRL	FAL	FRW	COE	SEA	URB
Area total (log$_e$)*								
# Projects	7	5	1	4	3	3	2	4
Project proponent	**NAF**	**MAF**	**GRL**	**FAL**	**FRW**	**COE**	**SEA**	**URB**
01.IMPECT	666	1,153		285	416			12
02.UIS	2,200	1,000	1,000	2,600	16			140
03.EPCO						7	30	18
04.AMPA	143,928			105,876				
05.FFI	117,598				16,118			
06.WCS	372,470							
07.TERI	10,823	2,332		2,074				128
08.Dahari		1,002						
09.FIDES	7,348	150				3,622		
10.GIF						1	3,900,000	

(hectares)

NAF: Natural & protected forest
MAF: Managed & resource forest
GRL: Grassland & rangeland
FAL: Farmland
FRW: Freshwater
COE: Coastal ecotone (including mangroves)
SEA: Inshore sea
URB: Urban and residential area

1. Setting the scene
   - Analytical frame and methods
   - SEPLS profile
2. **Values of SEPLS**
3. Traditional & local knowledge on SEPLS
4. Governance of SEPLS
5. Values – knowledge – governance interplay?
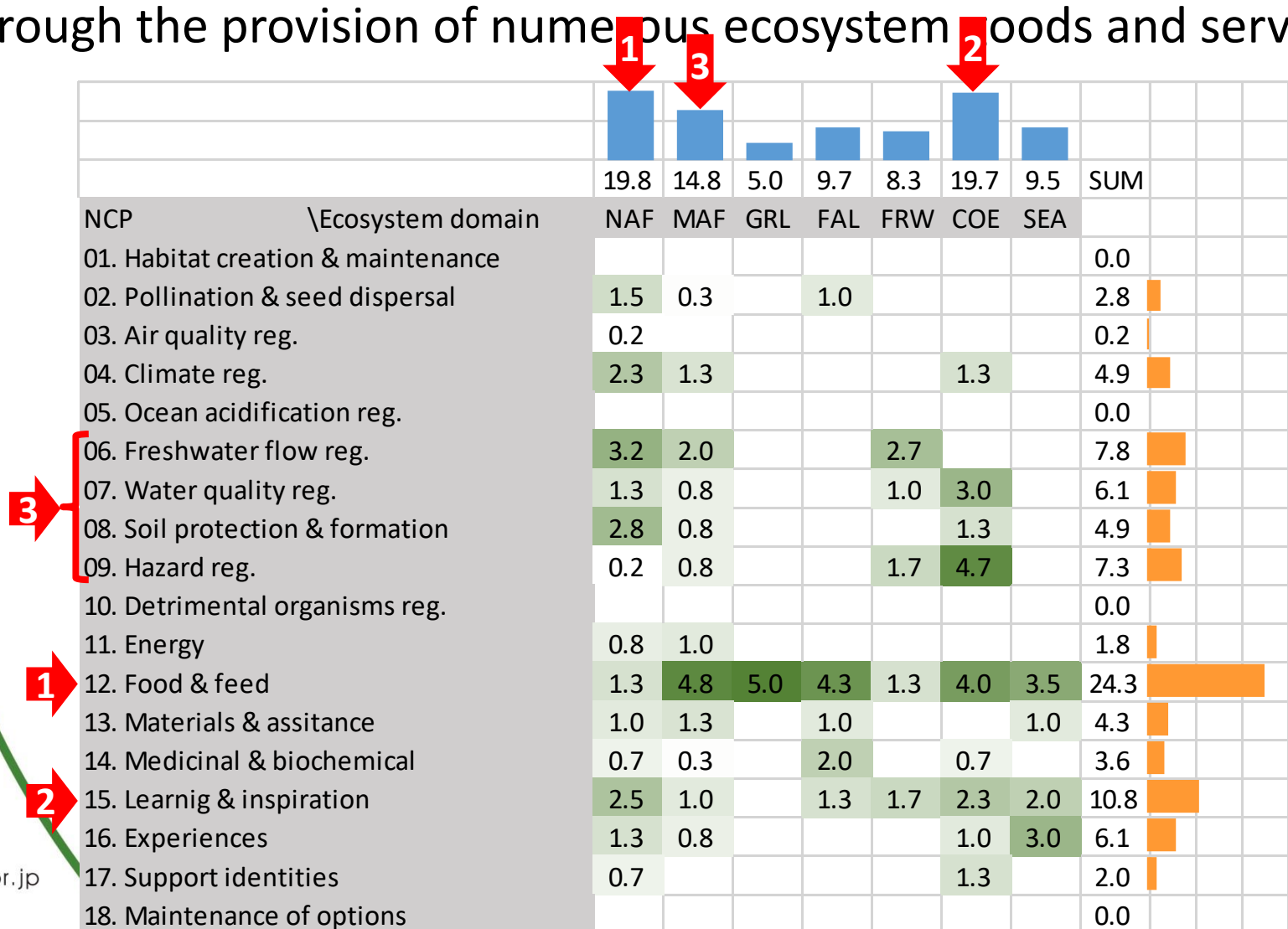6. Points for discussion

Values

1. SEPLS provide vital habitats for several threatened species

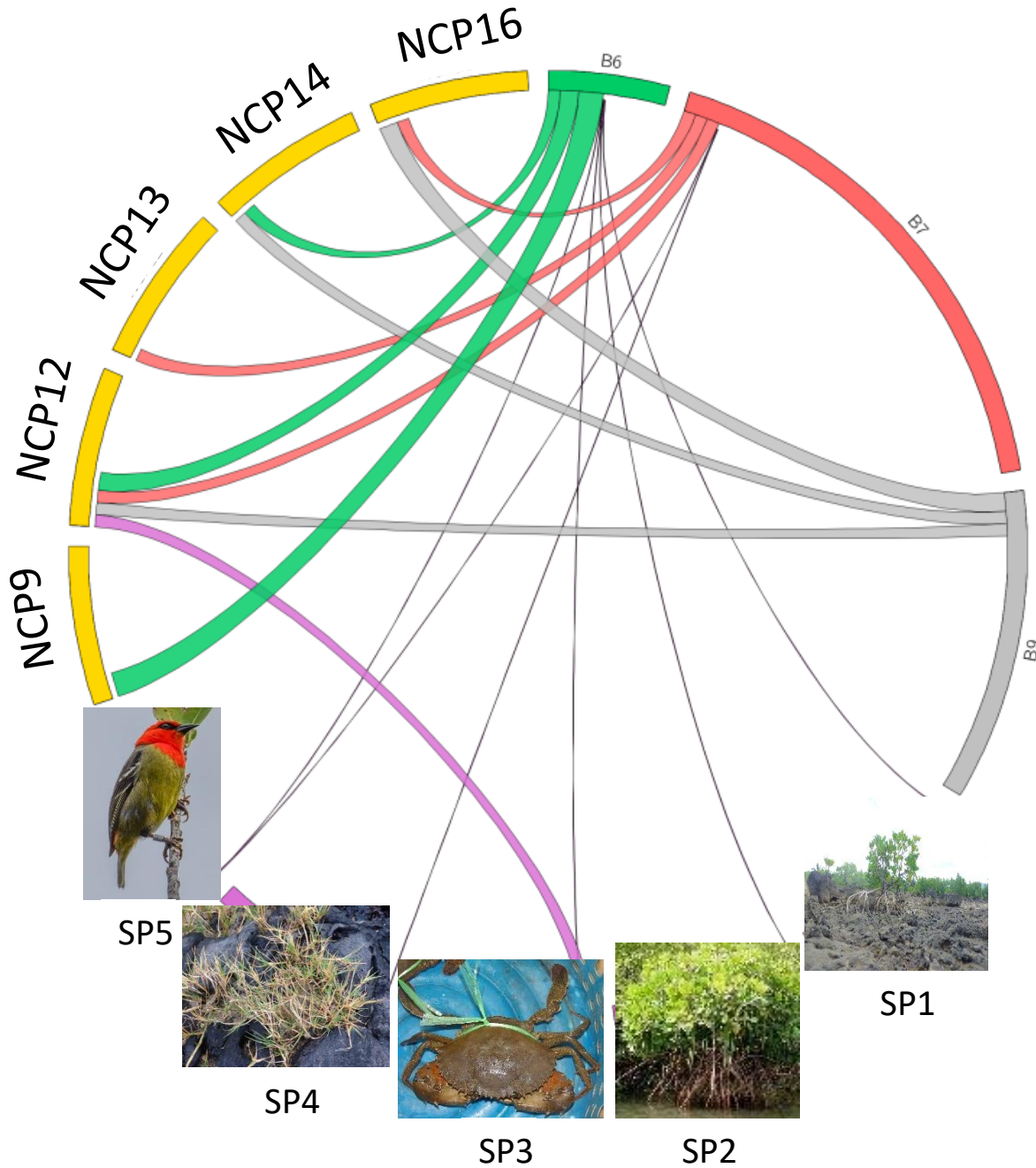| IUCN Red List	NAF	MAF	GRL	FAL	FRW	COE	SEA	Total
CR	8	1	0	1	0	0	0	9
EN	5	7	0	1	0	1	3	12
VU	7	1	0	1	0	0	2	9
Total	20	9	0	3	0	1	5	30

