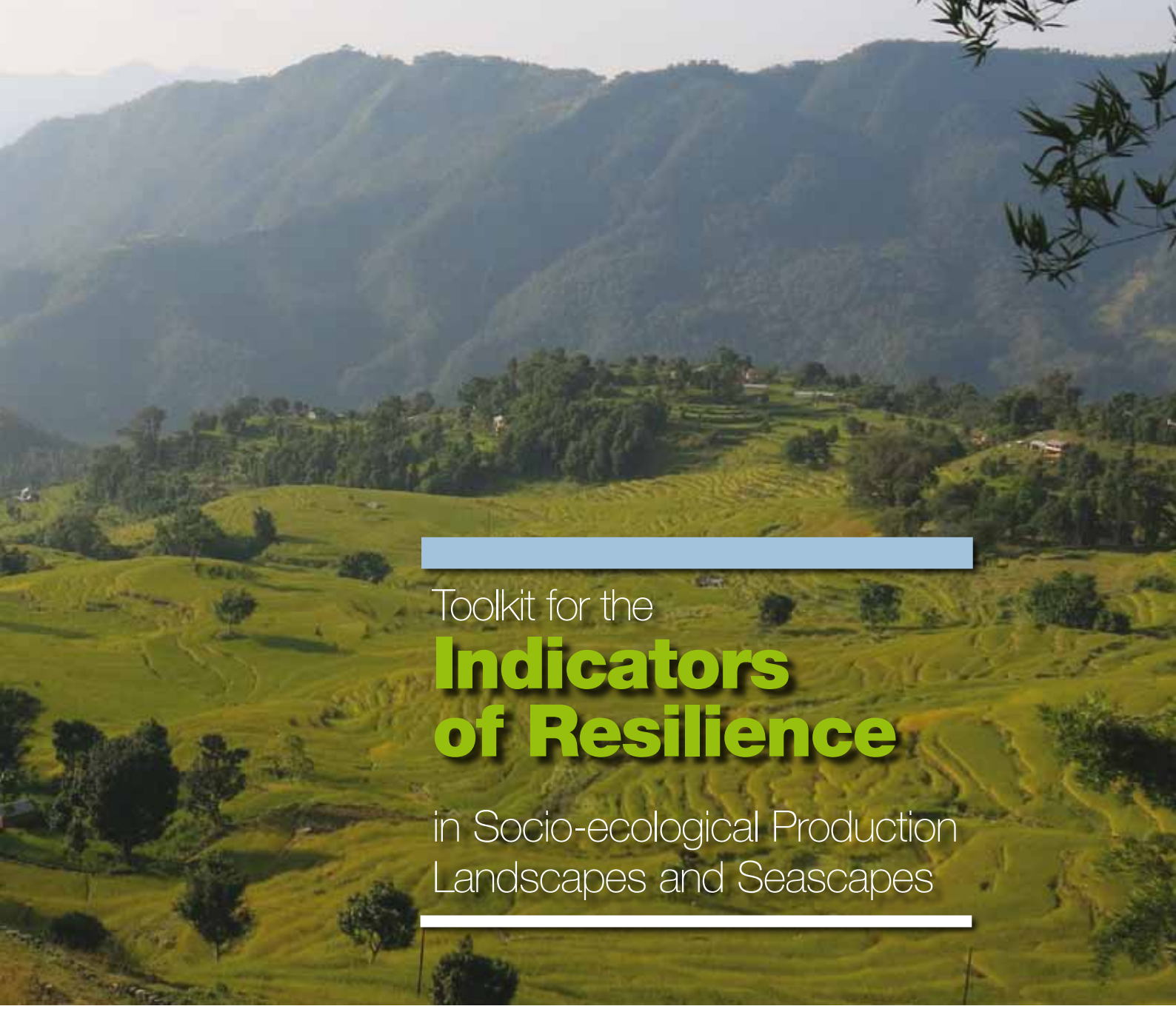

Toolkit for the **Indicators of Resilience**

in Socio-ecological Production Landscapes and Seascapes

SATOYAMA INITIATIVE

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Water, Land and Ecosystems

Toolkit for the

Indicators of Resilience

in Socio-ecological Production Landscapes and Seascapes

Citation

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The toolkit is also based on the useful inputs from a number of individuals who participated in the following events on the indicators and the toolkit: UNU-IAS Seminar on the indicators (April 2013, Yokohama, Japan), Expert Workshop on a draft toolkit for the indicators (July 2013, Yokohama, Japan) organized by UNU-IAS and IGES, Seminars on Indicators Research (January 2014, Rome, Italy) organized by Bioversity International. Participants in these events include Maurizio Farhan Ferrari (Forest Peoples Programme), Fumiko Fukuoka (UNDP), Yoko Watanabe (GEF Secretariat), Hongyan Gu (Shanghai Academy of Social Sciences), Rikiya Konishi (Ministry of the Environment, Japan), Fumiko Nakao (Ministry of the Environment, Japan), Dorothy Wanja Nyingi (Kenya Wetland Biodiversity Research team, KENWEB), Naohisa Okuda (Ministry of the Environment, Japan), Krishna Chandra Paudel (Government of Nepal), Suneetha M Subramanian (UNU-IAS), and Atsuhiro Yoshinaka (SCBD).

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TABLE OF CONTENTS

Floating islands on lake Titicaca, Puno, Peru

Foreword

As I have watched the development of the Indicators of Resilience in Socio-ecological Production Landscapes and Seascapes (SEPLS), I have come to believe that these have the potential to be one of the most effective tools for not only measuring, but also raising awareness of the concept of resilience in the field of sustainable development.

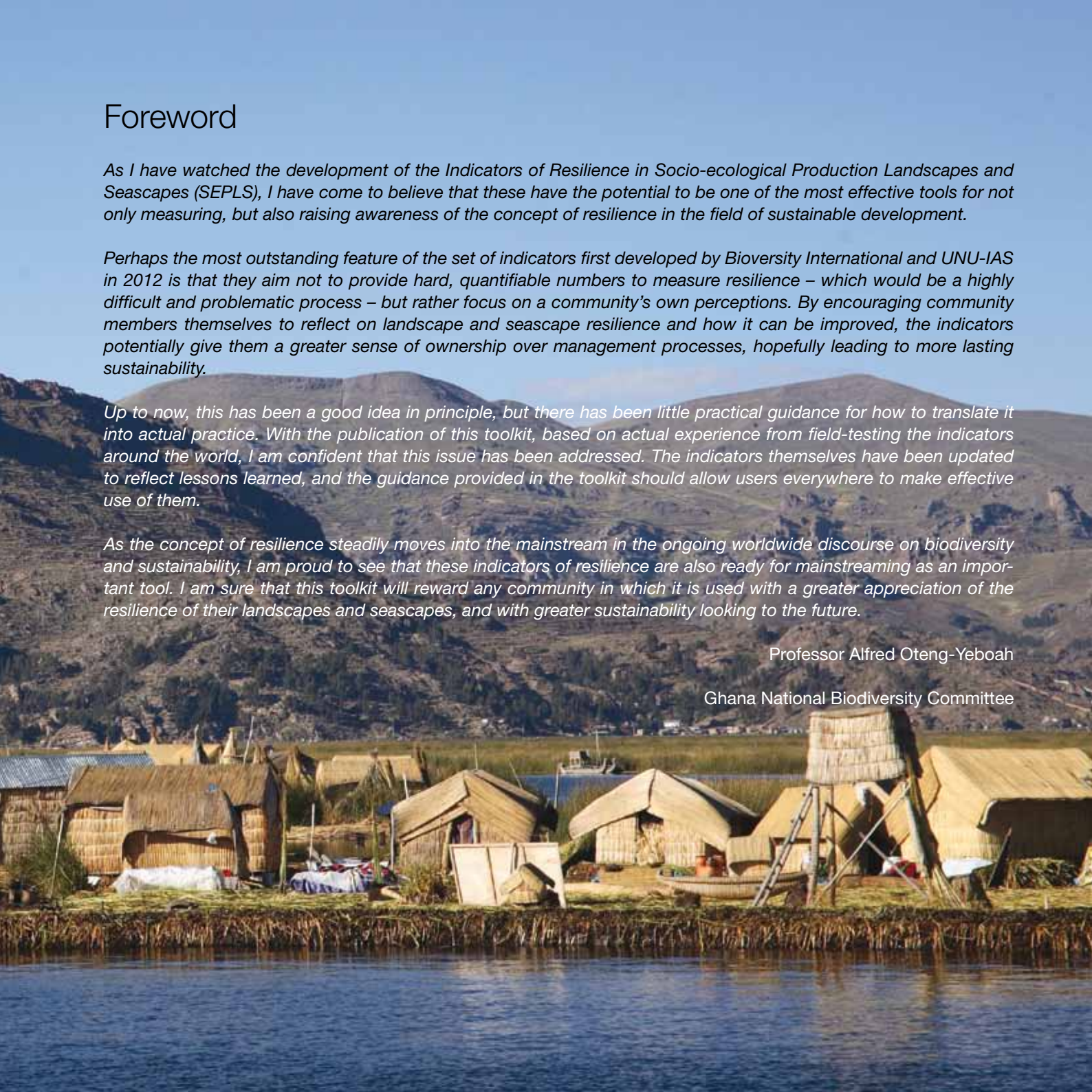
Perhaps the most outstanding feature of the set of indicators first developed by Bioversity International and UNU-IAS in 2012 is that they aim not to provide hard, quantifiable numbers to measure resilience – which would be a highly difficult and problematic process – but rather focus on a community's own perceptions. By encouraging community members themselves to reflect on landscape and seascape resilience and how it can be improved, the indicators potentially give them a greater sense of ownership over management processes, hopefully leading to more lasting sustainability.

