Indicators for Resilience in SEPLs: Development and Field Testing

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Bioversity International

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Socio-ecological Production Landscapes (SEPLs)

Mosaic production landscapes that have been shaped through long-term harmonious interactions between humans and nature in a manner that fosters well-being while maintaining biodiversity and ecosystem services (Gu & Subramanian 2012)

Photo by N. Bergamini

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Resilience in SEPLs

The capacity to:
i.   absorb shocks and
        maintain function
ii.   self-organize and
iii.   learn and adapt

Photo by S. Padulosi

Indicators of resilience in SEPLs

Measuring community's capacity to adapt to change while maintaining biodiversity

Photo by N. Bergamini

Purpose of indicators

1. Measure the impact of agricultural and other land management practices on ecosystem integrity and community wellbeing

2. Measure the benefits that wild landscapes and niches provide to livelihoods in managed ecosystems

3. Measure interactions between people and the various components of mosaic landscapes and biodiversity rich production systems

4. Assess community ability to adapt, innovate and maintain resilience in "Satoyama" landscapes

5. Establish a common understanding between conservation and development agencies and communities to establish an alternative global paradigm for conservation and development

Why develop indicators?

Indicators establish a set of agreed points in a process:

- Indicators of ecological processes that are being maintained or changing.
    - Ecosystem integrity, richness, distribution of biodiversity and bio-resources
    - Flows across components of a landscape and across ecosystems, and their impacts
- Indicators of progress towards common goals MDGs, conservation targets, community cohesion and reduced marginalization.
- Indicators can be applied to several concomitant processes
    - to manage tradeoffs or prioritise actions in the case of conservation and community development
    - To manage different land use practices in mosaic landscapes for ecosystem
    integrity, long term productivity. E.g interface between cultivated and wild landscapes, or pastoralism, forests uses, farming and conservation rules.

Socio-ecological resilience indicators

Bringing together communities, scientists, conservationist and other actors to strengthen communities' capacity to adapt to change while maintaining biodiversity.

Four categories comprising 20 indicators

- Ecosystems protection and the maintenance of biodiversity

- Agricultural biodiversity

- Knowledge, learning and innovation

- Social equity and infrastructure

Developing strategies for

- Conserving biodiversity at various scales (from genetic to landscape level)

- Sustaining evolution and adaptation processes that maintain and generate diversity

- Empowering local communities and strengthening their role as innovators and custodians of biodiversity