Values

2. SEPLS underpins human livelihood, security and development through the provision of numerous ecosystem goods and services.

NCP \Ecosystem domain	NAF	MAF	GRL	FAL	FRW	COE	SEA	SUM
	19.8	14.8	5.0	9.7	8.3	19.7	9.5	SUM
01. Habitat creation & maintenance								0.0
02. Pollination & seed dispersal	1.5	0.3		1.0				2.8
03. Air quality reg.	0.2							0.2
04. Climate reg.	2.3	1.3				1.3		4.9
05. Ocean acidification reg.								0.0
06. Freshwater flow reg.	3.2	2.0			2.7			7.8
07. Water quality reg.	1.3	0.8			1.0	3.0		6.1
08. Soil protection & formation	2.8	0.8				1.3		4.9
09. Hazard reg.	0.2	0.8			1.7	4.7		7.3
10. Detrimental organisms reg.								0.0
11. Energy	0.8	1.0						1.8
12. Food & feed	1.3	4.8	5.0	4.3	1.3	4.0	3.5	24.3
13. Materials & assitance	1.0	1.3		1.0			1.0	4.3
14. Medicinal & biochemical	0.7	0.3		2.0		0.7		3.6
15. Learnig & inspiration	2.5	1.0		1.3	1.7	2.3	2.0	10.8
16. Experiences	1.3	0.8				1.0	3.0	6.1
17. Support identities	0.7					1.3		2.0
18. Maintenance of options								0.0

Example 1: EPCO, Mauritius

Ecosystem type:
Mangrove
Inshore sea (barachois)
Settlement /urban

Species:
SP1: Mangrove (*Bruguiera gymnorrhiza*)
SP2: Mangrove (*Rhizophora mucronata*)
SP3: Crabs (*Scylla Serrata, Thalamita crenata*)
SP4: Gazon pic fesse (*Zoysia tenuifolia*)
SP5: Mauritius Fody (*Foudia rubra*) EN
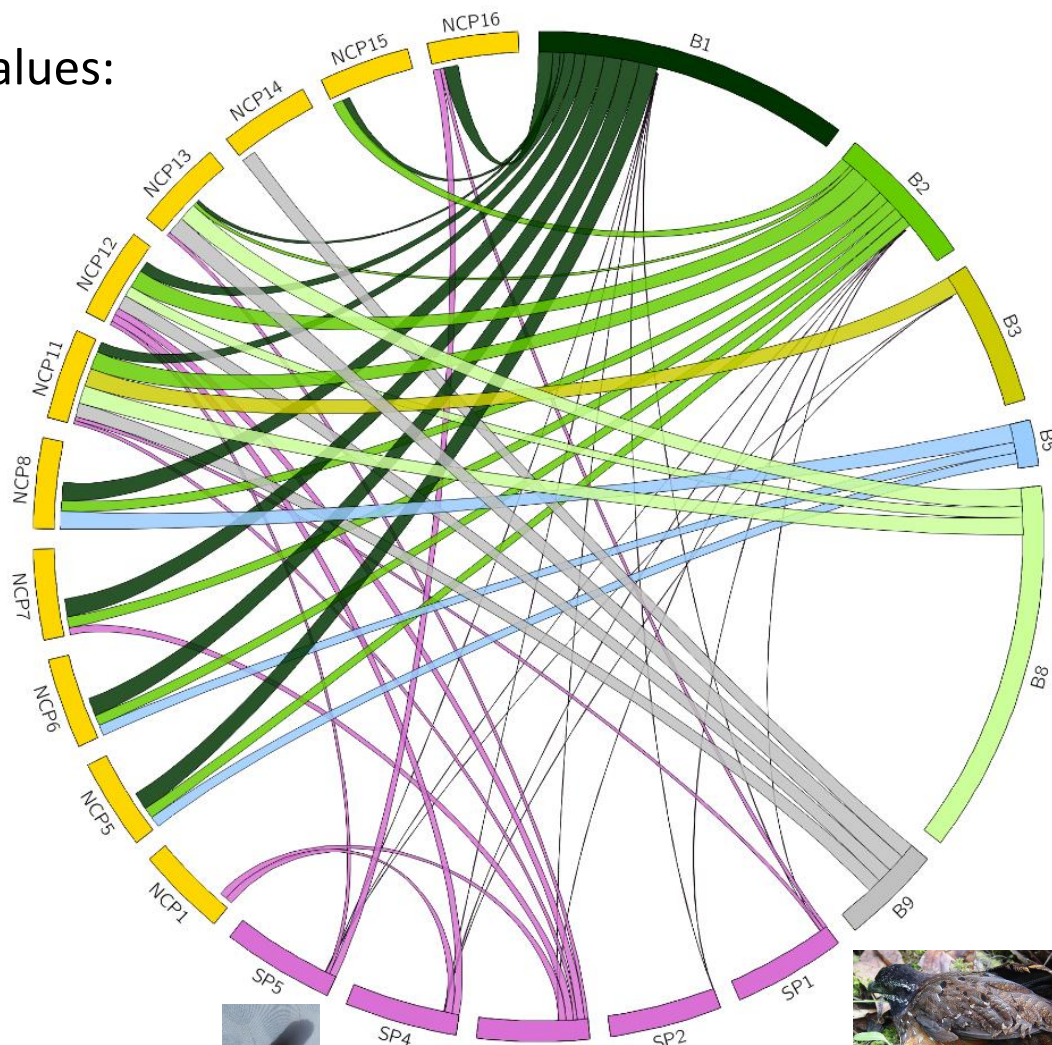
Value type:
9. Hazard regulation
12. Food and feed
13. Materials
14. Medicine
16. Recreation and tourism