Up to now, this has been a good idea in principle, but there has been little practical guidance for how to translate it into actual practice. With the publication of this toolkit, based on actual experience from field-testing the indicators around the world, I am confident that this issue has been addressed. The indicators themselves have been updated to reflect lessons learned, and the guidance provided in the toolkit should allow users everywhere to make effective use of them.

As the concept of resilience steadily moves into the mainstream in the ongoing worldwide discourse on biodiversity and sustainability, I am proud to see that these indicators of resilience are also ready for mainstreaming as an important tool. I am sure that this toolkit will reward any community in which it is used with a greater appreciation of the resilience of their landscapes and seascapes, and with greater sustainability looking to the future.

Professor Alfred Oteng-Yeboah

Ghana National Biodiversity Committee



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Semau island, Indonesia

Chapter 1: **Introduction**

1.1 About this toolkit

This toolkit provides practical guidance for making use of the "Indicators of Resilience in Socio-ecological Production Landscapes and Seascapes (SEPLS)" in the field. The indicators are a tool for engaging local communities in adaptive management of the landscapes and seascapes in which they live. By using the tested methods presented in this toolkit, communities can increase their capacity to respond to social, economic, and environmental pressures and shocks, to improve their environmental and economic conditions, thus increasing the social and ecological resilience of their landscapes and seascapes, and ultimately make progress towards realizing a society in harmony with nature.

The approach presented here is centred on holding participatory "assessment workshops". These involve discussion and a scoring process for the set of twenty indicators designed to capture communities' perceptions of factors affecting the resilience of their landscapes and seascapes. The participants in these workshops are members of the local community and stakeholders in the local area. Their participation allows them to evaluate current conditions across the landscape and identify and reach agreement on priority actions, contributing to enhanced communication among stakeholders and empowered local communities. Workshops may be planned and implemented by people from within or outside the community. The guidance provided in this toolkit is primarily intended for organizers and facilitators of resilience assessment workshops.

The toolkit is divided into four chapters. Chapter 1 explains the conceptual background, the purpose, uses and benefits of the indicators. Chapter 2 introduces the twenty indicators themselves. Chapter 3 provides practical guidance on how to use the indicators in an assessment workshop held by the local community. This involves steps to be taken before, during and after the workshop itself, including follow-up discussions and repeated workshops, encouraging a continuing, long-term, adaptive approach to management. Chapter 4 presents examples of past use of the indicators to highlight certain aspects of the assessment process.

To understand the rationale and purpose of the indicators, the toolkit reviews two basic concepts: "socio-ecological production landscapes and sea-scapes (SEPLS)" and "resilience".

1.2 Socio-ecological production landscapes and seascapes (SEPLS)

Humans have influenced most of the Earth's ecosystems through production activities such as agriculture, forestry, fisheries, herding and livestock production. While human impacts are often thought of as harmful to the environment, many such human-nature interactions are in fact favourable to or synergistic with biodiversity

conservation. Around the world, local communities' efforts over many years to adapt to the surrounding environment and enjoy its bounty for the long term have created unique and sustainable landscapes and seascapes that have provided humans with goods such as food and fuel, and services such as water purification and rich soil, while hosting a diversity of animal and plant species.

These landscapes and seascapes vary widely due to their unique local climatic, geographic, cultural, and socio-economic conditions. However, they are commonly characterized as 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. A variety of different names exist for these areas across countries and languages, including *dehesa* in Spain, *ahupua'a* in Hawaii, and *satoyama* in Japan, so the term "socio-ecological production landscapes and seascapes" (SEPLS) has been coined to refer to them collectively.

SEPLS have protected biodiversity and provided local communities with ecosystem services around the world for many years. However, with rapidly-growing human demands for food and other goods in recent years, as well as changes in socio-economic systems due to industrialization, urbanization and globalization, diverse production areas have been transformed towards more uniform systems requiring intensive use of external inputs such as chemical fertilizers, pesticides, and herbicides. Over time, this has had significant impacts on the associated biodiversity and ecosystems that underpin agricultural production activities. These impacts can be measured in terms of loss of resilience and sustainability in production areas to an extent that threatens human well-being, due to the degradation of natural resources and reductions in ecosystem services.

Dynamic mosaic of habitats and land uses in Gamri Watershed, Bhutan

1.3 Resilience in SEPLS – What is it?

Local communities and the ecosystems they live in may experience pressures and disturbances of different types and degrees, from extreme weather events to market shocks and profound demographic and institutional changes. Forests, farmlands, lakes and other habitats are affected by fires, storms and droughts, and nearly all landscapes and seascapes are affected to some degree by human-induced pressures such as pollution, soil erosion, deforestation and introduction of invasive species that can lead to ecosystem degradation. Events such as political unrest and economic crises impact human societies, causing changes to the way ecosystem goods and services are used. These disturbances can directly and indirectly affect the livelihoods of local communities, for example through higher input prices, reduced production and lower crop prices. In addition to the impacts from these shocks and short-term disturbances, ecosystems are influenced by relatively gradual but continuous changes in the climate and socio-cultural practices and institutions.

While some changes may cause critical damage to ecosystems and people's livelihoods, SEPLS vary in the degree to which their communities can absorb, resist and/or recover from these impacts. The ability of a SEPLS to absorb or recover – in terms of both ecosystem processes and socio-economic activity – from various pressures and disturbances without lasting damage is what is referred to as the "resilience" of the SEPLS. More generally, 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"[1]. Maintaining resilience in SEPLS is crucial for securing ecosystem services and sustainable production systems for the long term, both benefiting local communities and contributing to global sustainable development objectives.

Strengthening of SEPLS resilience by local communities

The long-term persistence of community-managed SEPLS that employ appropriate management and use of natural resources and biodiversity defines them as resilient systems. Nevertheless, many communities face growing challenges in maintaining these landscapes and the social and ecological processes that sustain them, especially in the face of rapid and often interrelated changes in socio-economic systems, accelerated by increasing climate change and ecosystem degradation. Communities, as the primary managers of the processes and resources of SEPLS, must reinforce existing management practices and institutions, and innovate in order to adapt to these changes and restore or strengthen the social and ecological resilience of their landscapes and seascapes.

1 Stockholm Resilience Center (2014) What is Resilience?. http://www.stockholmresilience.org

Resilience in SEPLS is a product of ecological, social, cultural and economic systems, dynamically linked to each other in ways that create synergies. Improvements in ecosystem services, for example, may require the adoption of new methods of natural-resource management, or new types of diversity in crops, animals and associated species. It may also require appropriate local governance mechanisms, including agreed-on rules on resource access, use and exchange, which may be embedded in formal and/or non-formal institutions. Increased sustainability of agro-ecosystems may require that access and equity issues be addressed, such as support for the role of women in crop selection, production and marketing.

The management of interlocking social and ecological systems requires the capacity to accept and cope with complexity and continuing adaptation. This capacity is associated with rural communities that depend on the wide range of functions, products and services that their landscapes provide. The resilience indicators in this toolkit are designed to contribute to a community's sense of ownership over the planning, implementation, monitoring and evaluation of their production and resource-management practices. Lessons and knowledge generated by these activities can then be used to communicate local visions and strategies for resilient landscapes and productive ecosystems as input into higher-level policies and programmes that affect community livelihoods as well as further conservation and resource-management planning.

1.4 About the indicators

Local communities require a more complete understanding of the status and changes in conditions in their landscapes and seascapes in order to strengthen resilience. However, resilience can be difficult to measure precisely because it is complex and multifaceted. Instead of attempting to define an overall

measure of resilience for SEPLS, this toolkit introduces an approach for monitoring SEPLS using a set of indicators designed to capture their essential attributes.

