Ecosystem services assessment in practice: the case of Pendjari Biopshere Reserve, Benin

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Which tools were applied in Pendjari?

1. *A 'classic' ecosystem services assessment tool, which is also specifically developed for that purpose: TESSA (*complemented with the Nominal Group Technique (NGT) approach to address possible group biases that woud arise in less structured focus group settings)

2. A multi-stakeholder workshop aimed at producing a range of management recommendations, using a combination of World Café setting, NGT voting and multi-criteria analysis.

3. Q methodology, which aims at mapping stakeholder perceptions (data analysis in progress)

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Which stakeholders were involved?

- *TESSA*: local communities living around Pendjari NP.
- *Multi-stakeholder workshop*: NGOs, academics, private sector stakeholders, African Parks (private park managers),…
- *Q methodology*: scientists, park managers, park rangers, local community leaders
- Multiple viewpoints were systematically mapped and taken into account.

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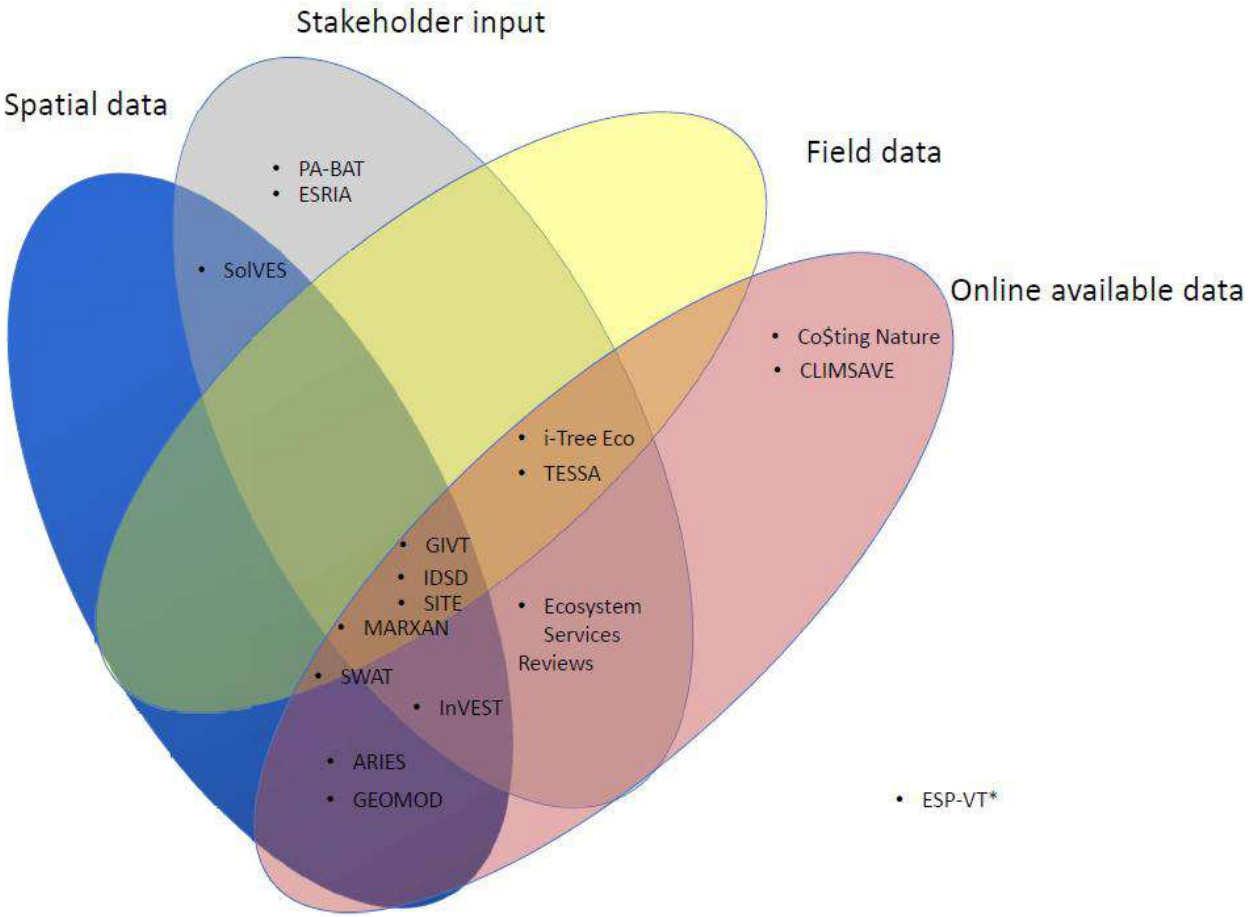
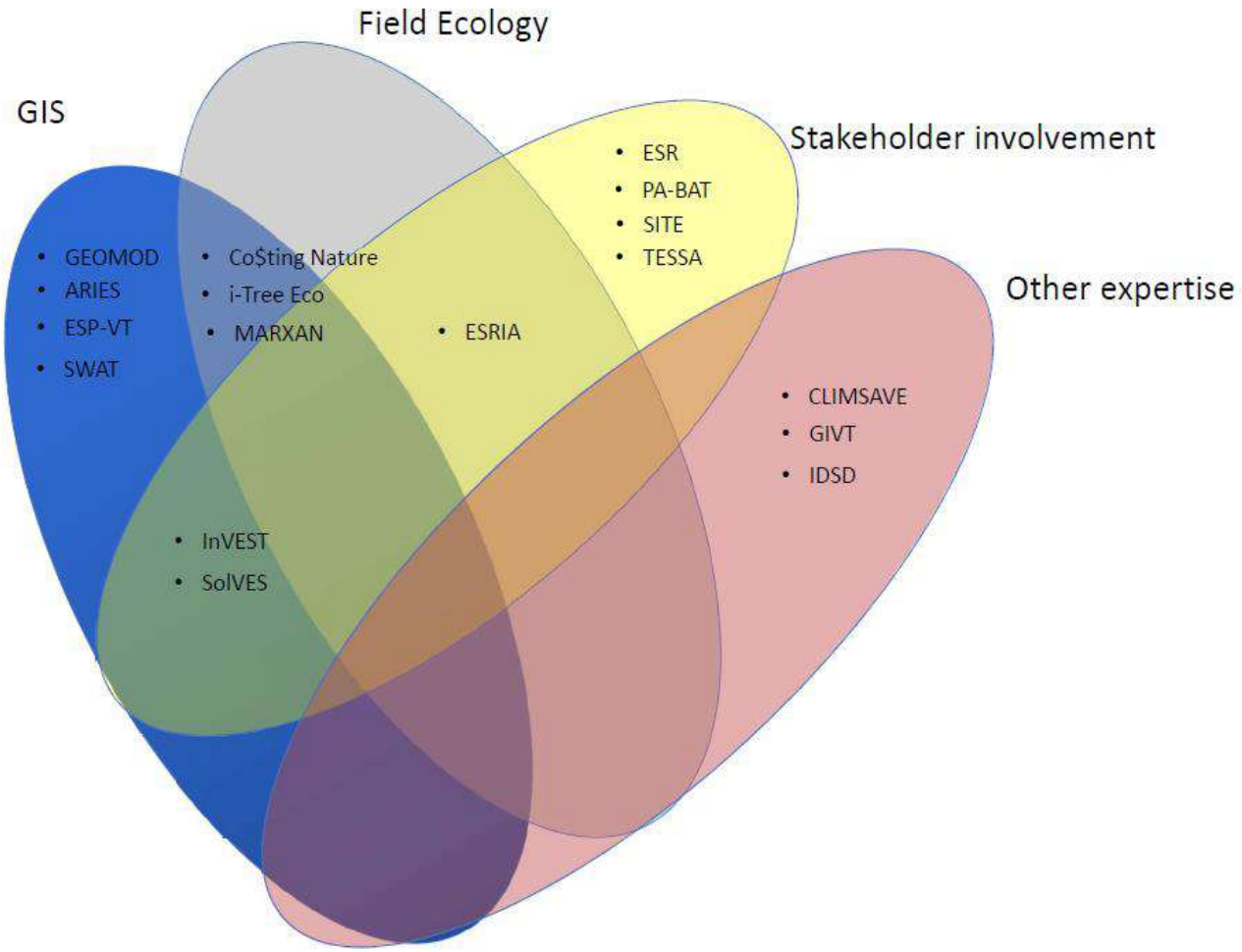
Quick reminder: Categorization of tools based on required input

