ASSESSMENT TOOL / MODEL **Indicators of Resilience in Socio-Ecological Production Landscapes and Seascapes (SEPLS)**

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This study assesses the resilience in Socio-Ecological Production Landscapes and Seascapes (SEPLS). Twenty indicators have been selected to help communities assess the resilience of the socio-ecological systems in the landscapes and seascapes on which they rely for their well-being. The indicators provide a framework for discussion and analysis of cultural, social, economic, ecological and agricultural conditions. In this way, synergies and trade-offs can be identified and strengthened.

NOTE An example of this tool in use is included as a case study at the end of this learning material.

Overview

The indicators are a tool for engaging local communities in adaptive management of the landscapes and seascapes in which they live.

The indicators aim to provide communities with a framework for discussion and analysis of cultural, social, economic, ecological, and agricultural conditions, the synergies and trade-offs between these areas of intervention to strengthen SEPLS resilience.

Measurement of resilience in SEPLS is based on the observation, perceptions and experiences of the local communities themselves.

Relevance of the level of analysis

Socio-Ecological Production Landscapes and Seascapes (SEPLS) are mosaic production landscapes shaped by the long-term co-existence between humans and nature (Gu and Subramanian 2012; Sterling et al., 2017). SEPLS generally includes a mosaic of land-uses from which communities derive the goods and services they depend on directly or indirectly. Similarly, communities directly impact SEPLS' resource base through the regular interactions with the natural biodiversity these landscapes embed. Therefore, a SEPLS may be delineated by administrative boundaries (e.g., a national park or state borders) or geographic boundaries (e.g., a watershed) or other factors. Despite the long and relative harmonious co-existence between humans and nature, more frequent and intense social, economic, and environmental pressures and shocks affect the resilience and sustainable management of SEPLS.

To foster innovation, adaptation, and sustainable biodiversity management with local communities in SELPS, 20 resilience indicators were selected and tested through a comprehensive consultation process with community members, local NGOs, and research institutes worldwide. The indicators provide insights from the cultural, social, economic, ecological, and agricultural dimensions that influence the resilience of SEPLS, also facilitating the identification and discussion of trade-offs and synergies between dimensions by local communities.

Populating the 20 quantitative and qualitative indicators required close collaboration with communities through group discussions, interviews, and people-to-people interchanges. The process also included collecting, sharing, and discussing observations, tallies, perceptions, desires, visions, and experiences. Hence, the culturally grounded indicators offer communities a systematic and comprehensive framework for collectively analyzing their SEPLS and planning strategies to re-build the resilience grounded on biocultural views.

Model/tool description

Resilience in production landscapes and seascapes depends on the interlinked, dynamic and evolving cultural, social, economic, ecological, and agricultural systems. The indicators approach considers these multiple dimensions influencing ecosystem functioning and assesses temporal changes to facilitate identifying knowledge gaps, trade-offs, and intervention areas to improve the resilience of target communities. Several principles informed the selection of the indicators, including that they should be easy to understand by local land users, reflect the views of various stakeholders, and capture people's perceptions and needs that change over time.
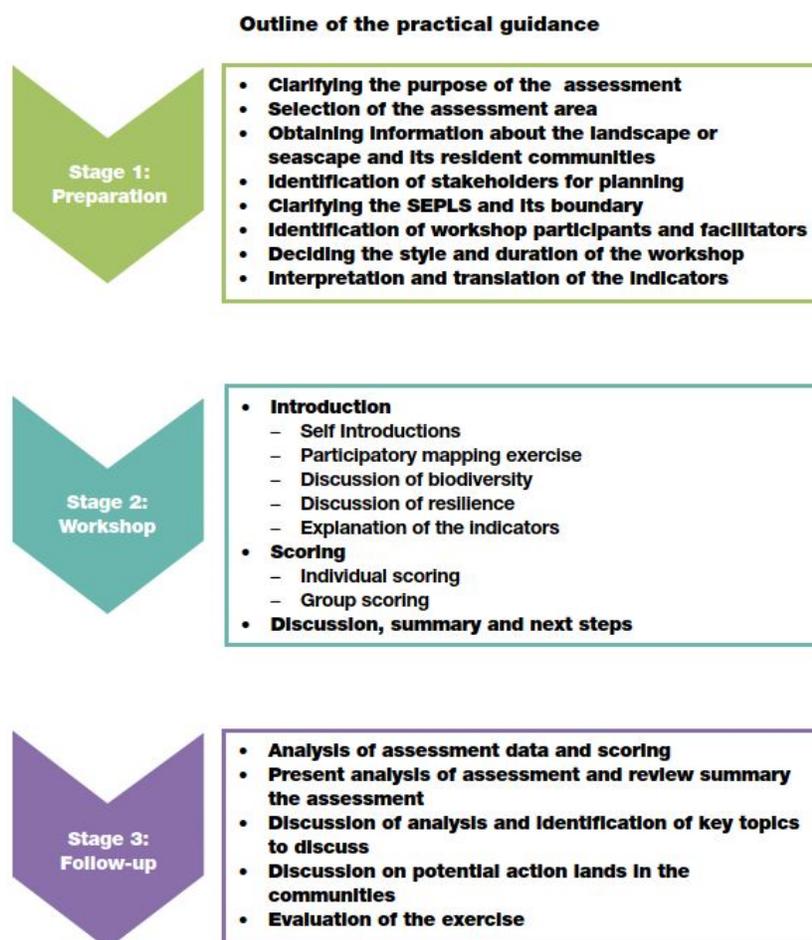
Outline of the practical guidance