Pastoral landscape in Jequitinhonha Valley, Brazil

The Indicators of Resilience in SEPLS consist of a set of 20 indicators designed to capture different aspects of key systems – ecological, agricultural, cultural and socio-economic. They include both qualitative and quantifiable indicators, but measurement is based on the observations, tallies, perceptions and experiences of the local communities themselves. They are to be used flexibly and can be customized to reflect the circumstances of each particular landscape or seascape and its associated communities.

The spatial scale of SEPLS, in the context of using the indicators, depends on how local community members themselves identify the area they depend on for their survival and livelihood. It generally includes the mosaic of land-uses from which communities derive the goods and services on which they depend directly or indirectly and where they have a direct impact on the resource base and regular interactions with the natural biodiversity. A SEPLS may be delineated by administrative boundaries (e.g., a national park or state borders) or geographic boundaries (e.g., a watershed), or by other factors.

Seascape in the Bouma National Heritage Park on Taveuni Island, Fiji

Inland water landscape at Begnas Lake, Nepal

The indicators aim to provide communities with a framework for discussion and analysis of socio-ecological processes essential for SEPLS resilience. This relates to critical livelihood and development objectives such as food security, agricultural sustainability, institutional

and human development, provision of ecosystem services and conservation of biodiversity, strengthening of community- and landscape-level organizations, and landscape governance for equity and sustainability. Discussion of the indicators within communities stimulates knowledge-sharing and analysis, which are key factors in creating social capital for landscape governance, planning and management, and fosters community ownership of this process. Periodic use of these indicators enables evaluation of progress towards development and sustainable management objectives and identification of priority actions for local innovation and adaptive management.

The indicators can contribute to local communities and other stakeholders in the following areas:

- **Understanding SEPLS resilience**

The indicators provide an analytical framework for understanding resilience and its status and changes in SEPLS. They are defined and measured in terms that are easy for local communities to understand and use, and can be adapted for successive analyses. By assessing current conditions and trends in different aspects of SEPLS, users can understand resilience as a multidimensional objective.

- **Supporting development and implementation of resilience-strengthening strategies**

The indicators can help to identify and track social processes, institutions, and practices for land-use, conservation, and innovation that are part of a resilient system's capacity to adapt and change. Through review and discussion of assessment results, communities can learn what areas and factors to focus on, which may include components of agricultural biodiversity, food security, ecosystem services, livelihood, governance and others.

- **Enhancing communication among stakeholders**

Because they provide a framework with a common set of parameters, the indicators can enhance the exchange of experiences and information within and beyond SEPLS and their communities, for example,

Landscape heterogeneity in the Cuchillas del Toa Biosphere Reserve, Cuba

between upstream and downstream communities and among communities in different geographic regions.

- **Empowering communities in decision-making processes and adaptive management**

Use of the indicators facilitates a continuous process of discussion and participation within local communities, leading to knowledge of what works and what does not. This kind of adaptive management model promotes a greater sense of ownership among the people living in SEPLS, encouraging them to be active at the policy-making level. Using the indicators as a framework for discussion also helps create consensus on what needs to be done to build or enhance resilience across the landscape and guide decisions and implementation.

1.5 Who can benefit from using the indicators?

While the indicators are primarily designed to be used by local communities, they have the potential to be valuable tools for others such as NGOs, development agencies, and policy-makers. The indicators may also be helpful for researchers to understand SEPLS and how communities see their landscape or seascape. The role of facilitator may be more important in situations where it is difficult for communities to use the indicators on their own.

The following are some possible benefits for different users.

Local communities:
- Increase common understanding of SEPLS (e.g., conditions and threats to them) among and beyond community members
- Identify priority issues and actions for sustaining SEPLS that benefit livelihoods and well-being, and to evaluate past efforts that community has made
- Contribute to enhancing trust and social capital in communities and resolving conflicts
- Inform policymakers, donors, and relevant stakeholders on the situation of their SEPLS and necessary areas for support in a more efficient manner
- Exchange experiences with communities who have tried the indicators

NGOs and development agencies implementing projects in SEPLS:
- Enhance understanding of resilience from the perspective of local communities
- Promote participatory processes
- Monitor and evaluate project interventions on resilience and biodiversity conservation and identify areas for support
- Communicate with policymakers and donors on the situation of the SEPLS they are working with and necessary areas for support in a more efficient manner

Policymakers and project planners:
- Better understand local conditions from the perspective of local communities
- Improve communication with local communities
- Identify areas that need to be improved and reflect these in policymaking, planning, and other decision-making processes
- Increase coherence across different project sites by applying a common analytical framework and tools

Researchers:
- Enhance multi-dimensional understanding of local conditions from the perspective of local communities
- Deepen the understanding of resilience by examining results from different sites
- Identify research gaps

INDICATOR APPROACHES AT DIFFERENT LEVELS

Indicator approaches are used increasingly in various sectors and contexts. At the global and national scales they play important roles in monitoring progress toward achieving specific goals and targets. For example, around 100 indicators have been listed[1] to monitor the progress of implementation of **the Strategic Plan for Biodiversity 2011-2020**[2] and the **Aichi Biodiversity Targets**[3], adopted during the CBD COP 10 in Japan in 2010 to provide a framework for action by all stakeholders to protect biodiversity and enhance its benefits for people. **The Millennium Development Goals Indicators**[4] are a set of 60 indicators for the measurement of progress toward the Millennium Development Goals (MDGs)[5], eight international development targets to be met by 2015 for addressing extreme poverty. The UN agreed at the Rio+20 Conference in 2012 to develop a set of **Sustainable Development Goals** (**SDGs**)[6] and is currently working to define the goals and relevant indicators to be adopted in 2015.

National- and global-scale indicators need to be quantitative for comparison across space and time and to be able to aggregate data at larger spatial scales. They also must be scientifically valid and objective, with assessment often conducted by experts. Unlike these higher-level indicators, the Indicators of Resilience in SEPLS introduced in this toolkit are for use at the local level. They include both qualitative and quantifiable indicators, but measurement is based on the observations, perceptions and experience of the local communities themselves. These local observations can be complemented by scientific data and information from global and national observations and data sets as well as prior studies. However, external data should be able to be adopted into the local knowledge base. The indicators in this toolkit provide local communities with a framework to discuss both current conditions of resilience and potential areas for improvement as part of the process of adaptive management. This can lead to quick and proactive efforts by local communities to strengthen the resilience of their production landscapes and seascapes. It also provides a consistent process for monitoring resilience of the landscape or seascape and the implementation of measures to address components and factors that lead to reduced resilience.

The Indicators of Resilience in SEPLS partially overlap and complement some of the higher-level indicators. More resilient landscapes resulting from the use of the indicators and implementation of actions identified from their use will also contribute to global and national targets, such as those of the CBD (e.g., the Aichi Biodiversity Targets and National Biodiversity Strategic Action Plans), and the FAO International Treaty on Plant Genetic Resources for Food and Agriculture.

1 UNEP/CBD/COP/DEC/XI/3 (www.cbd.int/doc/decisions/cop-11/cop-11-dec-03-en.doc)
2 www.cbd.int/sp/
3 www.cbd.int/sp/targets/
4 mdgs.un.org/unsd/mdg/Host.aspx?Content=Indicators/OfficialList.htm
5 www.unmillenniumproject.org/goals/
6 sustainabledevelopment.un.org/index.php?menu=1300

BACKGROUND

The Indicators of Resilience in Socio-ecological Production Landscapes and Seascapes (SEPLS) and this toolkit were developed as a collaborative activity under the International Partnership for the Satoyama Initiative (IPSI).

The Satoyama Initiative is a comprehensive effort to spread awareness that protecting biodiversity entails the protection of both wild and human-influenced natural environments, such as farmland and secondary forest, which have been managed sustainably over a long time. It is also an effort at thoughtful action towards the conservation and use of such human-influenced natural environments. Established through a joint collaboration between the Ministry of the Environment of Japan (MOEJ) and the United Nations University Institute for the Advanced Study of Sustainability (UNU-IAS), the Satoyama Initiative was recognized during the 10th meeting of the Conference of the Parties to the Convention on Biological Diversity (CBD COP 10) in 2010.

From its inception, the Satoyama Initiative has taken a global perspective and sought to consolidate expertise from around the world regarding the sustainable use of resources in socio-ecological production landscapes and seascapes (SEPLS). To this purpose, on 19 October 2010 at CBD COP 10, the International Partnership for the Satoyama Initiative (IPSI) was established to promote the activities identified by the Satoyama Initiative. A total of 51 organizations entered into partnership as founding members of IPSI, and as of 2014, their number had more than tripled. As an international platform open to organizations dealing with SEPLS, IPSI has sought to foster synergies in the implementation of their respective activities, as well as other activities planned under the initiative.

