Building local capacity for socio-ecological assessment and conservation management

5 April 2025

Room 1.4, NAC Building, University of Mauritius, Reduit, ***Mauritius***

Workshop Report

Background

In November 2024, Nature Yetu, in collaboration with the Tropical Island Biodiversity Ecology and Conservation (TIBEC) pole of research at the University of Mauritius, launched a project entitled "*Pioneering a participatory and multi-stakeholder approach to develop a conservation strategy and action plan for the Endangered cave bat in Mauritius*."[1] Supported by the Mohamed bin Zayed Species Conservation Fund, this initiative is piloting a multi-stakeholder, participatory approach in the Plaine des Roches Village Council Area (PRVCA) to inform conservation efforts for the Endangered and endemic Mauritian free-tailed bat (*Mormopterus acetabulosus*). Ongoing ecological studies and a recent publication[2] highlight the increasing threats posed by human activities in and around roosting caves. Conservation actions are often most effective when the underlying problems are well understood. Hence, two of the key objectives of this project are i) to better understand human-cave interactions and the perceptions of key stakeholders regarding the species' conservation through social analysis and ii) provide targeted training and build local capacity on socio-ecological systems (SES) assessment and the design of effective conservation management plans to local stakeholders.

Learning objectives:

Upon completion of this training, participants should have a deeper understanding of the concepts, methods and applications of socio-ecological assessments. More specifically, participants will:

1. Gain a better understanding of the principles of socio-ecological systems (SES).
2. Deepen knowledge of the human and social dimensions critical to biodiversity conservation.
3. Become familiar with a selection of social research techniques including questionnaires and focus groups.
4. Improve skills in designing and conducting effective, ethical social surveys.
5. Explore real-world applications of socio-ecological assessments in conservation management

[1] Mauritius Free-tailed bat Conservation Case Study | The Mohamed bin Zayed Species Conservation Fund

[2] Cave-roosting specialisation of an oceanic island endemic microbat elevates extinction risks as caves face multiple threats

Workshop implementation

Welcome and introduction

This session was facilitated by Ashmi Yogishah Bunsy, Principal Investigator at the University of Mauritius and Nature Yetu. Her PhD study, co-funded by Agence Française de Développement (AFD), contributes to the ecological basis of the conservation project entitled *"Pioneering a participatory and multi-stakeholder approach to develop a conservation strategy and action plan for the Endangered cave bat in Mauritius"*. The initiative is supported by the Mohamed bin Zayed Species Conservation Fund and implemented in collaboration with the Tropical Island Biodiversity Ecology and Conservation (TIBEC) research group at the University of Mauritius. Following a welcome and brief introduction to the work of Nature Yetu, the presentation focused on the ecological rationale for the project. Key findings from recent fieldwork were shared, including the discovery of new roosting sites and the need for long-term monitoring of both occupied and unoccupied lava tunnel caves. Several priority roosts have been identified to enhance the species' resilience to threats such as fire and ongoing human pressures. The session highlighted continuous threats to the Mauritian free-tailed bat and its habitats, including illegal waste disposal at cave entrances and the loss of critical roosting sites, notably the Roches Noires Bat Cave. Legal protection for both the species and its habitats has lapsed, with the ESA Bill drafted in 2009 never enacted. This leaves caves—including those classified as Environmentally Sensitive Areas (ESAs)—without formal protection under current legislation. The importance of cave protection was also discussed in the broader ecological context, with emphasis on coexisting species such as the Mauritius swiftlet and the role of cave systems in supporting unique subterranean biodiversity. Protecting these habitats is essential not only for species conservation but also for enhancing ecosystem resilience.