Example 2: UIS, Colombia

Values:

Ecosystem type:
Natural/protected forest
Managed/resource forest
Grassland /rangeland
Freshwater wetland
Freshwater /inland waterbodies
Coastal ecotone, e.g. mangrove
Coastal and near shore sea
Farmland
Settlement /urban

Value type:
1. Pollination & seed dispersal
2. Air quality regulation
3. Climate regulation
4. Ocean acidification regulation
5. Freshwater quantity, location and timing regulation
6. Freshwater and coastal water quality regulation
7. Soil formation, protection and decontamination
8. Hazards and extreme events regulation
9. Detrimental organisms regulation
10. Energy
11. Food and feed
12. Materials and assistance
13. Medicinal, biochemical and genetic resources
14. Learning and inspiration
15. Physical and psychological experiences
16. Supporting identities

SP1: Perdiz santandereana
SP2: Gray-bellied night monkey
SP3: Nogal
SP4: Panela quemada
SP5: Molinillo

Values

3. The configurations of the connections between biodiversity and people are unique to each SEPLS, but can be broadly characterized

Ecosystem type:
- Natural/protected forest
- Managed/resource forest
- Grassland /rangeland
- Freshwater wetland
- Freshwater /inland waterbodies
- Coastal ecotone, e.g. mangrove
- Coastal and near shore sea
- Farmland
- Settlement /urban

Value type:
1. Habitat creation and maintenance
2. Pollination & seed dispersal
3. Air quality regulation
4. Climate regulation
5. Ocean acidification regulation
6. Freshwater quantity, location and timing regulation

Value type (continued):
7. Freshwater and coastal water quality regulation
8. Soil formation, protection and decontamination
9. Hazards and extreme events regulation
10. Detrimental organisms regulation
11. Energy
12. Food and feed
13. Materials and assistance
14. Medicinal, biochemical and genetic resources
15. Learning and inspiration
16. Physical and psychological experiences
17. Supporting identities
18. Future options

17

Example 1: IMPECT, Thailand

Dimension	Ecosystem domain	Description	Trend	Knowledge holder			
				Spiritual leader	Women	Elders	Local community
Local and empirical knowledge	Forest	Biodiversity learning centre; use of herbs	↘	●			●
	Freshwater	Water quality indicator animals	↘		●	●	
	Farmland	Traditional crop varieties	↘				●
Resource management system	Forest	NTFP harvest	↗				●
	Farmland	Rotational farming system	↘				●
Social institutions	Forest	Customary law for forest management	↘				●
	Freshwater	Sacred water sources as a mechanism for conservation	↘				●
World view	Farmland	Interlinked spirituality, knowledge and practice for rotational farming	→				●

Traditional & local knowledge

4. Rich traditional and local knowledge is an integral part of SEPLS, enabling local communities to access, utilize and sustainably manage various ecosystem goods and services, but declining overall

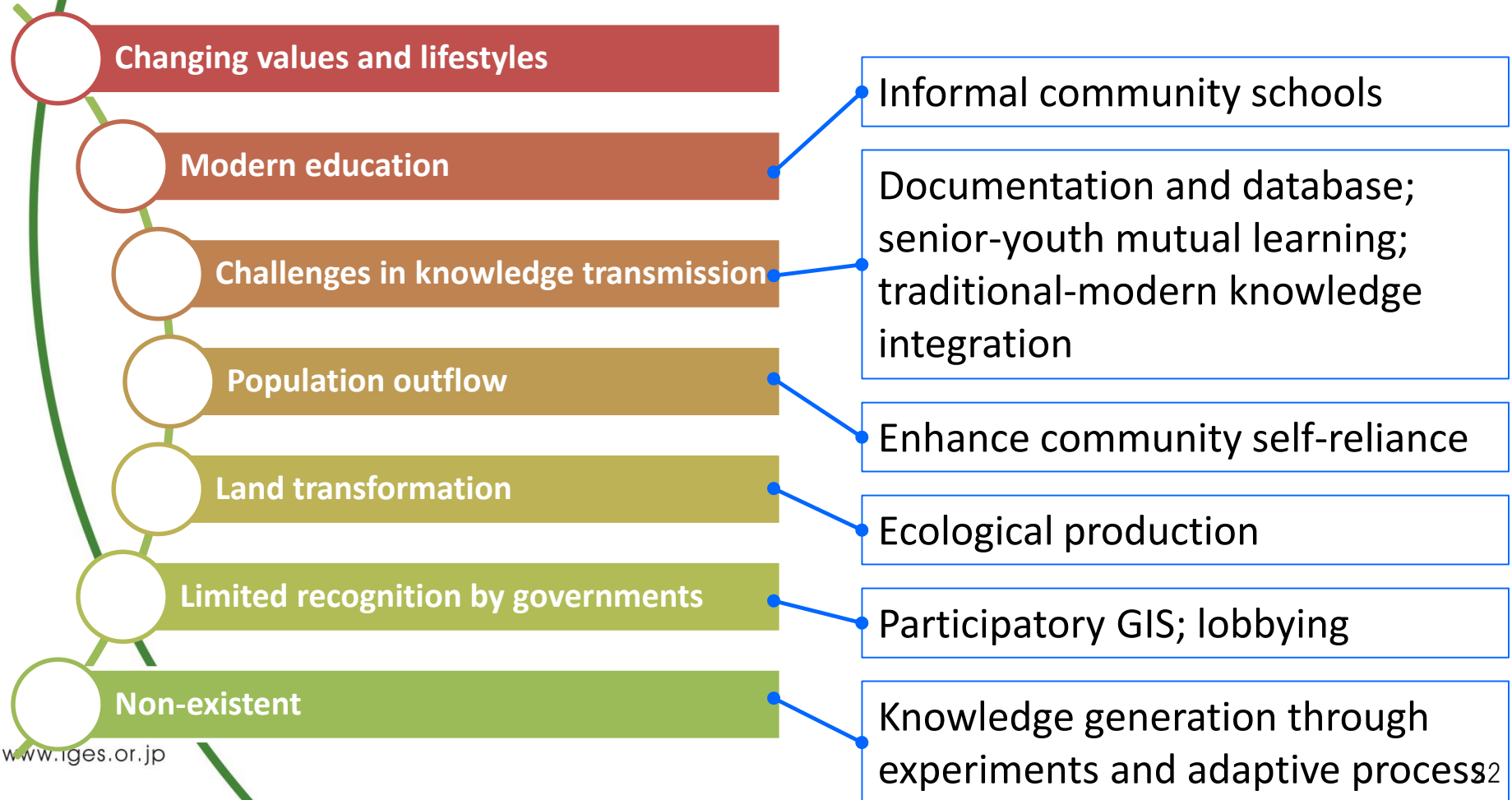|	Knowledge	Management systems	Social institutions	World view
NAF/ MAF	↗ Animals and plants ↘ High value species; medicinal plants; primate taxonomy, ecology and roles	↘ NTFPs uses; grow and use high-value trees; rotational farming, lunar calendar	↘ Customary forest management law	↗ Taboos relating to primates ↘ Folklores and lycanthropy; taboos on animal killing
FRW	→ Predict water flow changes ↘ Clean water indicator animals	↘ Restrict fishing during spawning season		→ Myths and legends related to unusual increase of stream flow and flush floods
COE	↘ High value species; fish spawning and nursing in mangroves			
SEA	↘ Fish taxonomy, habitat and movements	→ Species-specific fishing methods		
FAL	→ crop soil and climatic requirements; ↘ Local crop varieties;	↗ organic farming; → Pest management; ↘ Rotational farming		→ Karen's spirituality, knowledge and practice; ↘Rituals to beg forgiveness for animals and plants harmed