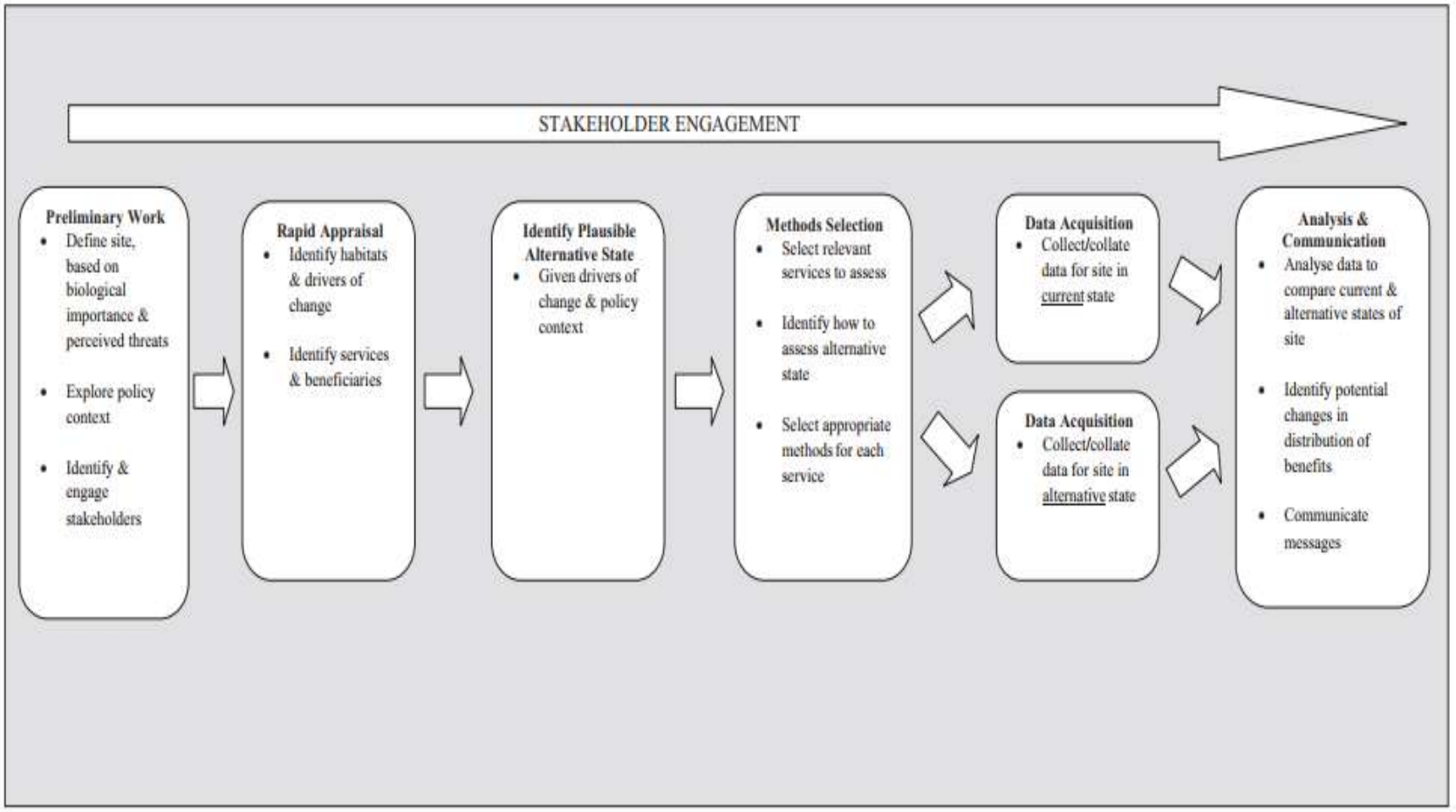


*Visualization tool only

Quick reminder: Categorization of tools based on required skills



TESSA


STAKEHOLDER ENGAGEMENT
Preliminary Work
Define site, based on biological importance & perceived threats
Explore policy context
Identify & engage stakeholders
Rapid Appraisal
Identify habitats & drivers of change
Identify services & beneficiaries
Identify Plausible Alternative State
Given drivers of change & policy context
Methods Selection
Select relevant services to assess
Identify how to assess alternative state