Session 1 - Introduction to Social and Human Sciences, and overview of social research methods

This session introduced the key concepts and methodological approaches in social and human sciences. Using the main three questions: "What is it? What does it mean? How to use it?" The presentation started by highlighting the diversity of fields and currents within social and human sciences, and some key figures and theories in the history of social sciences' development. Building on the epistemological and methodological differences between biophysical and social sciences, the presentation then introduced three key approaches pertaining to the discipline: situations that are always contextual; A 'natural language'; the internal implication of the observant/the researcher. During this comparison, the presentation introduced the recent history of social science posture, slowly moving from positivism to constructivism approaches, the importance of plural knowledge systems and the challenge to align them for research, and finally the concept of reflectivity. This last notion was emphasized using the etic/emic postures, and the work of F. Ouattara on 'anthropology at home', revealing the need for the observant to find balance between self-situated identity and the capacity to reach an objective and unbiased point of view. The difference between evidence development in biophysical and social sciences was then discussed, where biophysical studies tend to use hypothesis testing processes, while social sciences will use an iterative/comparative/deductive process. Some key methods were presented, including participant/direct observation, interviews (structured, semi structured, and non structured), and questionnaire

based surveys. Key insights were given on how to develop a research question, how to build a social science's methodology, and how to enter, triangulate and interpret social data.

Session 2 - Ethical consideration of social and socio-ecological research

This session illustrated how ethics serves as a critical guiding principle in socio-ecological assessments. It provided examples of key ethical concepts that are essential for navigating complex decisions in ecological restoration and socio-ecological research. Ethics was defined as a moral compass, empowering researchers to pursue responsible practices while balancing community needs and environmental sustainability. Key ethical theories were presented to demonstrate how they shape research approaches. Kantian Ethics was explained as a duty-based framework, where actions are governed by universal moral laws. Utilitarianism was introduced as a consequence-based approach that seeks to maximise benefits and minimise harm. Additionally, Virtue Ethics was presented to underscore the importance of qualities such as honesty, integrity, and stewardship.

The session also clarified foundational ethical principles, including respect for autonomy, beneficence, justice, non-maleficence, and sustainability, demonstrating their role in ensuring that research practices are equitable and socially responsible. Practical applications were discussed, such as the importance of informed consent, community engagement, data ownership, confidentiality, and collaborative decision-making. The role of the Institutional Review Board (IRB) was also highlighted, emphasising the necessity of comprehensive proposals, rigorous reviews, and required revisions to secure ethical clearance. Structured decision-making tools, like decision trees and the Ethical Matrix, were introduced as effective methods for evaluating ethical dilemmas. In conclusion, the session's key takeaway message was that socio-ecological assessments must be underpinned by a solid ethical framework. A thoughtful and unbiased approach to ethical decision-making not only enhances scientific robustness but also deepens the understanding of the relationship between human behaviour, environmental impacts, and sustainable outcomes.

Session 3 - Introduction to Socio- ecological systems, assessment frameworks and ES survey design

This session introduced socio-ecological systems (SESs) as integrated systems where humans and ecological processes interact, producing dynamic feedback loops and resource flows. Building on the foundational opposition between Garrett Hardin and Elinor Ostrom theories, the discussion emphasized the importance of collective governance, local knowledge, and highlighted the evolution from viewing nature and society as separate from seeing them as mutually constitutive systems.
Two main frameworks were presented:

- The Ecosystem Services (ES) Framework, which classifies nature's benefits to people but is often critiqued for its economic and utilitarian focus.
- The Nature's Contributions to People (NCP) Framework, which incorporates cultural, social, and ontological values, addressing some of ES' limitations.

The session highlighted the importance of accounting for:

- Multiple value systems and power relations
- Social diversity and local contexts
- Changes across scales and land use types

Tying back to the model session's methodology, the importance of reflexivity, context, and plural knowledge systems in assessing SESs were reinforced. Finally, a video on value classification within the ES framework illustrated key survey design principles.