Socio-ecological resilience indicators

Testing sites

❖ In Cuba, Kenya, Bolivia and Nepal

Further testing

❖ Several IPSI partners expressed interest in testing the indicators

• The Potato Park in Peru

• Co-management and sustainable herding in Mongolia

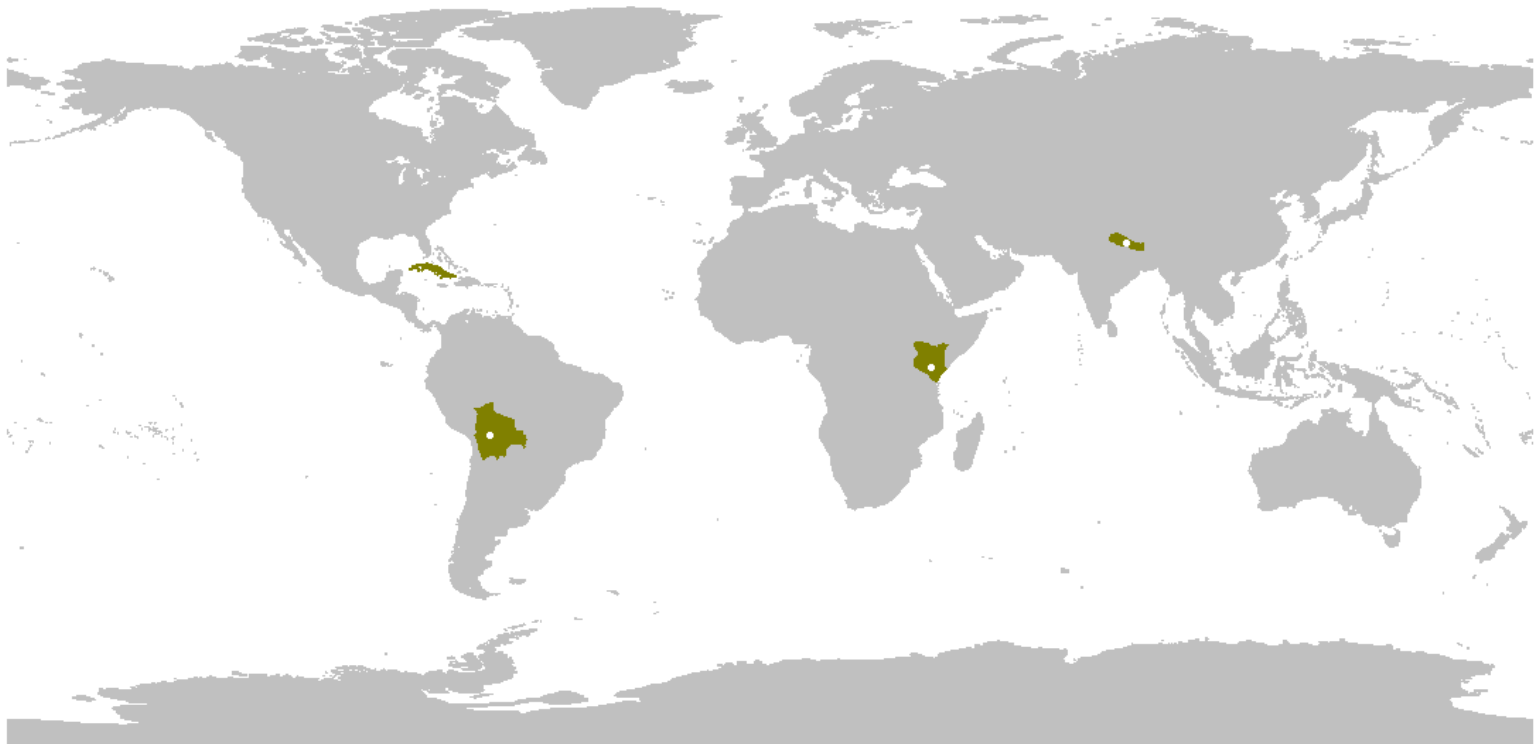# Case study sites in Cuba, Bolivia, Kenya and Nepal

Figure by D. Mijatovic

# Cuba case study – Cuchillas del Toa MaB reserve

- One of the most biologically diverse tropical island sites on earth

- First field testing of the indicators Oct-Nov 2011

Results:

- Identified areas of intervention in social infrastructures, access and sharing of information

Lessons:

- Fine tuning of some of the indicators' text to improve shared understanding

- Need to develop a methodology for testing
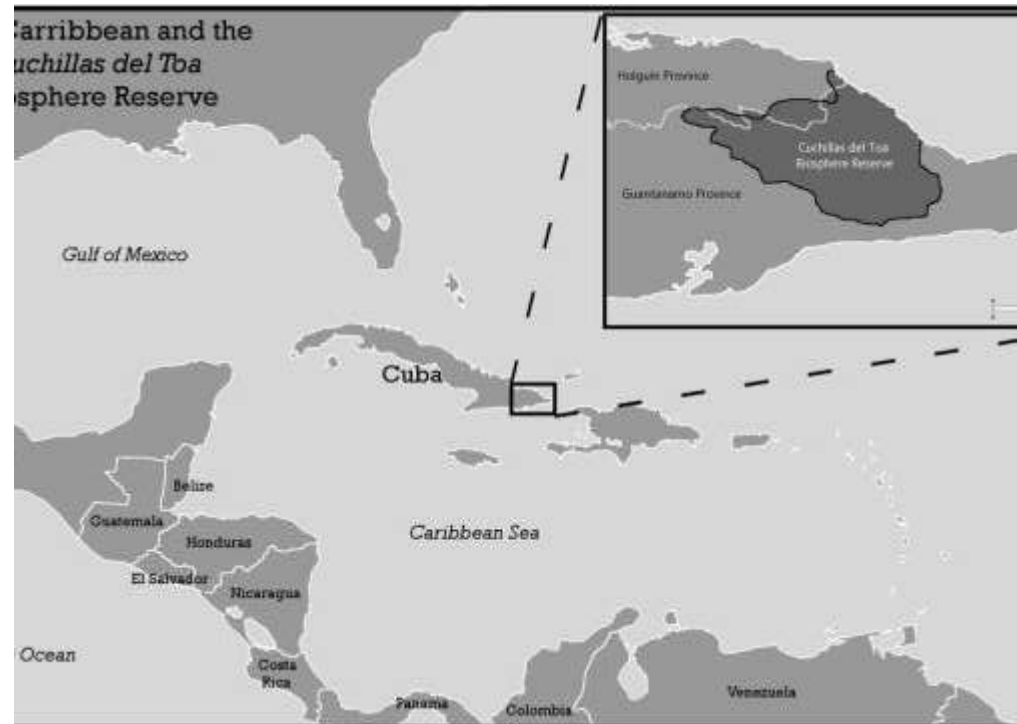
Methodology developed for Kenya, Nepal and Bolivia case studies