Select appropriate methods for each service
Data Acquisition
Collect/collate data for site in current state
Data Acquisition
Collect/collate data for site in alternative state
Analysis & Communication
Analyse data to compare current & alternative states of site
Identify potential changes in distribution of benefits
Communicate messages

TESSA Findings (2017): priority ES

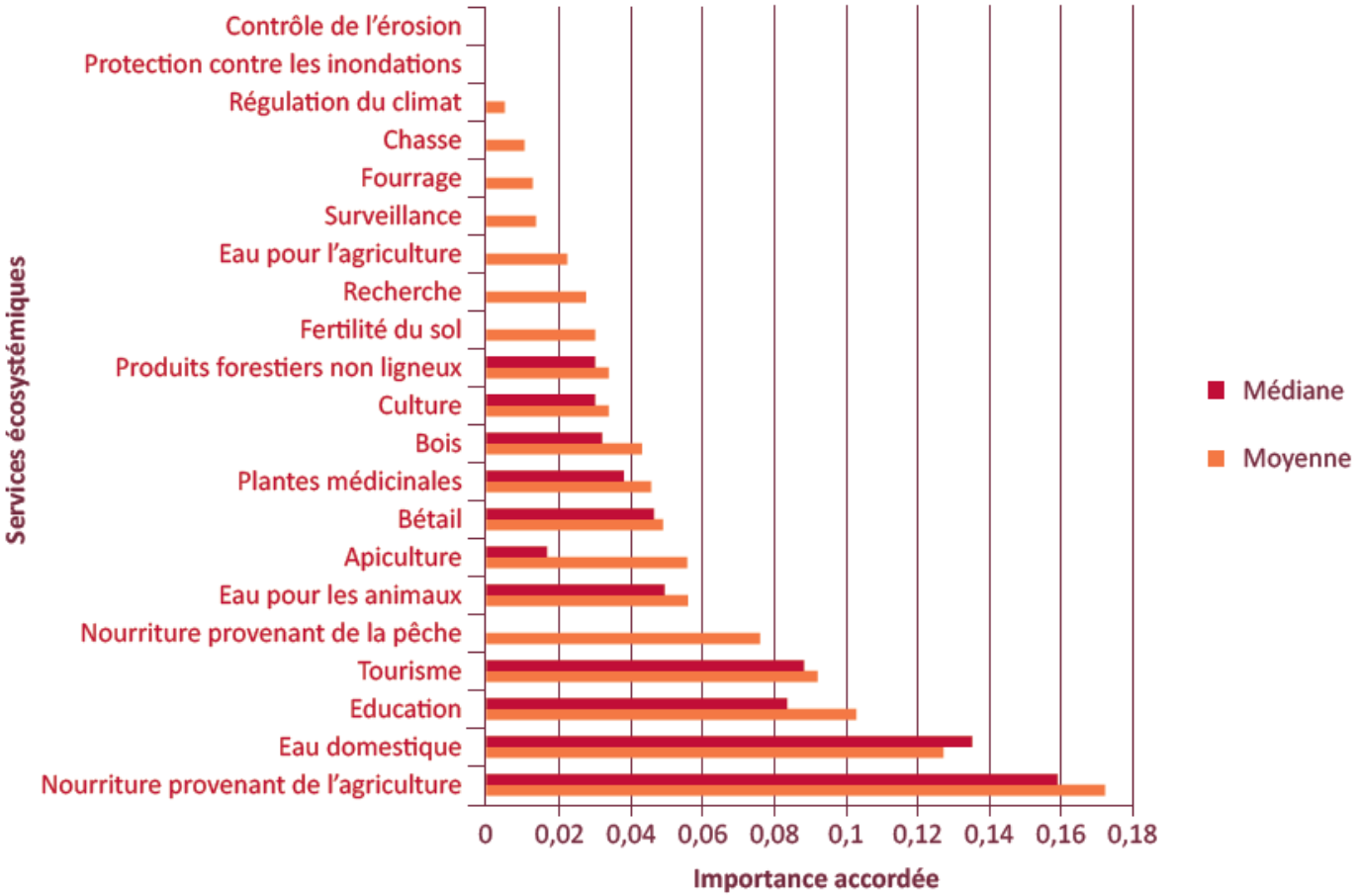


Fig. 5. Services écosystémiques identifiés comme prioritaires par les villages riverains de RB Pendjari lors de discussions de groupes.