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To date, over 20 IPSI Collaborative Activities have been initiated under IPSI, including this toolkit and its indicators, carried out by Bioversity International, the Institute for Global Environmental Strategies (IGES), the United Nations Development Programme (UNDP) and UNU-IAS. For more information on IPSI, please visit satoyama-initiative.org

The Indicators of Resilience in Socio-ecological Production Landscapes and Seascapes (SEPLS) were first developed by Bioversity International and UNU-IAS. The set of indicators has been tested in the field by Bioversity International in Bolivia, Burkina Faso, Cuba, Ethiopia, Fiji, Kenya, Mongolia, Nepal and Uganda, and also in selected areas in twenty countries participating in the Community Development and Knowledge Management for the Satoyama Initiative Programme of the United Nations Development Programme (UNDP-COMDEKS; see below) to form part of a baseline-assessment and community-consultation process to help measure and understand the resilience of target landscapes and seascapes. The field testing involved assessments conducted through a participatory and inclusive multi-stakeholder process in communities that inhabit, use and protect landscapes and seascapes. These assessments have been subsequently compiled and analyzed to support the development of strategies by identifying appropriate community-based activities in each SEPLS to strengthen their resilience. The indicators in Chapter 2 are the revised set of indicators based on these experiences.

The Community Development and Knowledge Management for the Satoyama Initiative (COMDEKS) Programme is an IPSI collaborative activity by UNDP, MOEJ, CBD Secretariat and UNU-IAS with the goal of promoting sustainable use and management of natural resources in SEPLS. Funded through the Japan Biodiversity Fund established within the CBD Secretariat, the COMDEKS Programme is implemented by UNDP, and delivered through the GEF Small Grants Programme, allowing for a fast, flexible, and proven mechanism to reach communities and civil society at the local level. As part of COMDEKS, small grants are provided to local community organizations with the overall long-term objective of enhancing resilience in SEPLS by developing sound biodiversity management and sustainable livelihood activities with local communities to maintain, rebuild, and revitalize landscapes and seascapes. COMDEKS grant-making is expected to generate key lessons on community-based best practices to maintain and rebuild SEPLS toward the realization of “societies in harmony with nature”, as defined in the vision of the Satoyama Initiative. Launched in 2011, the project is being implemented in twenty countries around the world – Bhutan, Brazil, Cambodia, Cameroon, Costa Rica, Ecuador, El Salvador, Ethiopia, Fiji, Ghana, India, Indonesia, Kyrgyzstan, Malawi, Mongolia, Namibia, Nepal, Niger, Slovakia and Turkey. For more information about the COMDEKS Programme, visit: www.comdeksproject.com.

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Participants score their landscape using indicators for resilience during a workshop, Bhutan

Chapter 2: **The indicators**

2.1 What the indicators measure

The indicators measure elements of SEPLS resilience that are, almost by definition, strongly interrelated. The practices and institutions that they describe can be grouped in five areas:

- Landscape/seascape diversity and ecosystem protection
- Biodiversity (including agricultural biodiversity)
- Knowledge and innovation
- Governance and social equity
- Livelihoods and well-being

Landscape/seascape diversity and ecosystem protection

Heterogeneous landscapes and seascapes that resemble natural patterns provide greater biodiversity benefits than intensively-managed monocultures or marine environments where natural ecosystems like mangroves, seagrass beds or coral reefs have been heavily transformed by extractive practices. Resulting SEPLS are likely to support higher levels of biodiversity and be more resilient to external shocks than more simplified systems. In the context of climate change, the protection and restoration of watersheds, forests and costal ecosystems in SEPLS help regulate hydrology and microclimate, thereby providing a buffer against extreme weather events, floods and droughts.

Biodiversity (including agricultural biodiversity)

The health of a landscape or seascape and the ecosystems it supports is reflected in part in the diversity of species living in it and their interactions. It also often forms the physical, cultural and spiritual bases of communities' well-being. Biodiversity contributes to community and landscape/seascape resilience by providing ecosystem services, which are sustained or degraded by the practices and institutions that regulate the use of natural resources. Agricultural biodiversity includes species used for food, fodder, fiber and fuel, as well as the large number of non-harvested species in the wider landscape that benefit communities through the services they provide, such as pollinators, soil biota and regulators of pests and diseases. Agricultural biodiversity provides material for experimentation, innovation and adaptation. The genetic diversity found in local crop varieties and animal breeds, expressed in important traits such as drought, cold and saline tolerance and resistance to pests and diseases, helps them adapt to various soil and climate conditions. Loss in diversity of these traits decreases options for risk management and adaptation.

Knowledge and innovation

Communities strengthen their own resilience by experimenting, innovating and learning within and between

different knowledge systems, cultures and age groups. Adaptation strategies may be novel or old, but generally build on bio-cultural or traditional knowledge. This knowledge is specific to the locations and cultures of given socio-ecological interactions. It is embodied in resource-use customs, agricultural traditions, local languages, cultural values and social institutions. Many communities are losing their knowledge of local resources, biodiversity and the historical events that have shaped their landscapes and seascapes. The maintenance of this knowledge increasingly depends on the ability of elders, parents and the younger generations in a community to document and share it.

Governance and social equity

Gender inequalities, social exclusion and marginalization can hinder the ability of women, indigenous groups and others to strengthen the resilience of their landscapes or seascapes. Women, youth and the elderly hold specific knowledge and skills related to biodiversity. For indigenous communities, resilience is intrinsically linked with efforts to protect traditional ways of subsistence and cultural heritage. The ability to access ancestral lands and engage in traditional land use and agricultural practices are important conditions for communities to maintain biodiversity and associated traditional knowledge.

Livelihoods and well-being

The resilience of a production landscape or seascape is also dependent on the availability of efficient and functioning infrastructure such as communication, health and education to meet various community needs and aspirations. Livelihood improvement can be directly linked to the options and opportunities of community members to engage in a variety of sustainable income-generating activities developed through peoples' ingenuity and the biodiversity portfolio they have available.

2.2 How to use the indicators

The indicators presented in the table below have been developed to guide the assessment of resilience during assessment workshops participated in by community members and others. Assessment entails assigning a score and trend to each indicator in response to the questions in the table's second column. A score can be assigned to all indicators using the 5-point scale given in the table's third column, and information about trends can be captured using the categories shown here:

Scores	Trends
(5) Very high	↑ Upward trend
(4) High	
(3) Medium	→ No change
(2) Low	↓ Downward trend
(1) Very low	

The other columns in the table are meant to facilitate understanding of the questions for scoring and to capture additional information during the group discussion. The first column gives an explanation of the question for scoring and some examples of what is meant by some of the terminology. The last column contains, where relevant, additional questions which can be asked after individual scoring has been done and the group is engaged in reaching a consensus. These questions are not fixed and can vary according to the situation at the discretion of the facilitator.

Notes can be found in the first column of some of the indicators. These are intended to facilitate answering the questions for scoring. For example, when talking about landscape and seascape diversity it may be useful to refer to a participatory mapping exercise, or the timeline used to explain the concept of resilience may help scoring when talking about the capacity for recovery and regeneration of the SEPLS. For more specific advice on how to carry out an assessment workshop, see Chapter 3, where the mapping exercise and timeline form part of the introduction of the workshop.

2.3 List of indicators

Indicator description	Questions for scoring	Scores	Discussion questions
Landscape/seascape diversity and ecosystem protection			
(1) Landscape/seascape diversity			
The landscape or seascape is composed of a diversity/mosaic of natural ecosystems (terrestrial and aquatic) and land uses. ***Examples:*** **Natural ecosystems:** mountains, forests, grasslands, wetlands, lakes, rivers, coastal lagoons, estuaries, coral reefs, sea grass meadows and mangrove forests. **Land uses:** home gardens, cultivated fields, orchards, (seasonal) pastures, haymaking lands, aquaculture, forestry and agro-forestry, irrigation canals, water wells. **Note:** Landscape/seascape diversity and land uses can be demonstrated through a mapping exercise.	Is the landscape/ seascape composed of diverse natural ecosystems (terrestrial and aquatic) and land uses?	(5) Very high (There is a large number of natural ecosystems and land uses) (4) High (3) Medium (2) Low (1) Very low (There is only one or a very small number of natural ecosystems and land uses)	
(2) Ecosystem protection			
Areas within the landscape or seascape are protected for their ecological and/or cultural importance. **Note:** Protection may be formal or informal and include traditional forms of protection such as sacred sites. ***Examples:*** Strict nature reserves, national parks, wilderness areas, heritage sites, community conserved areas, marine protected areas, limited-use areas, sacred sites, grazing reserve areas, rules and regulations to exclude outsiders from the (seasonal) use of natural resources, etc.	Are there areas in the landscape or seascape where ecosystems are protected under formal or informal forms of protection?	(5) Very high (Key resources are under some form of protection) (4) High (3) Medium (2) Low (1) Very low (There are no areas under protection)	Which ecosystems are protected and what is the form of protection?