Session 4 - Designing and conducting focus groups

This session facilitated by Fabiola Monty was originally scheduled for an after-lunch presentation, but some slight changes were made to the agenda. The presentation highlighted that focus groups are a qualitative social research method and that they are pre-arranged interviews with a group of individuals where discussions are facilitated and guided by a structured interview guide. Key characteristics of focus groups and their strengths and weaknesses as a research method were presented. The steps and elements to consider when designing and conducting focus groups as well as best practices were also shared:

Best practices for focus group design and facilitation:

- Have a clear rationale for the choice of focus group discussion
- Have a clear approach for participant recruitment and selection
- Allocate enough time to participant recruitment and selection
- Focus on facilitator skills:
  - ✓ Ability to build rapport by creating a warm, supportive and comfortable environment
  - ✓ Have good and active listening skills to help engage with the respondent
  - ✓ Have good observation skills, pay attention to participants' body language or demeanour and recognise group dynamics.
  - ✓ Have good speaking, communication skills and knowledge of the topic of discussion
  - ✓ Flexibility to adapt to the flow of the discussion
  - ✓ Ability to remain impartial
  - ✓ Should have a sense of humour to keep the discussion relaxed, encourage sharing of information and maintain a human connection

Session 5 - Ecosystem services and socio-ecological resilience assessment: Case study from Cité La Chaux, Mahébourg

To illustrate assessment of socio-ecological interactions within a particular landscape or seascape using existing frameworks such as nature's contributions to people (NCP) and other assessment tools, case studies from Cité La Chaux, Mahébourg (South-East of Mauritius) were used. The case studies presented the method used to assess values associated with biodiversity in the target site as well as the results. Another type of socio-ecological assessment, more specifically the quantitative assessment of socio-ecological resilience using the toolkit for the "Indicators of Resilience in Socio-ecological Production Landscapes and Seascapes (SEPLS)" was also shared. The presentation concluded with examples of the the applications of these socio-ecological assessments such as for the the design, implementation and monitoring of community-based natural resource management projects.

Session 6 - Human dimensions of biodiversity conservation

This session explained and provided examples of key concepts such as “knowledge,” “perceptions,” and “attitudes,” which are commonly used in studies aimed at understanding and predicting human behaviour in relation to biodiversity. These behaviours can be either pro-biodiversity or exploitative, with the latter often leading to negative impacts on biodiversity outcomes. Attitude studies are frequently employed to assess or predict human behaviour. A case study was presented to demonstrate how attitudes can be measured, alongside its application in the comparative analysis of different ecosystem management regimes and their influence on people’s attitudes. The presentation concluded with a visual reminder that social research, including attitude studies, must be conducted with a neutral and unbiased perspective. While it is tempting to judge behaviours that negatively affect biodiversity, thorough and in-depth assessments are crucial to better understand the underlying drivers of such behaviours.

Session 7 - Social study in practice: The case of Mangrove Ecosystem services assessment in Mauritius

This presentation outlined a step-by-step approach to studying socio-ecosystems, using mangrove in Mauritius as a case study. Their role as a source of cultural, economic, and subsistence value was emphasized. Despite their importance, mangroves in Mauritius—and globally—face increasing threats from development, tourism, and environmental change. A key takeaway is the need to approach mangrove and other habitats not just as ecosystems, but as socio-ecological systems—deeply shaped by human interactions, knowledge systems, and power dynamics. To capture this complexity, the study integrated different social science methods.

The process involved defining a clear socio-ecological context, building research questions around ecosystem services and community well-being, and selecting sites that reflect local realities. Methods included household surveys, interviews, direct observations, and the analysis of local ecological knowledge—highlighting the importance of triangulation and reflexive, mixed-method approaches.
Important lessons for implementation include:

- Recognize and incorporate local knowledge and cultural practices, especially those passed through generations.
- Address gender roles, particularly the essential role of women in mangrove-based livelihoods.
- Be aware of power relations and access issues, which often shape who benefits from mangrove ecosystems.
- Use both quantitative and qualitative tools to understand perceptions, dependencies, and social dynamics.
- Frame ecosystems as social, ecological, and institutional systems, not just natural resources.

Session 8 - Group exercise – Designing your socio-ecological research project

This interactive session was designed to consolidate key concepts introduced throughout the training by encouraging participants to actively apply their learning. Participants were divided into small groups and given approximately 30 minutes to collaboratively design a basic outline of a socio-ecological research

project. Each group was asked to identify a conservation issue of interest, formulate a research question, consider relevant social and ecological components, and outline potential data collection methods. The exercise aimed to foster collaborative thinking and to simulate a realistic and practical planning process for socio-ecological assessments. Following the group work, each team presented their project ideas to the wider audience. Presentations were followed by brief rounds of feedback and discussion, allowing for clarification, knowledge sharing, and constructive critique. This session served as an opportunity for participants to reflect on the relevance of SES approaches to their own conservation contexts and to consider the practicalities involved in integrating social and ecological perspectives into research and management.