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TESSA Findings (2018): stakeholder profiles

Characteristic		% of Focus Groups
Sex	Male	75
	Female	25
Age	< 30	25
	30 < age < 60	50
	>60	25
Education	None	38
	Alphabetisation/Primary	17
	Secondary	38
	University	8
Time Lived in Village	< 10	17
	< 20	13
	> 20	71
Affiliations	AVIGREF	42
	CENAGREF	4
	APN	4

Focus group profiles (n=24) of exercises conducted in Benin. Participant profiles were reduced to create focus group profiles with the following degree of homogeneity: sex (96.7%) and education (90%), age (76.7%) and time lived in village (85.6%).

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TESSA (2018) Findings

- **Importance** refers to the sum of rank values (5 to 1) given to a specific response summed across all focus groups

- **Agreement** – the frequency of occurrence of a specific response across all groups, regardless of rank.

- Data analysis inspired by Mountjoy *et al*. 2014 (Journal of Environmental Planning & Management)

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TESSA Findings (2018): stakeholder profiles

Occupation	Number of Groups	% of Groups
Farmer (Agriculture)	6	25.0
Hospitality & Tourism	3	12.5
NGO	2	8.3
Hunter	2	8.3
Farmer (Livestock)	2	8.3
Transformers (Shea)	2	8.3
Student	2	8.3
Ranger	1	4.2
Teacher	1	4.2
Tranditional Medicine	1	4.2
Apiculturist	1	4.2
NA (Non-Homogenous)	1	4.2

Occupational summary of focus group conducted in Pendjari NP, in September 2018

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TESSA Findings (2018): threats to ES

Category	Code	Importance	Agreement
Land tenure security	LTS	243	15
Water scarcity	WS	168	12
Agricultural expansion & other land use changes	AEO	158	16
Poor use & management of natural resrources	PUM	117	14
Poor or distant infrastructure	PDI	116	13
Water Pollution	WP	59	8
Reduced agricultural yield	RAY	43	6
Soil pollution & degradation	SP	33	6
Human-wildlife conflicts	HWC	31	5
Lack of watering holes for livestock	WH	30	3
Social conflict	SC	25	4
Climate change	CC	21	4
Illegal exploitation	IE	21	2
Population growth	POP	16	3
Poaching	POA	8	2

Threats to ecosystem services, as identified based on 24 focus groups ranked by importance and agreement

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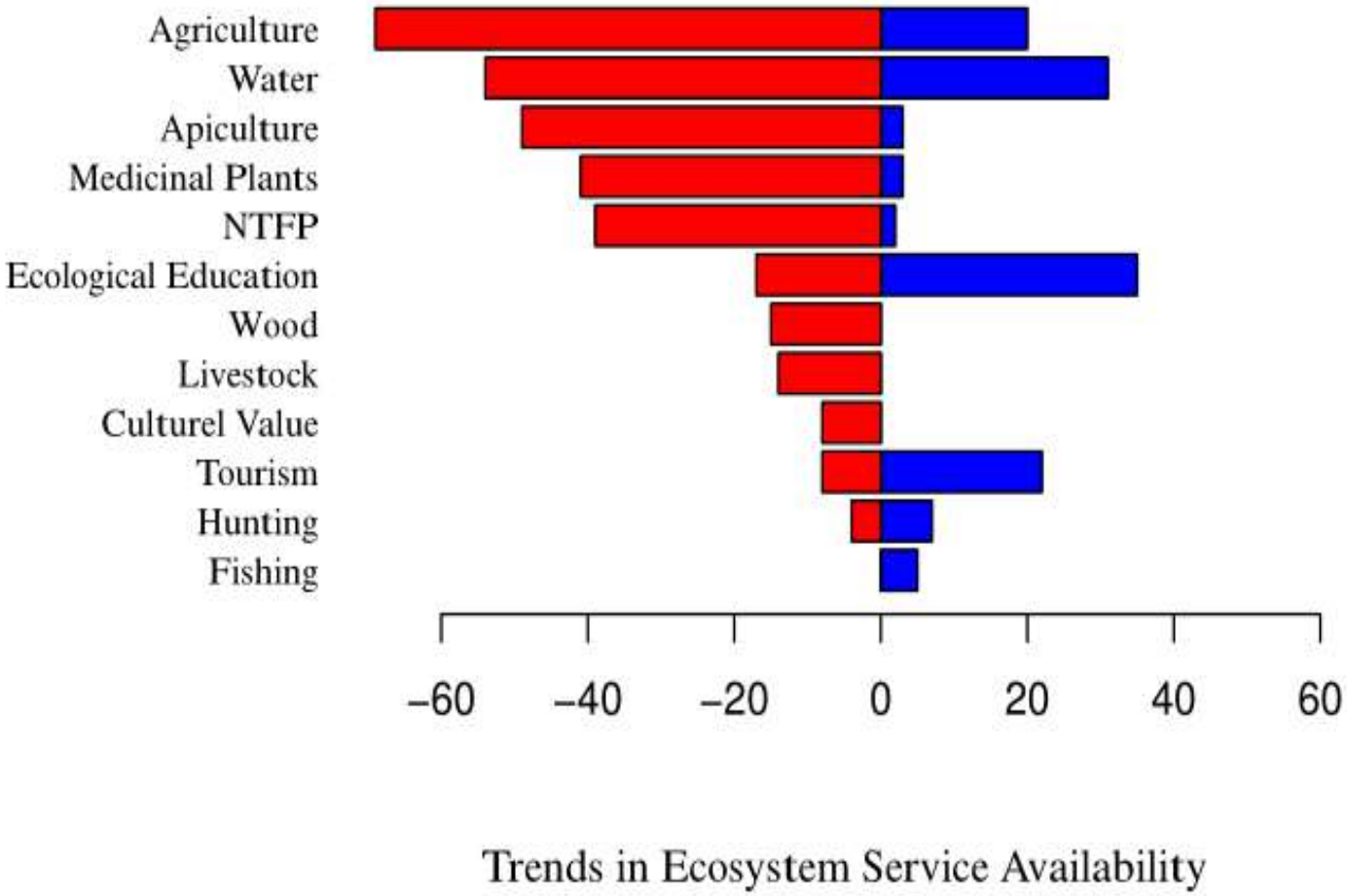
TESSA Findings (2018): trends in ES availability