Indicator description	Questions for scoring	Scores	Discussion questions
(3) Ecological interactions between different components of the landscape/seascape			
Ecological interactions between different components of landscape or seascape are taken into consideration in natural resource management. ***Examples of ecological interactions:*** Areas slated for conservation or restoration benefit other areas through pollination, pest control, nutrient cycling and increase of animal population. Forests protect water sources and provide fodder, medicine and food. Agricultural activities can affect other parts of the landscape. Marine protected areas may increase marine populations also in other in fishing areas (spill-over effects).	Are ecological interactions between different components of the landscape or seascape considered while managing natural resources?	(5) Very high (Ecological interactions are considered while managing natural resources) (4) High (3) Medium (2) Low (1) Very low (Ecological interactions are not considered while managing natural resources)	
(4) Recovery and regeneration of the landscape/seascape			
The landscape or seascape has the ability to recover and regenerate from environmental shocks and stresses. ***Examples of environmental shocks and stresses:*** Pest and disease outbreaks; Extreme weather events such as storms, extreme cold, flooding and droughts; Earthquakes and tsunamis; Forest fires. **Note:** If a timeline is created during the workshop introduction, in which recent shocks and stresses are listed, it can be a helpful reference for scoring this indicator.	Does the landscape or seascape have the ability to recover and regenerate after extreme environmental shocks?	(5) Very high (Very high ability to recover and regenerate) (4) High (3) Medium (2) Low (1) Very low (Very low ability to recover and regenerate)	What was the community's response to recent shocks and stresses?

Indicator description	Questions for scoring	Scores	Discussion questions
Biodiversity (including agricultural biodiversity)			
(5) Diversity of local food system			
Foods consumed in the landscape or seascape include food locally grown, gathered from local forests and/or fished from local waters. ***Examples:*** Cereals, vegetables, fruits, nuts, wild plants, mushrooms, berries, livestock, milk, dairy products, wildlife/insects, fish, seaweeds, etc.	Does the community consume a diversity of locally-produced food?	(5) Very high (Diversity of locally-sourced foods is very high and these foods are widely consumed) (4) High (3) Medium (2) Low (1) Very low (There are very few or no locally-sourced foods)	
(6) Maintenance and use of local crop varieties and animal breeds			
Households and/or community groups maintain a diversity of local crop varieties and animal breeds. ***Examples:*** Seed guardians, expert animal breeders, animal breeding groups, home gardens, community seed banks.	Are different local crops, varieties and animal breeds conserved and used in the community?	(5) Very high (Local crop varieties and animal breeds are widely conserved and used) (4) High (3) Medium (2) Low (1) Very low (There are few or no local crop varieties and animal breeds)	Is the quality of seeds and breeds maintained? Do invasive species replace local ones or is this not taking place?
(7) Sustainable management of common resources			
Common resources are managed sustainably in order to avoid overexploitation and depletion. ***Examples:*** Grazing regulations; Fishing quotas; Sustainable tourism; Control of wildlife poaching and illegal logging; or harvesting of forest products.	Are common resources managed sustainably?	(5) Very high (Common resources are managed sustainably) (4) High (3) Medium (2) Low (1) Very low (Common resources are overexploited or depleted)	What is the status of exploitation of common resources (forests, fisheries, grasslands)?

Indicator description	Questions for scoring	Scores	Discussion questions
Knowledge and innovation			
(8) Innovation in agriculture and conservation practices			
New practices in agriculture, fisheries and forestry are developed, adopted and improved and/or traditional practices are revitalized. ***Examples:*** Adoption of water conservation measures such as drip irrigation or water harvesting; Diversification of farming systems; Introduction or re-introduction of drought- or saline-tolerant crops; Organic agriculture; Terracing; Reintroduction of native species; Shifting and rotation of grasslands; Reforestation; Replanting of corals, sea grass and mangroves; Fish houses; Selective fishing gear.	Does the community develop, improve and adopt new agricultural, fisheries, forestry, and conservation practices and/or revitalize traditional ones to adapt to changing conditions, including climate change?	(5) Very high (The community is receptive to change and adjusts its practices) (4) High (3) Medium (2) Low (1) Very low (The community is not receptive to change and makes few innovations)	Which innovative practices are used in managing agriculture, fisheries and forestry?
(9) Traditional knowledge related to biodiversity			
Local knowledge and cultural traditions related to biodiversity are transmitted from elders and parents to young people in the community. ***Examples:*** Songs, dances, rituals, festivals, stories, local terminology related to land and biodiversity; Specific knowledge about fishing, crop planting and harvesting, and the processing and cooking of food; Knowledge included in school curricula.	Are local knowledge and cultural traditions related to biodiversity transmitted from elders and parents to young people in the community?	(5) Very high (Local knowledge and cultural traditions are transmitted to young people) (4) High (3) Medium (2) Low (1) Very low (Local knowledge and cultural traditions are lost)	

Indicator description	Questions for scoring	Scores	Discussion questions
(10) Documentation of biodiversity-associated knowledge			
The biodiversity in the landscape or seascape, including agricultural biodiversity, and knowledge associated with it is documented, stored and made available to community members. **Examples:** Traditional knowledge registers; Resource classification systems; Community biodiversity registers; Farmers' field schools; Animal breeding groups; Pasture co-management groups; Seed exchange networks (animal and seed fairs); Seasonal calendars.	Is agricultural biodiversity, and associated knowledge documented and exchanged?	(5) Very high (Documentation is robust) (4) High (3) Medium (2) Low (1) Very low (There is little or no documentation in the community)	
(11) Women's knowledge			
Women's knowledge, experiences and skills are recognized and respected in the community. Women often have specific knowledge, experience and skills about biodiversity, its use and management, which are different from those of men. **Examples of women specific knowledge:** Know-how about the production of particular crops; Collection and use of medicinal plants; Caring for animals.	Are women's knowledge, experiences and skills recognized and respected at household, community and landscape levels?	(5) Very high (Women's knowledge, experiences and skills recognized and respected at all levels) (4) High (3) Medium (2) Low (1) Very low (Women's knowledge, experiences and skills are not recognized and respected)	

Indicator description	Questions for scoring	Scores	Discussion questions
Governance and social equity			
(12) Rights in relation to land/water and other natural resource management			
Rights over land/water and other natural resources are clearly defined and recognized by relevant groups and institutions, for example governments and development agencies. Recognition can be formalized by policy, law and/or through customary practices. **Examples:** Land-use groups; Community forestry committees; Co-management groups or communities.	Does the community have customary and/or formally recognized rights over land, (seasonal) pastures, water and natural resources?	(5) Very high (Rights are fully recognized and not disputed) (4) High (3) Medium (2) Low (1) Very low (Rights are not recognized and heavily disputed)	Do these rights give security in terms of access and use?
(13) Community-based landscape/seascape governance			
The landscape or seascape has capable, accountable and transparent local institutions in place for the effective governance of its resources and the local biodiversity. **Examples of institutions:** Organizations, rules, policies, regulations and enforcement aimed at resource management; Traditional authorities and customary rules; Co-management arrangements, for example joint forest management, between local people and government.	Is there a multistakeholder landscape/ seascape platform or institution able to effectively plan and manage landscape resources?	(5) Very high (Platform or institution is capable of transparent, participatory and effective decision making) (4) High (3) Medium (2) Low (1) Very low (There is no multistakeholder platform or institution)	Does agreement exist about the boundaries of natural resources in terms of access and use? Is the policy and legal environment supportive or not?
(14) Social capital in the form of cooperation across the landscape/seascape			
Individuals within and between communities are connected and coordinated through networks that manage resources and exchange materials, skills and knowledge. **Examples:** Self-help groups; Community clubs and groups (women's and youth groups); Intercommunity networks; Associations of federations with a focus on natural resource management.	Is there connection, coordination and cooperation within and between communities for the management of natural resources?	(5) Very high (There is a very high level of cooperation and coordination in natural resource management) (4) High (3) Medium (2) Low (1) Very low (There is little or no cooperation and coordination in natural resource management)	Is the level of out-migration low?