Traditional & local knowledge

5. Traditional & local knowledge is being lost due to several interconnected causes

Changing values and lifestyles

Modern education

Challenges in knowledge transmission

Population outflow

Land transformation

Limited recognition by governments

Non-existent
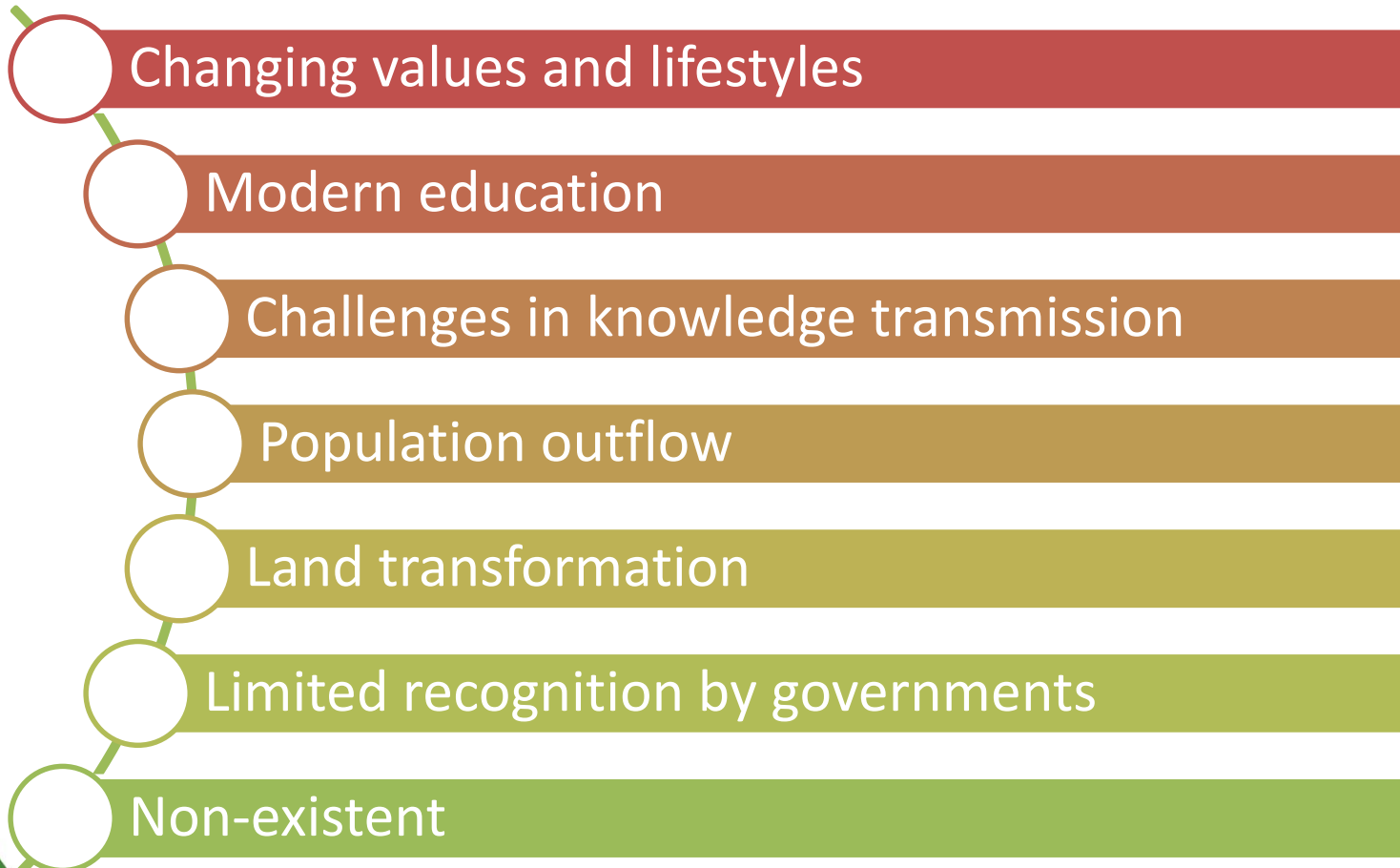
Traditional & local knowledge

6. Some measures are available to maintain and evolve traditional & local knowledge to enhance biodiversity and human well-being in SEPLS.

Changing values and lifestyles

Modern education

Challenges in knowledge transmission

Population outflow

Land transformation

Limited recognition by governments

Non-existent

Informal community schools

Documentation and database; senior-youth mutual learning; traditional-modern knowledge integration

Enhance community self-reliance

Ecological production

Participatory GIS; lobbying

Knowledge generation through experiments and adaptive process

Governance: Direct and indirect drivers

Key finding 7:

A range of **different direct drivers** (particularly resources overexploitation, LULUCC & pollution) **affect – to different extents –** the **various ecosystem** domains, including the **species** identified as key for the local communities