Focus group method (a group of 7 participants with good gender and age balance):

1. Introduction (common understanding of "landscape" & "resilience")

   - Landscape (Indigenous map of the landscape & ABD richness)

   - Resilience (Timeline, resilience & adaptation)

2. Questions

   - Individual answer

   - Group answer (agreement on categories, consensus)

Testing of the indicators in the Kitui landscape, Kenya

In the Eastern Province of Kenya. Kyanika and Museve villages
Climate: semi-arid with two rainy seasons

Results

- Increasing importance of
    - traditional drought-resistant crops (e.g. sorghum, millets),
    - wild plants (e.g. wild fruit trees)
    - Introduction of new crops
    - and the maintenance of landscape diversity (e.g. use of fields and gardens in different micro agro-ecological zones (landscape scale diversity)

Photos by Y. Morimoto

Extreme weather events in Kitui

Extreme drought (Oct 2009) and Extreme wetness (Mar 2010)
Both months are the hottest and driest in the year

Testing of indicators in Candelaria landscape, Bolivia

In the Department of Cochabamba in the Puna ecological zone at elevations between 3000-4100 masl
Results

– Vertical integration, intercropping and crop rotations, practices used to cope with climate change risks, to maintain soil fertility and regulate pests and disease are being modified due to expansion and intensification of Agriculture

– High levels of species and traditional varieties of (potato, oca, papalisa and isaño)

– Capacity to learn and adapt to changing temperatures (benefits from climate change)

Lessons

– Cultivation of traditional crops and varieties, unless combined with farm diversification and ecosystem protection, cannot ensure high resilience

Photo by H. Gruberg

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Testing of the indicators in the Begnas landscape, Nepal

In the Lekhnath Municipality of Kaski District Begnas is a subtropical valley in the Himalayas

Results

- Highest capacity to adsorb stresses due to: restoration and protection of ecosystems, diverse production systems, rich ABD, high level of organization and cohesion at the landscape level