Indicator description	**Questions for scoring**	**Scores**	**Discussion questions**
(15) Social equity (including gender equity)			
Rights and access to resources and opportunities for education, information and decision-making are fair and equitable for all community members, including women, at household, community and landscape levels. **Examples:** Upland and lowland communities; Community members belonging to different social or ethnic groups; Women's voices and choices are taken into consideration in household decision-making and at community meetings where decisions about collective actions are made.	Is access to opportunities and resources fair and equitable for all community members, including women, at household, community and landscape level?	(5) Very high (Access to resources and opportunities is fair and equitable at all levels) (4) High (3) Medium (2) Low (1) Very low (Access to resources and opportunities is not fair and equitable)	Is decision-making fair and equitable for all community members, including women, at all levels?

Indicator description	Questions for scoring	Scores	Discussion questions
Livelihoods and well-being			
(16) Socio-economic infrastructure			
Socio-economic infrastructure is adequate for community needs. **Examples of socio-economic infrastructure:** Schools, hospitals, roads and transport; Safe drinking water; Markets; Electricity and communication infrastructure.	Is the socio-economic infrastructure adequate for the needs of the community?	(5) Very high (Socio-economic infrastructure meets all community needs) (4) High (3) Medium (2) Low (1) Very low (Socio-economic infrastructure does not meet community needs)	
(17) Human health and environmental conditions			
The overall state of human health in the community is satisfactory, also considering the prevailing environmental conditions. **Examples:** Absence or regular occurrence of diseases; Frequency of disease outbreaks that affect a large number of people; Absence/presence of environmental stresses like pollution, lack of clean water, exposure to extreme weather events.	What is the general health situation of local people also considering the prevailing environmental conditions?	(5) Very high (The health situation and the environmental conditions are good) (4) High (3) Medium (2) Low (1) Very low (The health and the environmental conditions are bad)	What are the main risks? What types of medicine are used? (i.e. traditional healing methods, modern medicine)
(18) Income diversity			
People in the landscape or seascape are involved in a variety of sustainable income-generating activities. **Note:** Diversity in economic activities can help households in case of unexpected downturns, disasters, changes in environmental conditions, etc.	Are households in the community involved in a variety of sustainable, income-generating activities?	(5) Very high (Households are involved in a variety of sustainable, income generating activities) (4) High (3) Medium (2) Low (1) Very low (Households have no alternative economic activities)	What activities generate income in the landscape or seascape?

Indicator description	Questions for scoring	Scores	Discussion questions
(19) Biodiversity-based livelihoods			
Livelihood improvements in the landscape or seascape are concerned with innovative use of local biodiversity. **Examples:** Handicrafts using local materials, e.g. wood carving, basketry, painting, weaving etc.; Eco-tourism; Processing of local foods, bee-keeping etc.	Does the community develop innovative use of the local biodiversity for its livelihoods?	(5) Very high (Livelihoods are being improved by innovative use of local biodiversity) (4) High (3) Medium (2) Low (1) Very low (Livelihood improvements are not related to local biodiversity)	
(20) Socio-ecological mobility			
Households and communities are able to move around to take advantage of shifts in production opportunities and avoid land degradation and overexploitation. **Examples of mobility:** Shifting cultivation and crop rotation practices; Shifting between agriculture and herding/fishing; Seasonal migration of herders; Shifting fishing grounds; Maintaining reserve areas for periods of hardship.	Are households and communities able to move around between different production activities and locations as necessary?	(5) Very high (There are sufficient opportunities for mobility) (4) High (3) Medium (2) Low (1) Very low (There are no opportunities for mobility)	Are there agreed rules and regulations for effectively doing so?

3

Kitui landscape, Kenya
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Chapter 3 **Practical guidance for using the indicators**

The purpose of this chapter is to provide users of the indicators with concrete advice on their practical application, including various processes for actively engaging local communities in planning, preparing and holding assessment workshops, and then implementing activities for restoring and maintaining SEPLS after an assessment of their resilience.

While it is possible for the indicators to be used in several different ways for various policy-making, academic or other purposes, they are generally intended to be used in the context of a community-based assessment workshop held within the target landscape or seascape. The guidance provided in this toolkit is primarily intended for organizers and facilitators of resilience assessment workshops.

Different landscapes and seascapes may have vastly different geographical scales, governance systems, stakeholders, cultural traditions, and resources, and thus require different approaches to assessment workshops and follow-up activities. Facilitators and stakeholders should be flexible in identifying locally-adapted solutions accounting for the specific circumstances of communities. For guidance, this toolkit provides examples of the indicators in action, taken from previous field-testing by Bioversity International and UNDP-COMDEKS, plus some practical tips for practices that have been proven effective in the past.

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

The **preparation** stage consists of planning and organizing a community-based resilience assessment workshop. This may include steps such as clarifying the purpose of the assessment, determining the assessment area and obtaining information about the landscape/seascape, resident communities and stakeholders as well as practical matters such as translating the indicators into the local language.

The **workshop** itself is when the assessment of landscape or seascape resilience by local stakeholders actually takes place. A workshop will generally consist of: introductory presentations; scoring based on the indicators; and discussion, summary and next steps. This toolkit also provides tips for workshop facilitators to explain unfamiliar concepts such as “socio-ecological production landscapes and seascapes” and “resilience”, and encourage active and meaningful engagement of the participants.

The **follow-up** stage can vary widely depending on the purpose of the assessment, but is generally intended to use assessment results as part of an ongoing, participatory landscape/seascape management and planning process. This toolkit introduces ways of analyzing assessment data and scores, organizing follow-up discussion among stakeholders, and identifying priority areas and community-based interventions to enhance resilience.

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**

3.1 Stage 1: Preparation

Setting the stage

Before planning the details of an assessment workshop, it is advisable to make sure there is a clear understanding of a number of basic principles, such as the exact purpose of the assessment, the target SEPLS, etc. All involved parties should share the same understanding to ensure that everyone is working toward the same purposes.

Clarifying the purpose of the assessment

It is important to make sure that everyone involved in the planning of the resilience assessment has a clear and consistent understanding of the purpose(s) of the assessment and what it is expected to accomplish. The purpose of the assessment will affect how it is carried out.

Tips:

Some examples of purposes of an assessment may include:

- Gaining a common understanding of the state of the landscape or seascape.
- Identifying strengths of and threats to the landscape or seascape.
- Empowering local communities to strengthen their resilience.
- Developing landscape/seascape management strategies and identifying possible collaborative actions in the landscape or seascape to strengthen resilience.
- Enhancing trust and social capital in communities and resolving conflict.
- Monitoring resilience of the landscape or seascape and its communities over time.

Selection of the assessment area

The target landscape or seascape should be determined based on the purpose of the assessment and the available resources, and a demonstrated interest and engagement of the communities living in the area.

To help clarify why the landscape or seascape was chosen, it may be useful to develop a number of parameters, such as natural assets, socio-economic activities, cultural heritage, threats and opportunities, and the presence of particular species and biodiversity values.

INDICATORS IN ACTION

SELECTION OF THE ASSESSMENT AREA

- For Bioversity International's study in Bolivia, a local NGO that had worked for over two decades on the conservation, improvement and marketing of local varieties of roots and tuber crops to benefit small farmers in sixteen villages facilitated the planning and preparing of the resilience assessment. The NGO selected two of the villages to conduct the resilience assessment.

- For the COMDEKS baseline assessment in Namibia, the target landscape was a new conservancy that had been created as an administrative unit and was selected by the SGP National Steering Committee based on a number of criteria including its biodiversity value, ecosystem sensitivity, tourism potential, its ranking among the most underdeveloped areas in Namibia, and UNDP presence in the area (see Chapter 4).

Stakeholders gather to assess boundaries of the landscape in Daman, Nepal

Obtaining information about the landscape or seascape and its resident communities

Obtaining scientific and statistical information about the landscape or seascape facilitates better understanding of the area and appropriate design and preparation of the assessment. This information is also useful for assessment participants and stakeholders to have a common understanding of the area and to utilize the information in the resilience assessment. Information may include land uses, population, rainfall, livelihoods and others, as well as biodiversity and its value.

Where possible, it is a good idea to obtain information on development plans and projects being undertaken in the area, capacities of key stakeholders such as governments, NGOs and community-based organizations and their presence in the area, and any potential opportunities and synergies available to enhance resilience.

INDICATORS IN ACTION
INFORMATION COLLECTION

- Geographic Information System (GIS) mapping was used to identify the target landscape for COMDEKS activities in Cambodia and divide the target area into a number of socio-ecological areas taking into account topography, rainfall patterns, soil types, land use, forest cover change and statutory land tenure systems.

- In Bhutan, the baseline assessment of the target landscape was carried out building on an existing Watershed Management Plan developed in 2009 by the Royal Government of Bhutan, which had been stalled due to a lack of financial resources. In this case, the COMDEKS landscape-wide baseline assessment was part of an effort to build on existing development plans to rebuild and revitalize the Gamri Watershed based on the data already collected for those plans.