Direct drivers affecting the key species (green) and ecosystem domains (red), as identified by the subgrant projects in their SEPLS
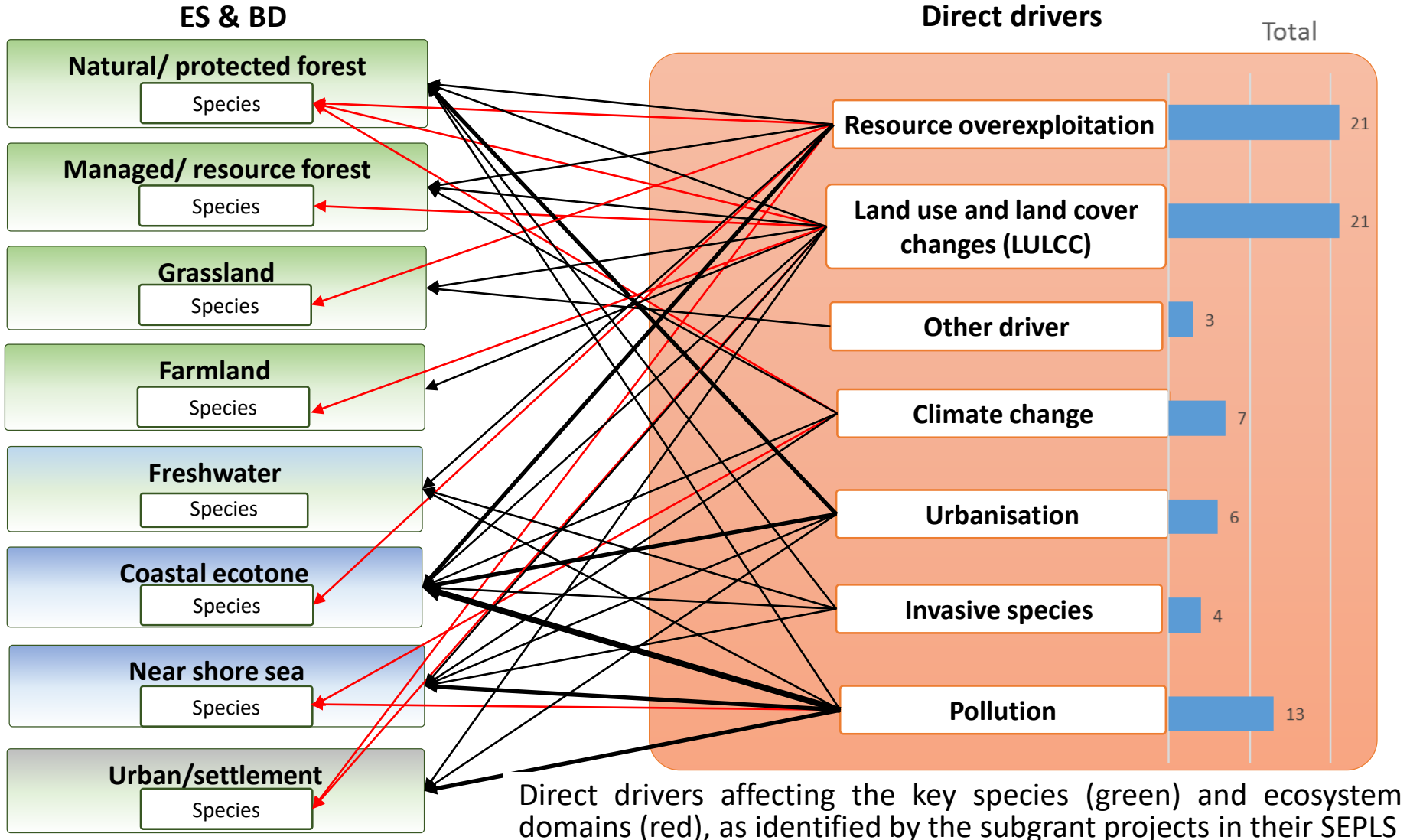
The direct drivers are **reinforced by a series of indirect drivers:**

- *Growth of human population* increasing the pressure of direct drivers such as resource overexploitation (EPCP, WCS, Dahari, TERI), land use changes (AMPA, GIF) and pollution (FIDES).
- *Economic* **drivers**: Development of coastal areas (EPCO), cash crop production (WCS), export markets (GIF), negative incentives (shrimp industry [FIDES]), extreme poverty (AMPA), unemployment (Dahari).
- **Socio-cultural drivers:** Unsustainable changes in lifestyle (WCS), lack of social cohesion (Dahari)**,** breakdown of traditional power structures, young people leaving practices/conservation (FIDES, FFI, UIS).
- *Policies & governance systems:* Ineffective governance (EPCO, UIS), lacking institutions (Dahari) and govt. support for conservation (TERI, FIDES), weak law enforcement (WCS), and low participation (FIDES)
- *Science & technology*: Road infrastructure increasing illegal wood extraction (WCS, FFI), roads & communications increasing hunting & fisheries (WCS, GIF, TERI), solar panels for electric fishing (FFI)
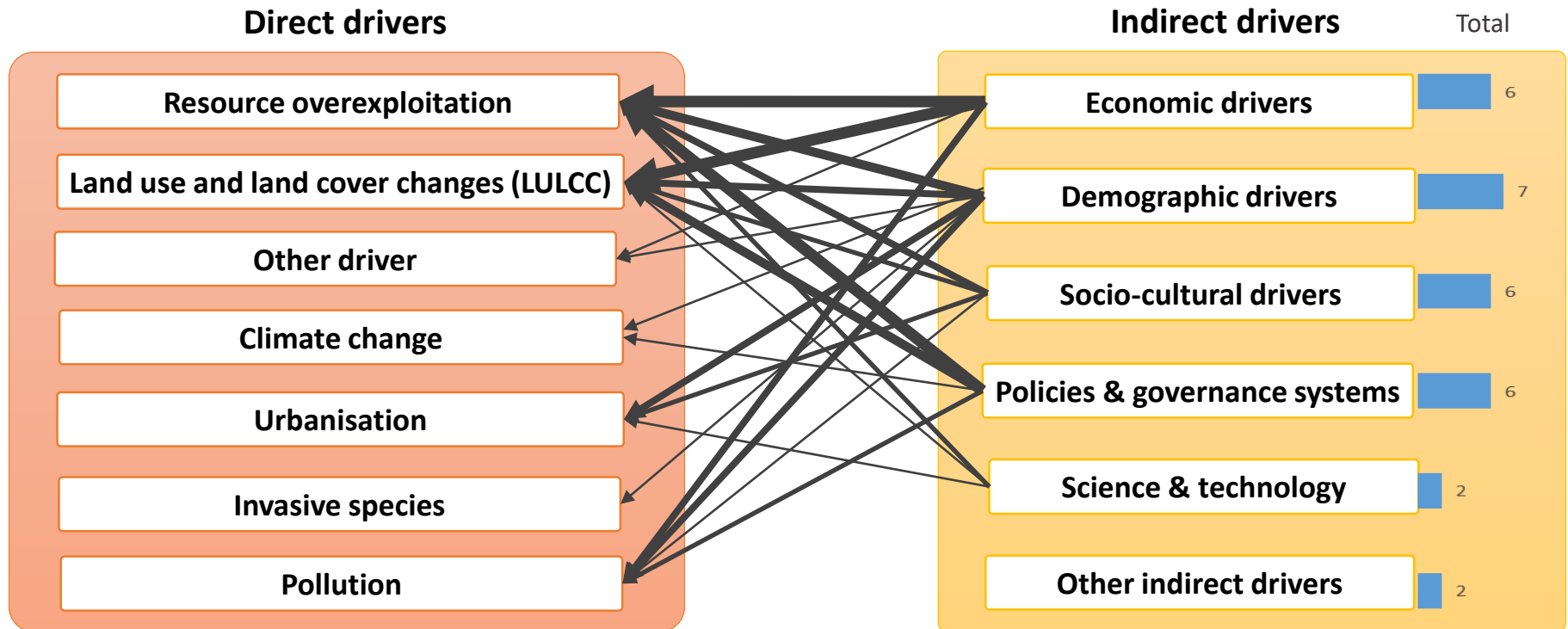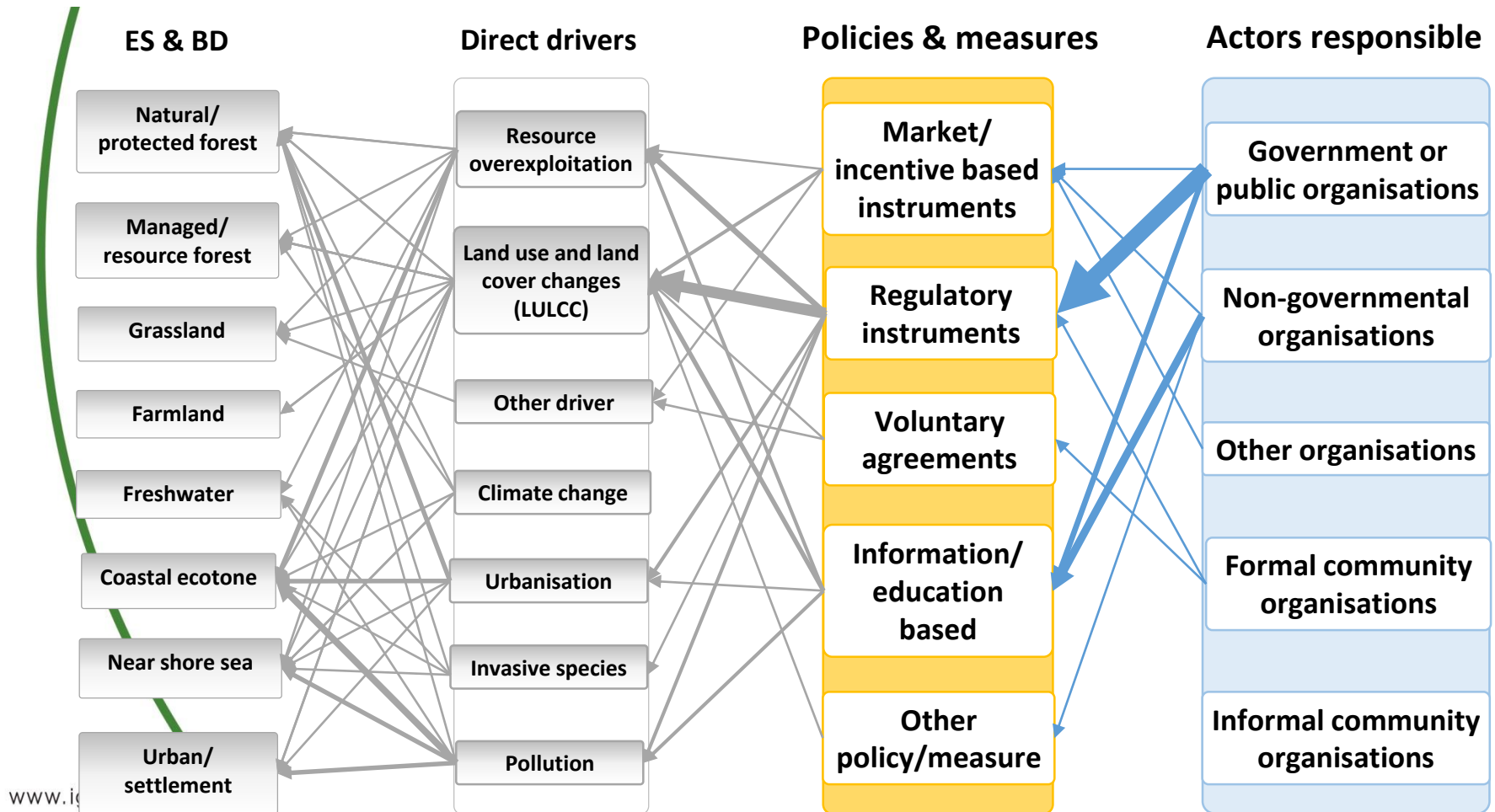
Key finding 8:

A range of **policies and measures** at different scales, address – to varying degrees – several of the drivers affecting the main ecosystem domains and key species in the SEPLS:
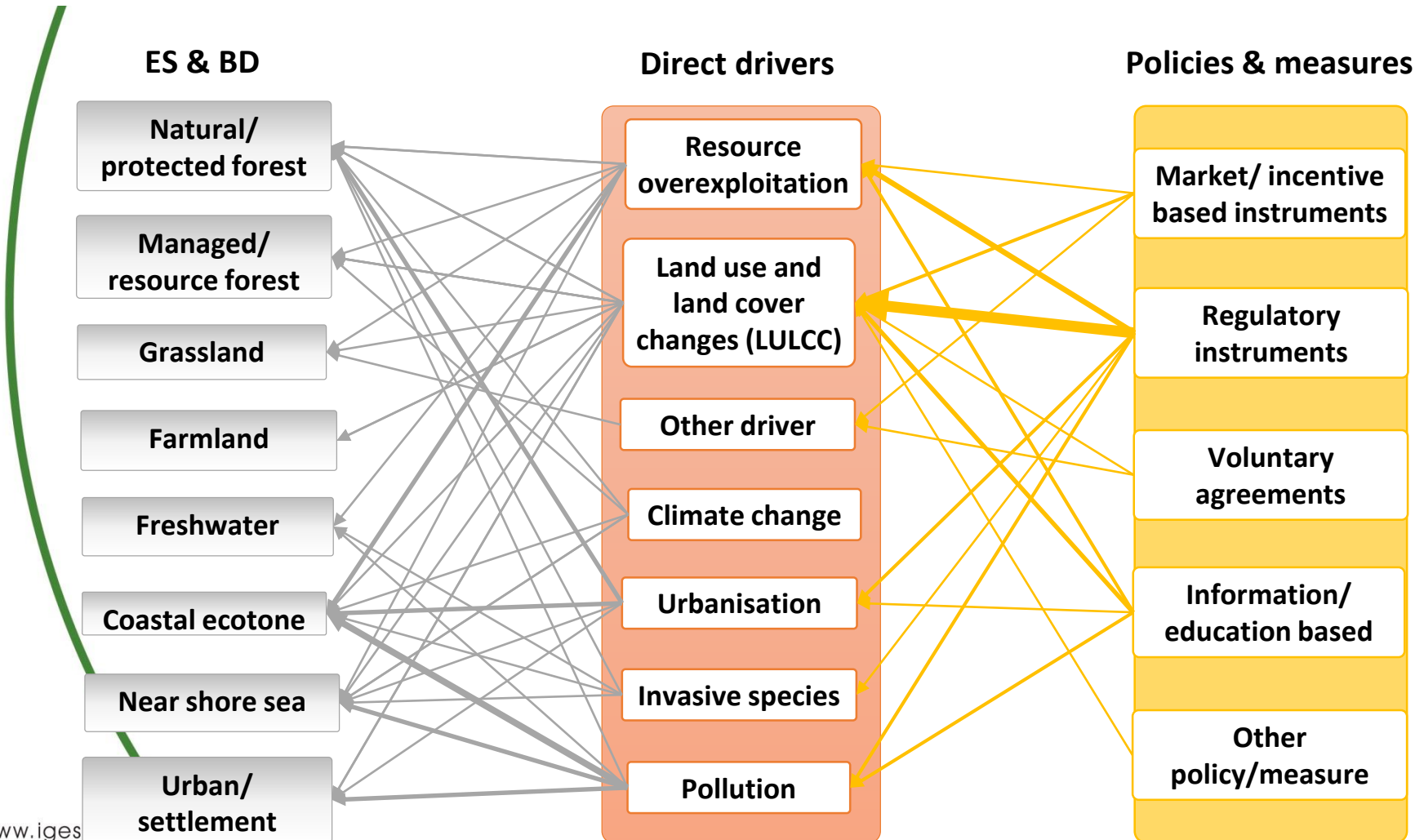
Governance: Policies & measures and actors