Stage 1: Preparation
- **Clarifying the purpose of the assessment**
- **Selection of the assessment area**
- **Obtaining information about the landscape or seascape and its resident communities**
- **Identification of stakeholders for planning**
- **Clarifying the SEPLS and its boundary**
- **Identification of workshop participants and facilitators**
- **Deciding the style and duration of the workshop**
- **Interpretation and translation of the indicators**

Stage 2: Workshop
- **Introduction**
  - Self Introductions
  - Participatory mapping exercise
  - Discussion of biodiversity
  - Discussion of resilience
  - Explanation of the indicators
- **Scoring**
  - Individual scoring
  - Group scoring
- **Discussion, summary and next steps**

Stage 3: Follow-up
- **Analysis of assessment data and scoring**
- **Present analysis of assessment and review summary the assessment**
- **Discussion of analysis and identification of key topics to discuss**
- **Discussion on potential action lands in the communities**
- **Evaluation of the exercise**

Figure 1. *A resilience assessment generally consists of three main stages: 1) preparation, 2) assessment workshop and 3) follow-up.*

Twenty indicators have been selected to help communities assess the resilience of the socio-ecological systems in the landscapes and seascapes on which they rely for their well-being. The indicators are grouped into five areas, outlining practices and institutions that contribute to resilience in SEPLS and account for the specific social and ecological functions and components that make up the SEPLS system as follows:

Landscape or seascape diversity and ecosystem protection
1. Landscape/seascape diversity
2. Ecosystem protection
3. Ecological interactions between different components of the landscape/seascape
4. Recovery and regeneration of the landscape/seascape

Biodiversity (including agricultural biodiversity)
5. Diversity of local food system
6. Maintenance and use of local crop varieties and animal breeds
7. Sustainable management of common resources

Knowledge and innovation
8. Innovation in agriculture and conservation practices
9. Traditional knowledge related to biodiversity
10. Documentation of biodiversity-associated knowledge
11. Women's knowledge

Governance and social equity
12. Rights in relation to land/water and other natural resource management
13. Community-based landscape/seascape governance
14. Social capital in the form of cooperation across the landscape/seascape
15. Social equity (including gender equity)

Livelihoods and well-being
16. Socioeconomic infrastructure
17. Human health and environmental conditions
18. Income diversity
19. Biodiversity-based livelihoods
20. Socio-ecological mobility

Details for potential users

Proposed users - With the support of a facilitator, the tool can be used by landscape community members; NGOs and development agencies implementing projects in SEPLS; Policymakers and project planners; Researchers

Model input -
- Definition of the purpose of the assessment.
- Identification of facilitators
- Selection of the assessment area (i.e. GIS or participatory mapping).
- Collection of baseline data on land uses, population, rainfall, livelihoods and others, as well as biodiversity and its perceived value.
- Identification and consultation with local stakeholders.
- Definition of the style and duration of the workshop with stakeholders
- Resilience assessment workshop – one for each identified group (i.e. men, women or age groups).

Model output -
- Map of the assessment area.
- Assessment of each indicator and individual and overall scores.
- Diagrams showing scoring of indicators.
- Creation of action plans for landscape and seascape resilience strengthening strategies.
- Adaptive management plans through repeated resilience assessments.

Time period for different steps of model use and analysis - Timing for the preparatory phase depends on the available information and existing interactions with the community stakeholders.
1.5 days are needed to conduct the three steps of the resilience assessment workshop (preparation, workshop, follow up).

Key terms

- ○ **Socio-Ecological Production Landscape and Seascape** - dynamic bio-cultural mosaics of habitats and land and sea uses where the interaction between people and the landscape maintains or enhances biodiversity while providing humans with the goods and services needed for their well-being.

- ○ **Resilience** - resilience refers to the "capacity of a system to deal with change and continue to develop; withstanding shocks and disturbances and using such events to catalyze renewal and innovation.

- ○ **Agricultural biodiversity** - the variety and variability of animals, plants and micro-organisms that are used directly or indirectly for food and agriculture.

- ○ **Participatory approaches** - specific methods employed to achieve active participation by all members of a group in a decision making process and to ensure equal opportunities for everybody involved.

- ○ **Land uses -** involves the management and modification of natural environment or wilderness into built environment such as settlements and seminatural habitats such as arable fields, pastures, and managed woods.

Manuals, tutorials, or other learning materials:

- [https://www.bioversityinternational.org/e-library/publications/detail/toolkit-for-the-indicators-of-resilience-in-socio-ecological-production-landscapes-and-seascapes/]

- https://www.researchgate.net/publication/340061632_Assessing_Agrobiodiversity_A_Compendium_of_Methods

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Key references

Osamu Saito, Suneetha M Subramanian, Shizuka Hashimoto, Kazuhiko Takeuchi (Eds), 2020. Managing Socio-ecological Production Landscapes and Seascapes for Sustainable Communities in Asia. Mapping and Navigating Stakeholders, Policy and Action. Science for Sustainable Societies. Springer, Singapore. https://doi.org/10.1007/978-981-15-1133-2

Case Studies

Case studies can be found in Chapter 6 of the following publication https://doi.org/10.1007/978-981-15-1133-2.
And also in: https://www.researchgate.net/publication/313165143_Landscapes_for_Agrobiodiversity
And: https://www.berghahnjournals.com/view/journals/environment-and-society/8/1/ares080104.xml

Applying the model: The model can be used to gain a common understanding of the state of the landscape or seascape, to Identify strengths of and threats to the landscape or seascape, to empower local communities to strengthen their resilience, to develop landscape/seascape management strategies and identify possible collaborative actions in the landscape or seascape to strengthen resilience, to enhance trust and social capital in communities and resolve conflict, to monitor resilience of the landscape or seascape and its communities over time.

Because this indicator approach is based on community members' perceptions, it is limited in that it cannot be used for comparison of different SEPLS, rather collecting subjective information for the use of the community itself.