Identification of stakeholders for planning

Key stakeholders in the area should be identified during the planning process for consultation in the next phase. These should represent all relevant sectors and may include local and national NGOs; indigenous peoples', women's, elders', and youth groups; officers in forest and agricultural management; cooperatives and unions; representatives from local farmers, fishermen, hotel owners and tourism operators; and others.

INDICATORS IN ACTION

IDENTIFYING STAKEHOLDERS

- During the COMDEKS assessment in Malawi, the assessment facilitators were supported by the District Executive Committee (DEC), composed of members from the different government departments (agriculture, fisheries, environment, education, planning, etc.). Selected members of the DEC accompanied the assessment coordinators as they mobilized communities through local traditional authorities and village heads. The team conducted a participatory appraisal with relevant NGOs, local communities and front-line agricultural and natural resources extension staff in the area.

- In Namibia, where an assessment was carried out for an already-defined conservancy, the NGO contracted to run the assessment made use of the radio, which is the major means of wide-scale communication in the area, to gather stakeholders from around the conservancy. The NGO then consulted as many people as possible to gain an understanding of the various actors and interests in the landscape.

Consultation and planning

Consultation with local stakeholders is a useful way and essential requirement to learn more about the area and communities to tailor the assessment to local needs. Some degree of consensus must be reached on the assessment's purpose, definition of the landscape/seascape and its boundary, participants, facilitators, etc.

Community members are consulted before devising landscape strategy, Cambodia

Tips:

Consultation with local stakeholders will facilitate learning more about:

- Community priorities, the current state of the environment and socio-economic conditions and perceived threats.
- Existing and potential projects and plans in the target area.
- Capacities and capability of the various stakeholders in the area.
- Opportunities for collaboration with other activities.
- Suitable community representatives and other assessment participants representing different groups.
- The expected time frame for trends in changes of the indicators of resilience (for example, 10 years, 30 years, etc.).

The following pages cover some of the issues involved in the planning of an assessment and consultation with local stakeholders.

Clarifying the SEPLS and its boundary

The exact landscape or seascape should be defined based on a community perspective. The boundaries of the landscape or seascape (watershed, jurisdictional boundaries, social definition of the landscape or seascape, etc.) may be determined through consultation with key local stakeholders and/or by using sketches, maps, GIS data of the region, etc. In general, it is helpful to take a flexible approach depending on local needs. The SEPLS and its boundary can also be discussed at the beginning of the assessment workshop.

Identification of resilience assessment workshop participants

The participants in the workshop will vary depending on its purpose and the background of the landscape or seascape. Participants may include key local stakeholders with a variety of interests such as local farmers, fishermen, government authorities, the private sector and others, as well as cross-sector expertise if technical service providers are included.

Attention should be paid to ensuring there is a good gender and age balance. Likewise, it is vital to include indigenous peoples and minority groups if they are present in the landscape or seascape. For a large or diverse landscape or seascape, it is important to include stakeholders from different communities in the target area.

In order to identify assessment participants from different groups, it is useful to visit all communities in advance. Communities can suggest key representatives of the community to be participants in the workshop.

INDICATORS IN ACTION

CLARIFYING THE LANDSCAPE

In Cambodia, information from the Geographic Information System (GIS) was used to divide the target Seung Siem Reap watershed area into three sub-areas, upstream, midstream and downstream. The watershed area is highly heterogeneous due to the wide diversity of biological, geographical and topographical features located within the region. In order to capture the heterogeneity of the target landscape, and identify potential community-based activities to enhance resilience of the landscape, the target area was further divided into six socio-ecological zones, taking into account topography, rainfall pattern, soil types, land use, forest cover change, and statutory land tenure systems.

© COMDEKS Cambodia/Srey Marona

Geographic Information System (GIS) has been used in Cambodia to divide the target watershed area into three sub-areas and six socio-ecological zones based on the heterogeneity of the landscape.

GENDER MAINSTREAMING

It is essential that gender knowledge is captured and documented to improve the participation of women in future community programs including landscape or seascape resilience-strengthening strategy development and action plans.

The norms and culture of the area should be considered. To enable effective participation of women in the planning process and strategy development, community consultation and the assessment need to be conducted in the context of social conventions, organizing separate meetings for men and women if appropriate. This approach has been employed at several COMDEKS sites including Gilgel Gibe I dam catchment area in Ethiopia.

Where inequalities exist, gender integration in the resilience assessment workshop and strategy development should focus on strengthening women's capacities and leadership abilities, and helping to advance their involvement in governance and decision-making processes, as gender equity helps to increase resilience. Ways of doing this include supporting specific projects managed by women's groups within the landscape, ensuring women's participation in community-based institutions and involving women in engagement with external partners and networks. For example, after the assessment workshop in the Natewa-Tunuloa Peninsula, a COMDEKS site in Fiji, a village chief suggested that women should lead the COMDEKS project recognizing that, despite their limited access to resources, they can greatly improve livelihoods in their communities such as by bark cloth production and weaving to support small scale cottage industries.

Women are interviewed to gather information on local small scale farming activities, Niger

Women and men are separated into groups to ensure both perspectives are heard, Ethiopia

Identification of facilitators

Facilitators are the people who will run the workshop, and their role may involve organizing, planning, acting as emcees, following-up, and other tasks. The facilitators should lead the smooth proceeding of an assessment workshop and stimulate active and equal participation of workshop participants.

It is important to have a note-taker among the facilitators, who understands local languages to be used during the workshop and discussion. The notes taken by this person will be of vital importance during the follow-up stage.

Ideally, facilitators have a working relationship with communities in the area. If local community members are actively engaged in SEPLS management, they themselves can become facilitators. In such cases, they may require some training in how to facilitate.

Local NGOs and project coordinators who have developed a strong relationship with local communities through existing projects can be good candidates to serve as facilitators. Alternatively, facilitators need to develop a relationship with the communities and learn about the landscape or seascape through available documents and discussion with key community members before the assessment workshop. In this case, facilitators may need to spend some time in the communities to learn about them beforehand.

The role of the facilitator during an assessment is vital for explaining the concepts of “socio-ecological production landscapes and seascapes (SEPLS)” and “resilience” to communities and workshop participants. Facilitators should have a good understanding of these concepts and be able to translate the indicators into the local language if necessary, or reword them with vocabulary understood at the local level.

Deciding the style and duration of the workshop

A resilience assessment workshop generally consists of three main parts: 1) an introduction; 2) scoring of the indicators; and 3) discussion of the results and wrap-up. Time constraints may allow for more or less time, but testing has shown that the introduction and scoring may take one whole day (including lunch and tea break), with another half day for discussion and wrap-up.

The design of an assessment workshop should be based on information obtained in the consultations, field visits and other information collection, and finalized together with local stakeholders. For this reason, it is important to have a good understanding of the target landscape or seascape and the socio-economic, cultural, and other circumstances of resident communities during planning. For example, women and men tend to have different perceptions because of the different roles they usually have, and come up with different views on many of the indicators. In such cases it is recommended to have separate groups for the scoring process and then bring the results together in the whole group discussion. The same process can be considered for community members of different socio-economic status.

The number, size and duration of assessment workshops depend on the resources available and the capacity of the communities. In many cases local community members, such as farmers and fishermen, will be busy with their work, so it is advisable that the assessment workshop be completed within one or two days, or adapted to the schedule of the local stakeholders.

INDICATORS IN ACTION

SAMPLE ASSESSMENT WORKSHOP TIMETABLE

Bioversity International held assessment workshops in Fiji, with participants from villages in the Bouma National Heritage Park on Taveuni Island. Around 10 villagers from each of two villages participated in a 1.5 day workshop. Since there were a large number of participants, the introduction was done for the whole group and the group then divided into two, with each village doing its own mapping exercise and scoring of the indicators. Discussions were held separately for each village the next day.

DAY 1: Introduction and scoring

9:30-10:00	Introduction (30 min.)
10:00-11:00	Participatory mapping exercise (1 hour)
11:00-12:00	Discussion about diversity and resilience in the communities (1 hour)
12:00-12:15	Tea break (15 min.)
12:15-14:00	Scoring (Questions 1-7) (1 hour 45 min.)
14:00-14:30	Lunch break (30 min.)
14:30-16:30	Scoring (Questions 8-20) (2 hours)
16:30-17:00	Summary of the assessment and next steps (30 min.)

DAY 2: Discussions

9:30-10:00	Analysis of scoring and review summary of the assessment (30 min.)
10:00-11:00	Discussion of analysis and identification of key topics to discuss (1 hour)
11:00-12:00	Discussion of potential action plans in the village (1 hour)
12:00-12:30	Evaluation of the exercise (30 min.)
12:30-13:00	Lunch (30 min.)