TESSA results can inform ES threat assessment frameworks

Category	Definition	Threshold
Functionally extinct	Service no longer supplied in the region and is practically unrecoverable	Lost
Dormant	Service no longer supplied in the region but is potentially recoverable	
Critically endangered	Current levels of demand exceed supply and the ratio of supply to demand declining or expected to decline	Undersupplied
Endangered	Current levels of demand exceed supply; ratio of supply to demand is stable but supply is declining	
Stable but undersupplied	Current levels of demand exceed supply; neither supply nor ratio of supply to demand declining	
Vulnerable	Ratio of supply to demand is declining or expected to decline such that supply is likely to be insufficient to meet demand within a set time horizon	At risk
Least concern	Supply currently meets or exceeds demand, and does not meet the criteria for Vulnerable	Secure
Data deficient	Inadequate information is available about either or both of supply and demand to assess the level of threat	n/a

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TESSA Findings (2018): impact of change in park management

Category	Code	Importance	Agreement
Strict enforcement of rules & an loss of extractive access	SE & AB	309	18
Eviction of farmers encroaching illegally	EF	210	12
Exclusion from management and lack of communication	EM & C	127	14
Increased employment opportunities	JC	120	12
Increased floral & faunal security	F & FS	104	12
False radio transmissions	FRT	82	6
Creation of and funding for social support programs	EE	72	9
Loss of cultural & religious access	C & RA	68	7
Inceased tourism	IT	42	6
Changes to environmental education	EE	33	5
Infrastrucutural & logistic support in the park	I & Ls	27	3
Lack of support from the state	SS	25	4
Lack of sustainable alternatives to access ban	SA	19	2
Termination of the CPL program	CPL	16	2

Focus group responses to changes in management

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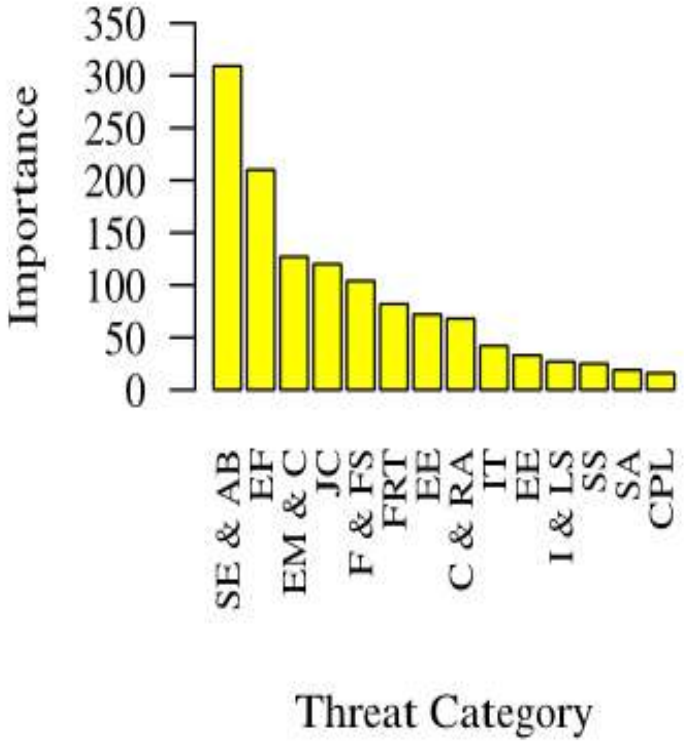
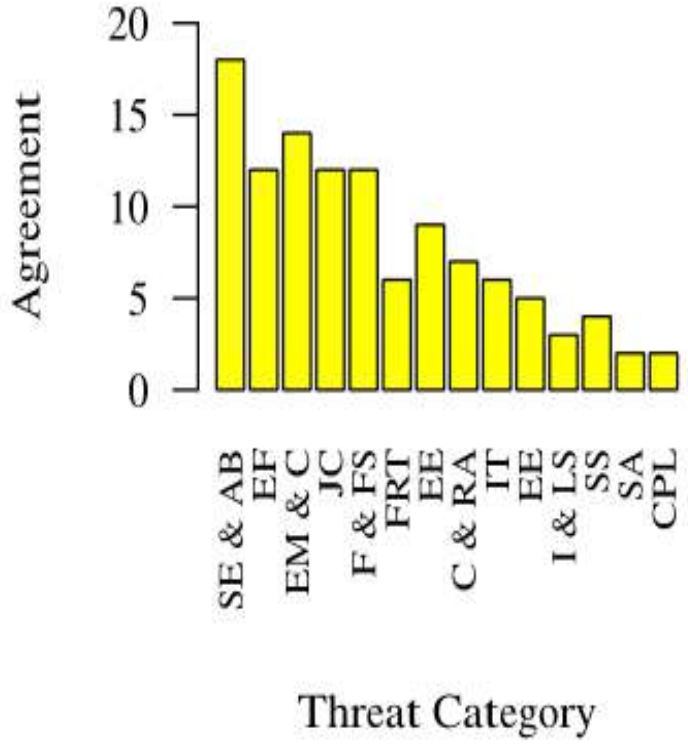
Focus group responses to changes in management ranked by Importance and Agreement





Picture by Devonne Goad

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Q methodology: what?