Annexe 1: Agenda

Morning

Time	Session title	Content	Session lead
8.30 – 9.00 (30 minutes)	Arrival, registration and housekeeping		Yogishah Ashmi Bunsy (Nature Yetu / TIBEC) & Fabiola Monty (Nature Yetu)
9.00 – 9.10 (10 minutes)	Welcome and introduction	Presentation: Provide brief background on the project and cover objectives for the day	Yogishah Ashmi Bunsy (Nature Yetu / TIBEC)
9.10 – 10.00 (50 minutes)	Introduction to Social and Human Sciences, and overview of social research methods	Presentation: Provide background on a selection of social / socio-ecological research concepts and methods including key references	Raphael Merven (Nature Yetu)
10.00 – 10.45 (45 minutes)	Ethical consideration of social and socio-ecological research	Presentation: Ethical principles and considerations in conducting social and socio-ecological research, respect for participants, informed consent, confidentiality, and the potential impact of research on communities; Guidance on navigating ethical	Tavinia Naiken (Nature Yetu)

		challenges; IRB and ethical clearance processes.	
10.45 - 11.00 (15 minutes)	Tea BREAK		
11.00 - 11.45 (45 minutes)	Introduction to Socio-ecological systems, assessment frameworks and ES survey design	Components and dynamics of SES, including how human and ecological systems interact and influence one another; Ecosystem Services (ES) & Nature's Contribution to People (NCP) frameworks	Raphael Merven & Fabiola Monty (Nature Yetu)
11.45 – 12.15 (30 minutes)	Human dimensions of biodiversity conservation	Presentation: Understanding the differences between knowledge, attitude, perceptions and behaviours and how this influence nature; Theory of planned behaviour	Fabiola Monty (Nature Yetu)
12.15 – 13.15 (60 minutes)	Lunch BREAK		

Afternoon

Time	Session title	Content	Session lead
13.15 – 13.30 (15 minutes)	Designing and conducting focus groups	Presentation: Key principles and practical approaches to designing and conducting focus groups	Fabiola Monty (Nature Yetu)
13.30 - 13.50 (20 minutes)	Group exercise – Designing your socio-ecological research project	Briefing on the group activity, distribution of handouts, participants are assigned to their groups, each group has a case study	Fabiola Monty & Tavinia Naiken (Nature Yetu)
13.50 – 14.05 (15 minutes)	Social study in practice: The case of Mangrove Ecosystem services assessment in Mauritius	Presentation: The project design, research methods used, lessons learned and conservation implications	Raphael Merven (Nature Yetu)
14.05 - 14.35 (30 minutes)	Group creation of a socio-ecological research project	Group activity: Each group creates its own socio-ecological research project based on the case study they were attributed, following the guidance in the handout	Fabiola Monty & Tavinia Naiken (Nature Yetu)
14.35 – 15.20 (45 minutes)	Group project restitution and discussion	Activity: Each group pitches their projects and gets feedback and examples from	Fabiola Monty Tavinia Naiken

		trainers (15 minutes per group)	Raphael Merven (Nature Yetu)
15.20 – 15.40 (20 minutes)	Workshop closure and group photo		
15.40	End of workshop		