Key finding 9:

The **main actors** in charge of the policies and measures that address the direct drivers are **public or government entities**, but in some SEPLS *NGOs* and *community organisations* are responsible for implementing specific instruments addressing drivers in specific ecosystem domains:

ES & BD	Direct drivers	Policies & measures	Actors responsible
Natural/ protected forest	Resource overexploitation	Market/ incentive based instruments	Government or public organisations
Managed/ resource forest	Land use and land cover changes (LULCC)	Regulatory instruments	Non-governmental organisations
Grassland			
Farmland	Other driver	Voluntary agreements	Other organisations
Freshwater	Climate change		
Coastal ecotone	Urbanisation	Information/ education based	Formal community organisations
Near shore sea	Invasive species		
Urban/ settlement	Pollution	Other policy/measure	Informal community organisations

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Governance: Ownership/management right holders & stakeholders

Key finding 10:
With few exceptions, the **main ownership right holders** of the different ecosystem domains **coincide with the management right holders**,
while **additional important stakeholder groups** are also involved in/affected by the management of most ecosystem domains.
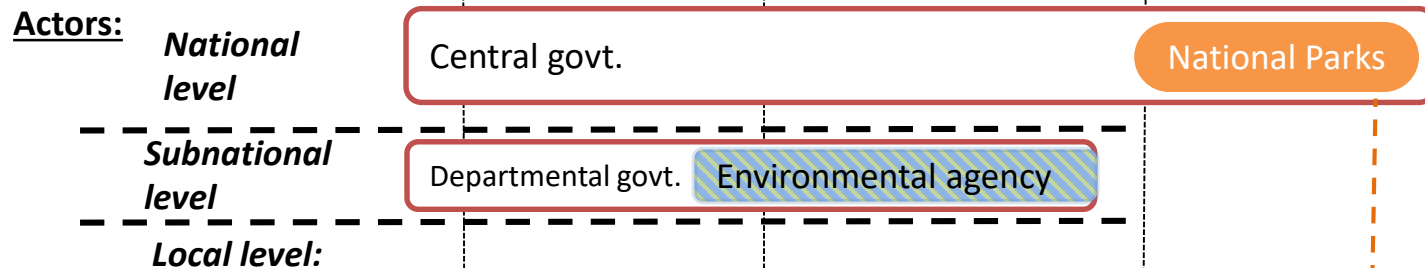
Actor category	NAF O	NAF M	NAF S	MAF O	MAF M	MAF S	GRL O	GRL M	GRL S	FAL O	FAL M	FAL S	FRW O	FRW M	FRW S	COE O	COE M	COE S	SEA O	SEA M	SEA S	URB O	URB M	URB S	SUM
Government/public	0.5	0.3	1.0	0.0	0.3	0.8	0.0	0.0	1.0	0.0	0.0	0.3	0.7	0.7	0.7	1.0	1.0	1.0	1.0	1.0	1.0	0.3	0.7	1.3	14.5
Formal comm. org.	0.2	0.2	0.8	0.0	0.0	0.5	0.0	0.0	1.0	0.0	0.0	0.3	0.0	0.0	0.7	0.0	0.0	1.0	0.0	0.0	0.5	0.0	0.0	0.7	5.8
Informal/tradit. org.	0.2	0.2	0.2	0.5	0.5	0.8	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.5	0.0	0.0	0.3	0.3	0.3	5.8
Non-governmental	0.2	0.3	0.8	0.0	0.0	0.8	0.0	0.0	1.0	0.0	0.0	0.7	0.0	0.0	0.7	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	0.7	7.1
Individuals	0.0	0.0	0.2	0.5	0.3	0.5	1.0	1.0	1.0	0.3	0.3	0.3	0.0	0.0	0.3	0.0	0.0	0.7	0.0	0.0	1.0	0.7	0.3	0.3	8.8
International org.	-	-	0.5	-	-	0.5	-	-	1.0	-	-	0.3	-	-	0.7	-	-	1.0	-	-	0.5	-	-	0.3	4.8
Local business	-	-	0.0	-	-	0.3	-	-	1.0	-	-	0.0	-	-	0.0	-	-	0.3	-	-	1.0	-	-	0.7	3.3
Other private sector	-	-	0.2	-	-	0.3	-	-	0.0	-	-	0.0	-	-	0.0	-	-	0.3	-	-	0.5	-	-	0.3	1.6
Research institutions	-	-	0.3	-	-	0.0	-	-	0.0	-	-	0.0	-	-	0.3	-	-	0.0	-	-	0.5	-	-	0.3	1.5
Schools/universities	-	-	0.3	-	-	0.3	-	-	1.0	-	-	0.3	-	-	0.7	-	-	0.7	-	-	1.0	-	-	0.3	4.6
Distant end users	-	-	0.0	-	-	0.5	-	-	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-	-	0.5	-	-	0.3	1.3
Other stakeholder	-	-	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-	-	0.3	-	-	0.5	-	-	0.3	1.2