- Capacity to learn and adapt to climate change

- Adoption of perennials and diversification of farming systems (goats, bee-keeping and fisheries)
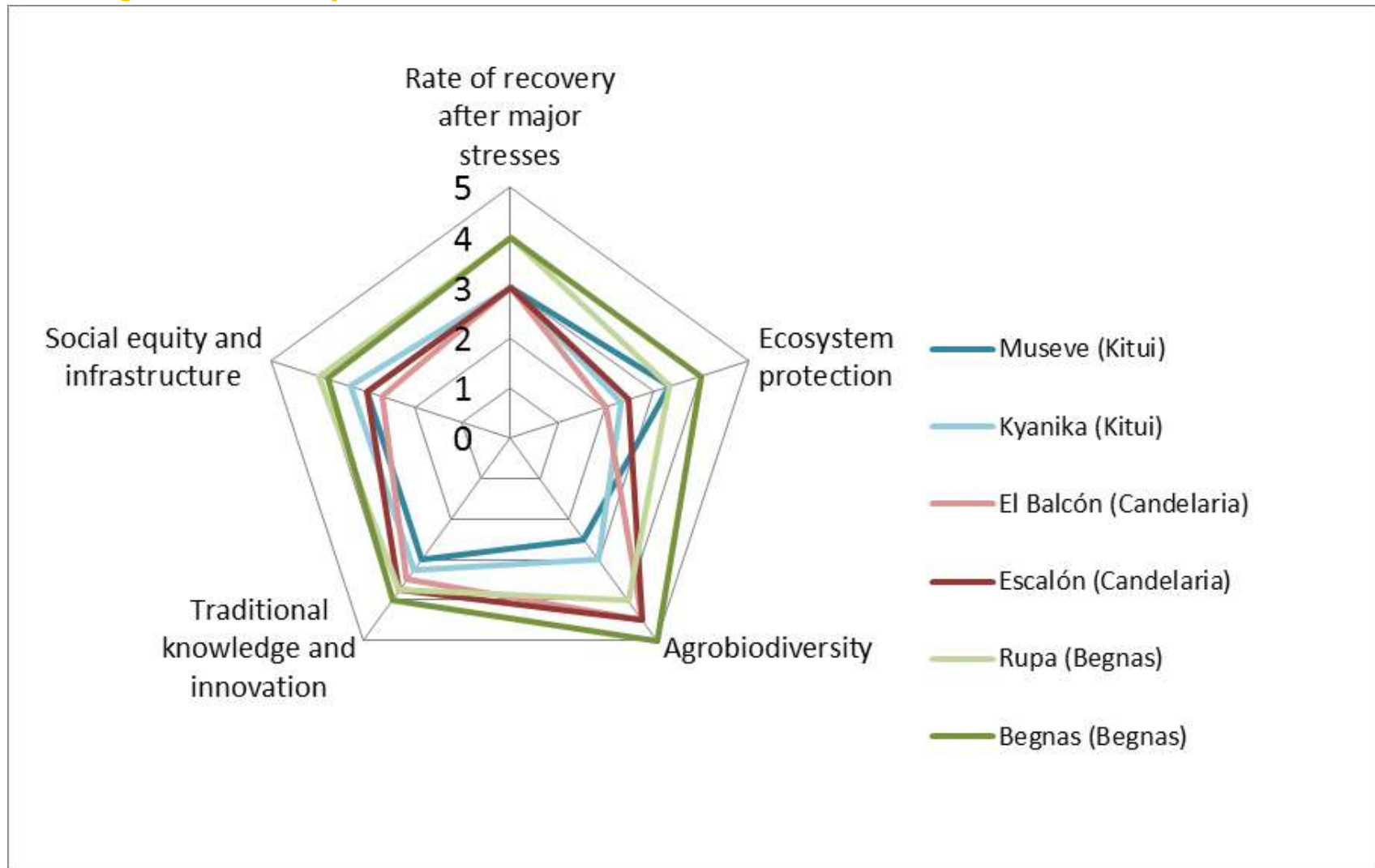
Lessons

- A resilient SEPL can be achieved by strengthening and building local institutions for the sustainable management of ABD and ecosystems

Photo by S. Padulosi

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Social-ecological resilience to climate change (case study results)

Lessons

- **Indicators help to reach a common understanding of threats and solutions, and define resilience-strengthening strategies (improving access to seeds, planting trees, protecting sacred sites, reducing deforestation.)**

- **Accessing new knowledge and practices from other communities, NGOs, research organisations.**

SEPLs indicators the way forward

- **Development**

- **Testing to identify gaps**

- **Policy report to explain the considerations that went into creating the list of indicators and outcomes of first testing**

- Development of a Manual to assist in the use and to describe lessons learnt form their application

- Testing in a wider range of landscapes and seascapes to include pastures, wetlands and coastal area

- Dissemination

UNU-IAS Policy report

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Indicators of Resilience in Socio-ecological Production Landscapes (SEPLs)

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Need to test the indicators in a wider range of landscapes and seascapes

➢ Pastoral systems

➢ Wetland and coastal areas

Hypothesis:

Naturally renewable resources opposed to cultivated crops

Need to capture issues like common pool resources governed by common property regimes based on self management by local communities

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