Annexe 2: Participant list

		Name	Email
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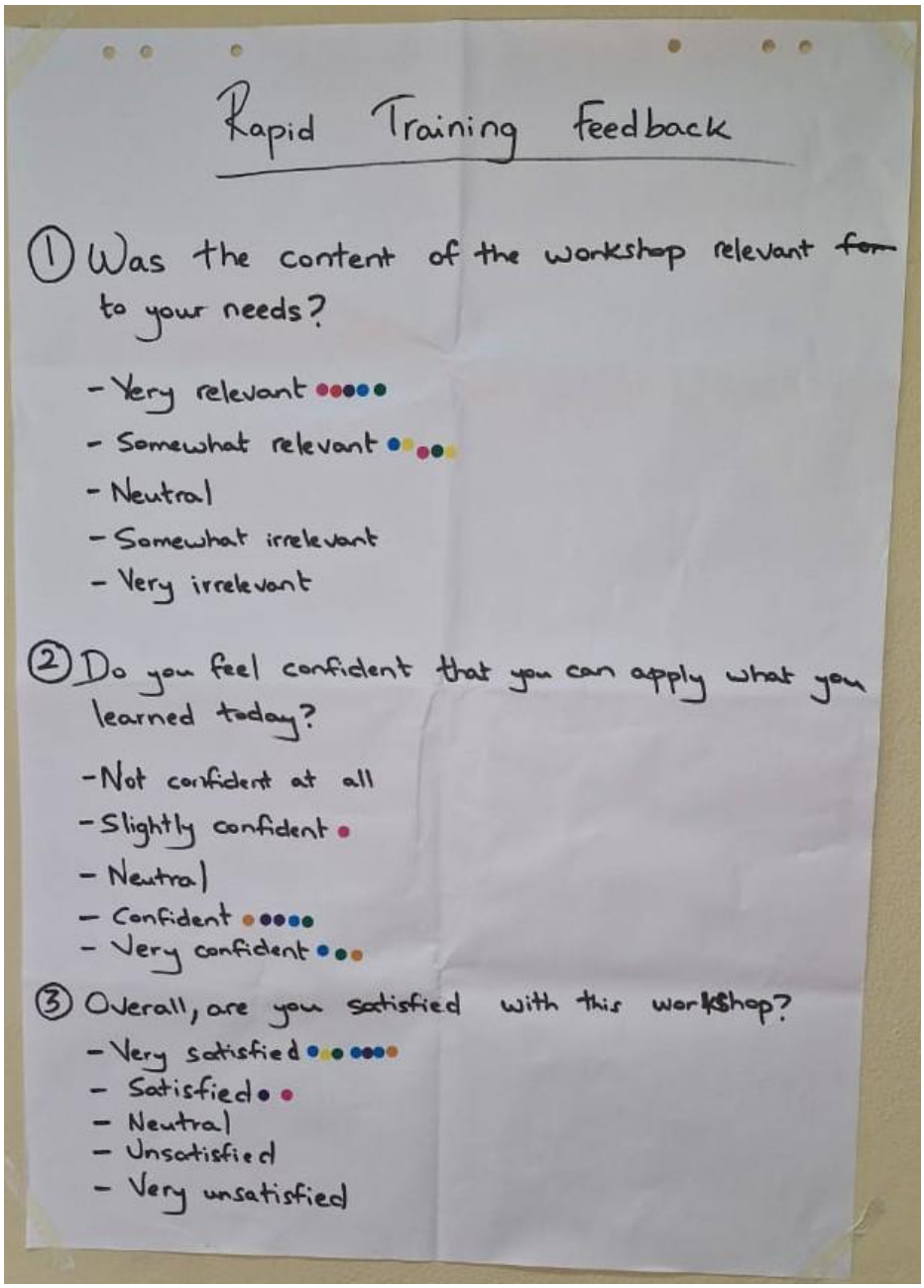
11			
Resource persons			
12	Mr	Raphael Merven	
13	Ms	Fabiola Monty	
14	Ms	Tavinia Naiken	

Annexe 3: Rapid training feedback



Annexe 4: Selection of pictures from the workshop


NATURE YETU
The Mauritian Free-tailed Bat Project
Pioneering a participatory and multi-stakeholder approach to build a conservation strategy and action plan in Mauritius.
Perception
If you had to rank these species in order of importance to you?
A
B
C


EXIT
LECTURE HALL -1
NATURE YETU
The Mauritian Free-tailed Bat Project
Pioneering a participatory and multi-stakeholder approach to build a conservation strategy and action plan in Mauritius.
NATURE YETU
TIBEC