Main ownership (O) and management (M) right holder as well as stakeholder (S) types in each ecosystem domain (NAF: natural/protected forest; MAF: managed/resource forest; GRL: grassland/rangeland; FAL: farmland; FRW: freshwater wetland and waterbodies; COE: coastal ecotone (including mangroves); SEA: inshore sea; and URB: settlement/urban)
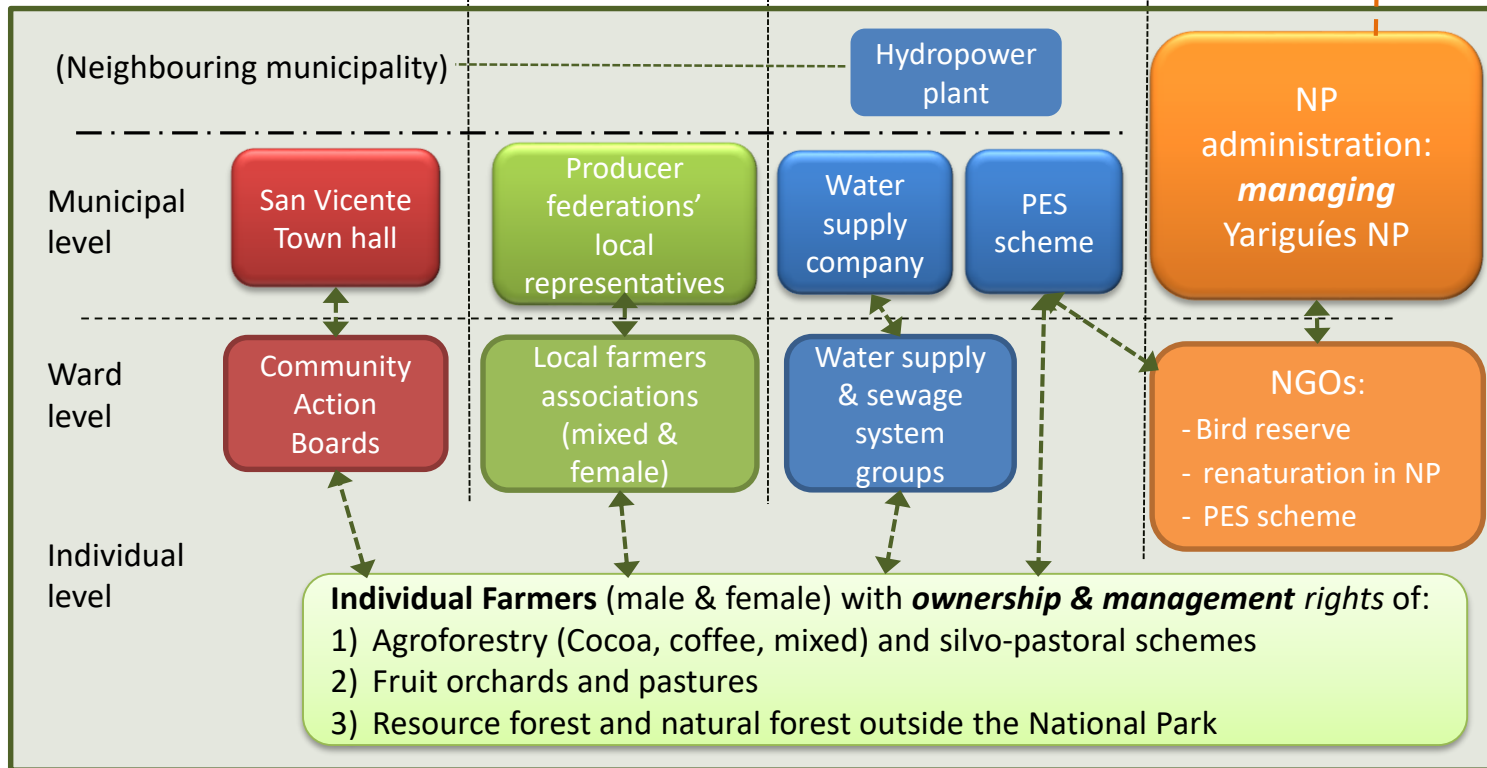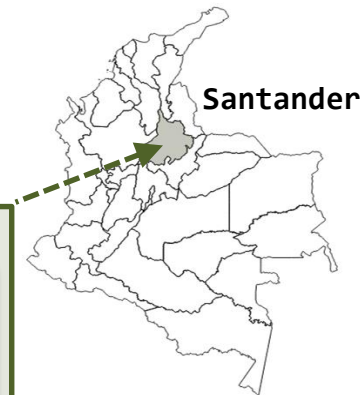
Example: UIS, Colombia

Respon-sibilities:

| Administration / participation | Agriculture | Water conservation, supply & consumption | Biodiversity conservation |

Actors:

National level

| Central govt. | | | National Parks |

Colombia

Subnational level

| Departmental govt. | Environmental agency |

Local level:

(Neighbouring municipality)

| | | Hydropower plant | |

Santander

Municipal level

| San Vicente Town hall | Producer federations' local representatives | Water supply company | PES scheme | NP administration: *managing* Yariguíes NP |

Ward level

| Community Action Boards | Local farmers associations (mixed & female) | Water supply & sewage system groups | | NGOs:
- Bird reserve
- renaturation in NP
- PES scheme |

Individual level

Individual Farmers (male & female) with ***ownership & management*** *rights* of:
1) Agroforestry (Cocoa, coffee, mixed) and silvo-pastoral schemes
2) Fruit orchards and pastures
3) Resource forest and natural forest outside the National Park

"Las Cruces" micro-basin

1. Setting the scene
   - Study objectives
   - Analytical frame and methods
   - SEPLS profiling
2. Values of SEPLS
3. Traditional knowledge on SEPLS
4. Governance of SEPLS
5. Values – knowledge – governance interplay?
6. Points for discussion

Synthesis

Value – knowledge – governance interplay (1) [extracts]:

Ecosystem	NCP*	ILKP	Governance: issues and stakeholders
NAF/MAF	**Habitat creation** Pollination/seed dispersal Regulation of climate **Freshwater quantity** **Freshwater quality** **Reg. of extreme events** **Energy** Food & feed **Phys. and psychological experiences** **Supporting identities**	**Traditional beliefs** in spirits: Lemur species conservation (WCS), forest conservation (IMPECT). Little **knowledge exchange** betw. communities & NP (UIS). **Local knowledge (LK)** of land, animals and plants (e.g. *tree species protecting water* sources (Dahari, UIS, TERI). **LK** of **management systems** (e.g. Lunar calendar [FIDES])	**Natural resource management delegated to local communities:** co-management scheme (WCS, TERI), community based forest management (IMPECT) or natural resource management committees, but **lacking capacity** (Dahari). Locals largely **excluded** from access & jobs in NP, water sources **disputed** (UIS). Environmental authority largely **absent** from NR management (Dahari, UIS). **Restrictions** on hunting &logging (TERI). **Private owners** protecting forest (FIDES).
FAL	Habitat creation Pollination **Soil format. & protect.** Freshwater quantity Food & feed, Materials Medicinal/genetic res. Learning & inspiration Supporting identities	**TK** of *soil productivity*, applying organic fertilizers (IMPECT). **Ancestral knowledge** for quinoa production (AMPA). **LK** of *tree species preventing soil erosion* (UIS).	**Sustainable farming system** of Karen people **recognised** by scientists (IMPECT). **Individual & collective** farming (AMPA). Farming practices for erosion control on slopes **recognised by PES scheme** (UIS).

Synthesis

Value – knowledge – governance interplay (2):

Ecosystem	NCP*	ILKP	Governance: issues and stakeholders
COE	**Habitat creation** Freshwater quality Regulation of extreme events **Food** Genetic resources	**LK** of shell & crab species (FIDES). General **understanding** of the **functions** of *mangrove ecosystem*, but **no knowledge & practices** for sustainable management (EPCO). **LK** on *coral reef* and *sea grass beds* as important feeding, reproduction and foraging grounds for fish (GIF)	Estuary under **state's protected area system** with **limited community's participation**, or under **community protected area** currently with **limited legal support**; **Regulations** on season/ size limits for crab harvest (FIDES). **Owned** by national **govt.**, **managed** under concession (**EPCO**), **claimed** by community **Managed** by various entities, coastal development **overseen** by central govt. (GIF)
SEA	1. Habitat creation 12. Food, 13. Material, 15. Learning and inspiration 16. Physical & psychological experiences	In *Barachois*, **LK** on harvesting fish, molluscs, crabs, etc. for subsistence; In *lagoon*, fisher folk own knowledge on fishing grounds, but no collective knowledge, practice and institution for sustainable management (EPCO). **LK** of inshore sea as an important habitat for all fish species and foraging ground for juvenile sharks (GIF)	*Barachois* area **managed** by EPCO under concession, **overseen** by central govt.; in *lagoon*, fisheries **management by central govt.** through law enforcement (EPCO). Seychelles Fishing Authority **enforcing fishing regulations,** e.g. sites and gears restrictions, under the provisions of New Fisheries Act 2014, which provides mechanisms for enabling **co-management approaches** (GIF).

Identify and map best practices

- **Value**
  - ✓ Actions to enhance the recognition of the values of SEPLS

- **ILKP**
  - ✓ Actions to address the loss and to promote the use of traditional and local knowledge

- **Governance**
  - ✓ Options to strengthen the governance of SEPLS to ensure biodiversity and human wellbeing

Thank you!