- In Q methodology, respondents are asked to sort statements according to how much they agree with them.
- Analysis then identifies categories of like-minded respondents whose opinions cluster together.
- This leads to the identification and description of a small number or shared perspectives (framings / discourses).

Q methodology: how?

- Q methodology is a semi-quantitative method to map perceptions;
- Statements are listed based on literature searches;
- Respondents are asked to rank/sort statements using a Likert scale (-3 to +3, expressing degree of agreement with the statement), and are asked additional information during a post-sorting interview;
- The correlation between the different rankings (and hence participants) is calculated.
- Clusters of like-minded respondents are identified.

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Q methodology: steps

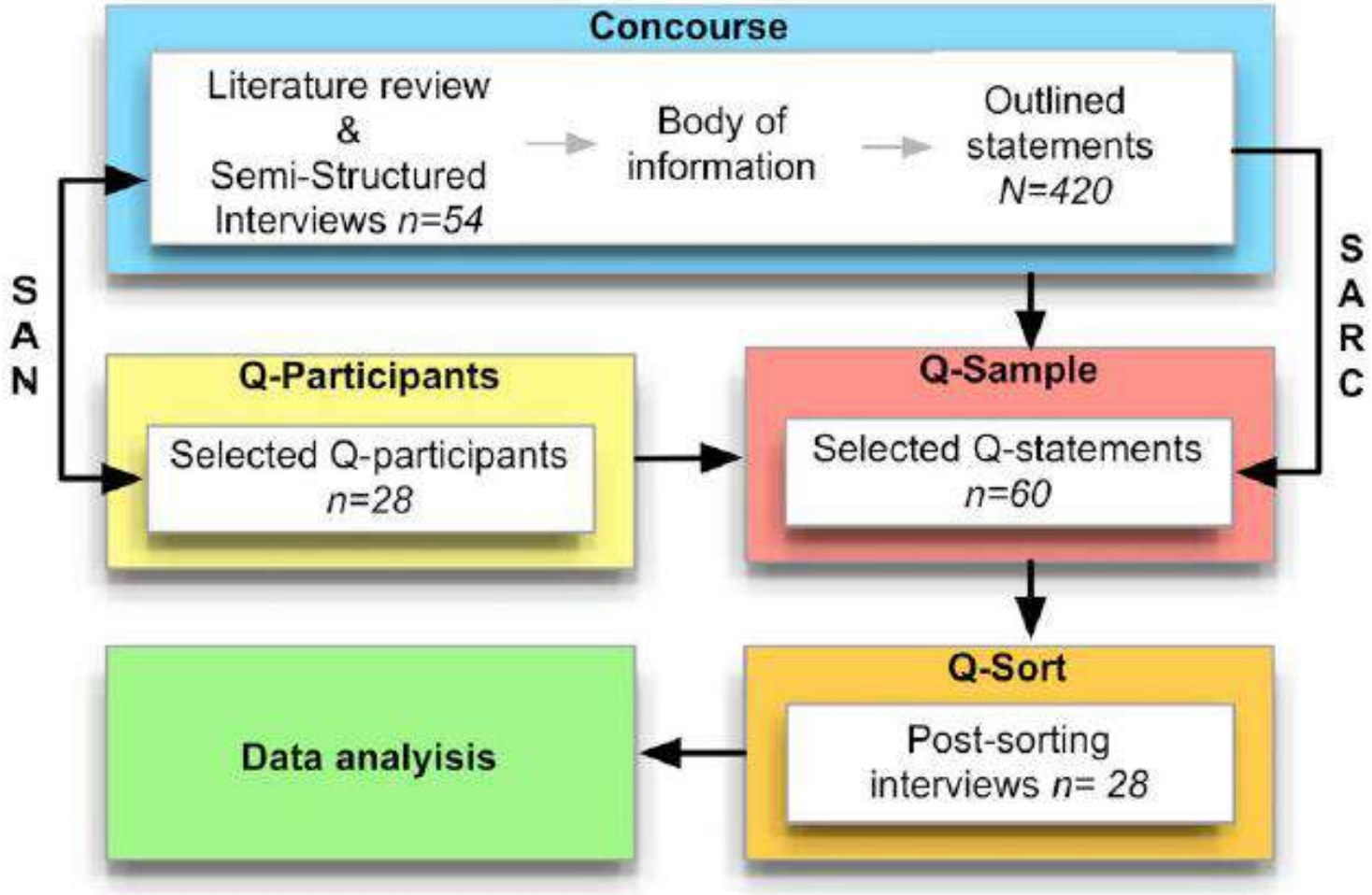


Figure 4.2. Diagram flow for gathering data in Q methodology.

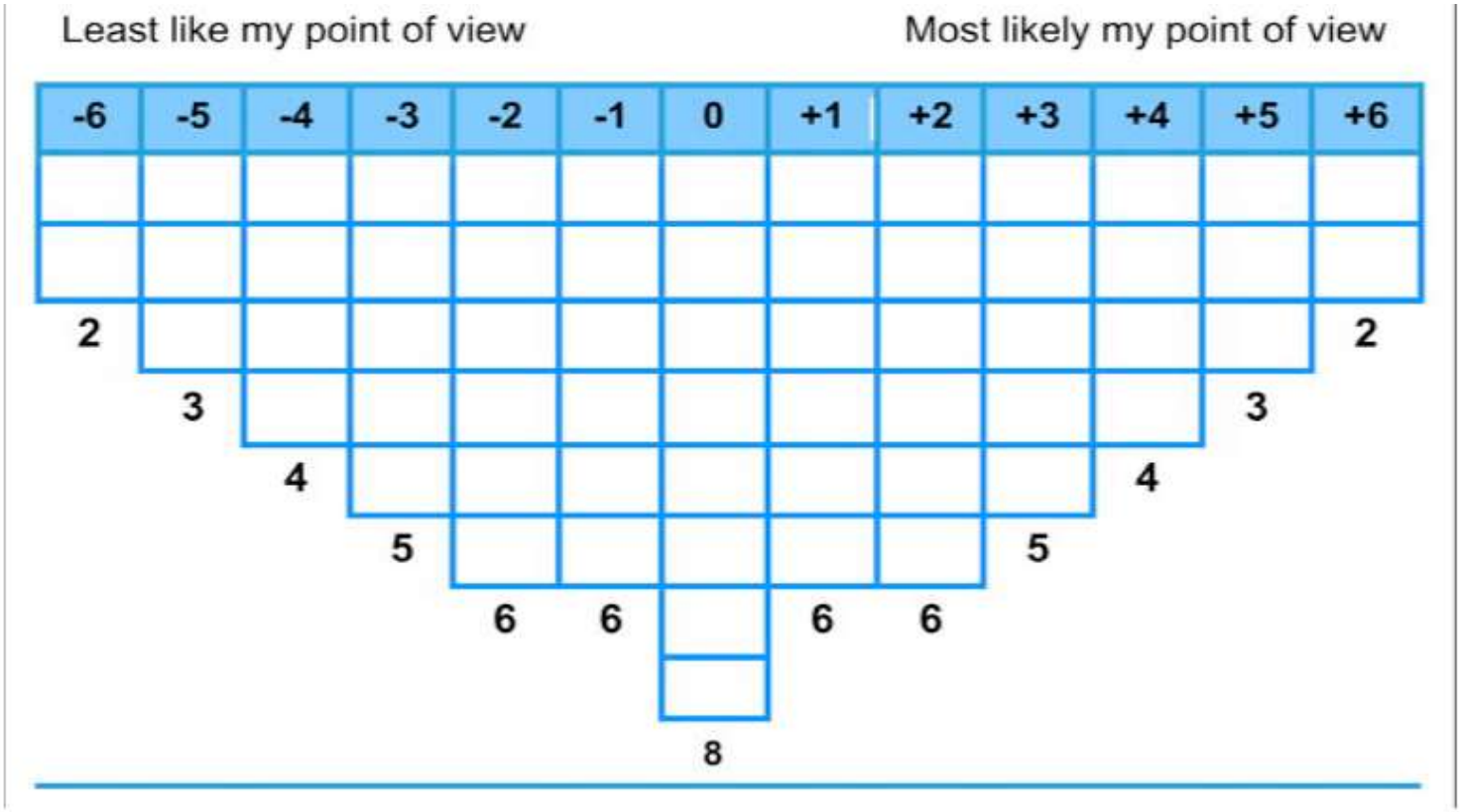
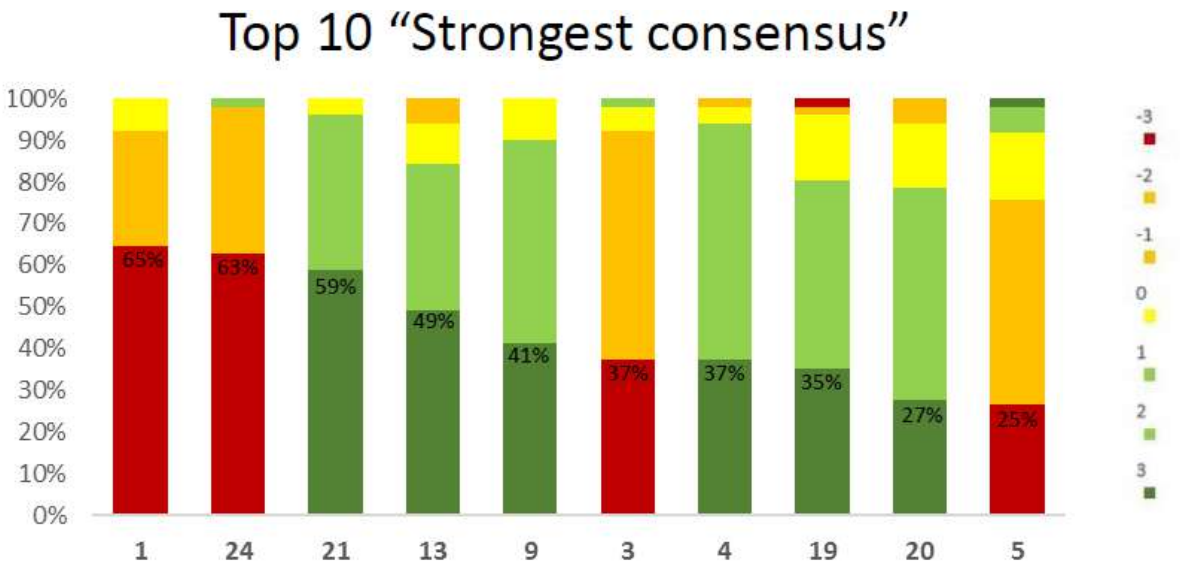


Figure 4.3. Example of pyramidal quasi normal distribution used to sort and rank the Q-sample.

Q methodology: findings Pendjari



N°	Affirmation	+3	-3
1	La participation des communautés locales n'est pas essentielle pour la conservation efficace des animaux sauvages et des écosystèmes dans le PNP.	0	33
24	Toutes les activités agricoles devraient être interdites dans le PNP et sa périphérie pour assurer la conservation de la faune.	0	32
21	Il est important d'impliquer les enfants et les jeunes dans la conservation de la faune, car ils sont les futurs gestionnaires de notre environnement.	30	0

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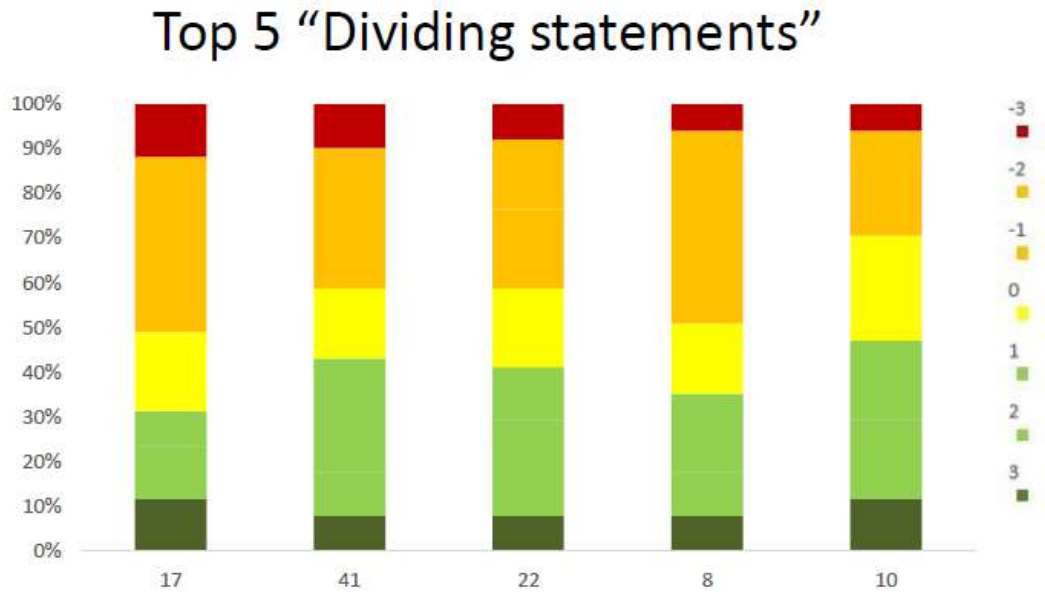
Q methodology: findings Pendjari



N°	Affirmation	+3	-3
17	L'agroforesterie est une solution clé pour réduire la pression sur le PNP.	6	6
41	Un régime foncier sécurisé plutôt qu’une «première utilisation et d'une occupation continue» sera bénéfique pour les écosystèmes du parc et la population locale.	4	5
22	A long terme, il ne faut pas réstreindre l’accès de l’homme au parc enfin de garantir la protection de la faune sauvage.	4	4

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Multi-stakeholder workshop in Natitingou, Benin, September 2018

08h30-10h — 1. Identification of main threats

Method: individual answers, restitution, vote
Result: 2 main threats per priority service

Pause café

10h30-13h — 2. Defining management options

Method: World Café discussions
Result: List of management options for each threat

Lunch

14h-15h30 — 3. Restitution and prioritization of management options

Method: Show of hands
Result: 6 priority management options

Pause café

16h-16h30 — 4. Ranking of criteria and scoring management options against each criteria

Method: individual surveys
Result: Classified criteria, scored options

16h30-17h — 5. Closing discussion

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Process of the multi-stakeholder workshop

Priority ES	Threat to the ES (step 1)	Priority management measures (Steps 2 & 3)
Food from agriculture	Threat 1	Measure A
	Threat 2	Measure B
Water for domestic use	Threat 1	Measure C
	Threat 2	Measure D
Tourism (& its benefits for local communities)	Threat 1	Measure E
	Threat 2	Measure F

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Findings of the multi-stakeholder workshop

Priority ES	Threat to the ES (step 1)	Priority management measures (Steps 2 & 3)
Food from agriculture	Unsustainable agricultural practices	Promote & adopt organic agriculture
	Unequal distribution of land	Land use & land tenure plans must be developed & enforced
	Deforestation	Sustainable land use practices
Water for domestic use	Pollution due to agricultural effluents	Organic agriculture
	Lack of water	Connect villages to water network
	Non-functioning pumps	Training & regular maintenance of pumps
Tourism (& its benefits for local communities)	Bad state of the roads	Maintenance of roads
	Low quality hotel infrastructure	Encourage private management of hotels
	Perception of insecurity in the whole region	Strengthen positive communication

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Concluding reflections

- Applying a tool with multiple entry points and various degrees of detail proved workable and realistic in the field (TESSA-NGT).
- This provided us with information regarding ES threats and trends, and regarding the impact of changes in management.
- Q provides in-depth information on stakeholder perceptions.
- Multi-stakeholder workshop allowed prioritization & validation.
- This information can feed both formal and informal stakeholder-inclusive management at strategic and operational levels.

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