Interpretation and translation of the indicators

Prior to the assessment workshop, it is essential to make sure that the resilience indicators are expressed in language that the participants will be able to understand easily. This may require translating them into one or more languages. Even for native English speakers, it may be necessary to alter the language used in the indicators to make them more easily understood in the local context.

The indicators have been developed to be applicable to different types and sizes of landscapes and seascapes. Therefore, facilitators and participating communities may also need to adjust the content of the indicators depending on the local circumstances. Depending on the context, additional indicators can be integrated while indicators that are not deemed relevant maybe discarded.

During a baseline assessment in Niger, stones are used as markers

Tips:

- Prepare enough copies of the translated indicators for each of the participants and facilitators.
- Provide pens or pencils and scratch paper for all participants.
- Ensure that there is enough poster-sized paper and markers, coloured pens for mapping, stickers, tape, scissors and/or whatever will be needed for prominently displaying scoring results, mapping, etc.
- Prepare suitable refreshments and organize meals for participants as appropriate.
- Consider how participants are going to get to the assessment, and whether transportation should be provided.

3.2 Stage 2: The assessment workshop

Introduction

An assessment workshop will generally begin with an introductory presentation given by the facilitators. It is important during the introduction that time be allowed to answer any questions participants may have. Explaining key concepts and answering all questions can be expected to take a few hours.

Participatory activities may also be carried out at this time, to ensure not only that participants feel comfortable interacting with each other, but also that they have a common understanding of the landscape or seascape and its resources. See below for some examples of participatory activities.

It is a good idea to collect participant information such as name, age, gender and village name or organization, or, alternatively, circulate a sheet for participants to provide this information at the beginning of the workshop.

Baseline assessment workshop, Ghana

Tips:

The introduction is a good opportunity to explain:

- The purpose of the assessment and the value of people's participation. Be aware that in some places it can be very difficult for communities to open up and hold discussions freely.
- The basic concepts of "socio-ecological production landscapes and seascapes (SEPLS)" and "resilience". It is important that all participants understand these concepts. The use of simple, easy-to-understand language is recommended as well as examples to help participants understand. It may be useful to use pictures or photos of socio-ecological production landscapes or seascapes.
- Other concepts found in the indicators, such as "agricultural biodiversity" and "land uses". Pictures and diagrams may be helpful.
- The flow of the resilience assessment and indicators according to their specific themes. These are: Landscape/seascape diversity and ecosystem protection; Biodiversity (including agricultural biodiversity); Knowledge and innovation; Governance and social equity; and Livelihoods and well-being.
- The workshop schedule, including plans for follow-up.

The exact procedure for the introductory segment will vary depending on time, resources, local context, purpose etc., and may include some or all of the following:

Self-introductions

If participants are from multiple communities within a landscape or seascape, or if facilitators or other participants are from outside the target community, it may be helpful to have each participant introduce himself or herself and explain their interest in the assessment workshop.

Participatory mapping exercise

Having participants draw a map of their landscape or seascape including resources, land-uses, landmarks and others – agricultural lands, water sources, hunting or fishing areas, buildings, etc. – is useful for identifying the landscape or seascape and its boundaries and ensuring a common understanding of the target area. Participatory SEPLS mapping is also effective for engaging participants in discussion.

Discussion of biodiversity

Discuss and list examples of agricultural and aquatic biodiversity such as fruits, vegetables, medicinal plants, trees, livestock, pollinators, fish and crustaceans, including their local names. It may also be appropriate to list various kinds of wildlife.

Discuss and list landscape or seascape components including fields, forest patches, rivers, pastures, wetlands, water sources, coral reefs etc. Also list the local words for these components.

Discussion of resilience

Make a timeline with major events and changes in relation to the climate, environment and others, such as droughts, floods, storms, earthquakes etc., on a large sheet of paper.

Explain resilience, for example, as "recovering after stress" (see Chapter 1: "Resilience in SEPLS – What is it?"), and then let participants explain it in their own words.

Explain adaptation, for example, and ask participants how they cope with droughts, floods, typhoons, earthquakes, forest fire, pest, disease and other disasters.

Explanation of the indicators

Explain the concept of indicators in general, as well as the Indicators of Resilience in SEPLS specifically, their purpose and how using them is intended to benefit the community.

INDICATORS IN ACTION

PARTICIPATORY MAPPING EXERCISE

A participatory mapping exercise can provide an opportunity for involvement of a greater number of both men and women from the community including those traditionally marginalized, building trust and strengthening relationships between facilitators and community members, and establishing a structure in which decision-making and responsibilities are shared. The mapping activity initiates a community involvement forum which continues to be developed through regular village meetings. Finally, the maps created serve as reference material for future planning, providing important insight into the specific socio-ecological characteristics of the area.

Community members in Fiji engaged in participatory mapping

Scoring

The process of having the workshop participants score their landscape or seascape according to the twenty indicators of resilience is at the heart of the assessment workshop. The twenty indicators are each accompanied by questions for use in scoring, as well as notes, examples and additional discussion questions where appropriate.

The physical method of collecting scores may depend on the local context. When planning the workshop, facilitators should decide whether each participant will be given a scorecard, write their scores on a chalkboard, place a number of small stones into a cup, or some other method.

Scores: The indicators are intended to be scored on a five-point scale. A score of 1 means the landscape or seascape performs very poorly in that indicator and a score of 5 means an extremely good performance. (see page 18)

Trends: A basic score for each indicator may be enough in some cases. In cases where resources allow, it may be desirable to have participants also provide their perceptions of trends, notes on reasons for their scores, and potential problems and solutions.

Trends are generally captured using a time span (5, 10, 30 years etc.) determined for each indicator. It is generally sufficient to evaluate trends using a three-tiered scale (improving; no change; worsening), but a more complex five-tiered scale (rapidly improving; slowly improving; no change; slowly worsening; rapidly worsening) has also been used.

It is important to ask questions on the resilience indicators in a way that is easy to understand for all participants. It is recommended that facilitators prepare in advance how to pose each question to the participants using local examples and interpreting questions in the

local context. When participants have difficulty comprehending a question, facilitators can assist participants by explaining the scores and trends.

Individual Scoring

The facilitator should ask the participants the question for each resilience indicator and explain with some local contexts and examples. Have each individual participant give his or her own score for each indicator.

Participants score their landscape using indicators for resilience during a workshop, Bhutan

Group Scoring

After individual scoring has been completed, the group should discuss, for each indicator question, which score represents the overall perceptions of the whole group. This may be done by having individual participants discuss their scores and trends and the reasons behind them to arrive at a consensus opinion, or another method such as taking a simple mathematical average.This step is important:

- To provide a space for discussion.
- To identify different views within and among community members.
- To reach a common understanding (if possible) of the landscape/seascape situation and any threats and solutions.

To reach consensus, the additional questions found in the fourth column of the indicator table (Chapter 2) can be asked during the discussion.

Tips:

- Facilitators should work at creating a participatory and communicative atmosphere to keep participants interested and engaged in the process.
- It is important to capture how things have changed temporally and what the drivers associated with these changes are. This will help the communities develop strategies to improve their resilience as a follow up process to the resilience assessment.
- Materials such as cards, small stones, plastic or paper caps can minimize the time taken for scoring. Providing a cup and 5 small stones for each individual participant, facilitators can ask the participants to put stones for each question in the cup while a note-taker captures individual scores.

It may be useful to prepare an indicator score sheet like the one on the next page on a poster-sized sheet of paper and write each participant's scores for the whole group to see, in order to facilitate a participatory process in arriving at group scores.

Table 1. Score sheet for group scores

Indicator Question#	Name		Name		Name		Name		Name		Group Consensus	
	Score	Trend	Score	Trend	Score	Trend	Score	Trend	Score	Trend	Score	Trend
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

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Scoring data collected at a workshop in Kenya

Discussion, summary and next steps

Discussion of the results of the indicator scoring is as important as the scoring itself. An active and productive discussion of the indicator scoring can help participants understand how to enhance the resilience of the landscape or seascape and identify potential community-based activities that can improve resilience based on these findings. The additional questions found in the indicator table (Chapter 2) can be also asked at this stage to guide the discussion.

Facilitators should guide the discussion in a way that encourages participants to share ideas, views, problems, threats, explanations and local solutions such as knowledge and practices used to mitigate, manage

and recover from shocks. Based on these understandings, participants should further explore options for enhancing the resilience of the landscape/seascape and identify possible next steps for the group to take.

Everyone should be encouraged to speak freely in the discussion, even if there is repetition, and a note-taker should record the comments.

Tips:

Group discussion is a good opportunity to:

- Identify potential solutions to problems facing the landscape or seascape.
- Ask participants what strikes them most about the findings.
- Discuss how to improve the resilience of the landscape or seascape and identify potential community-based activities to do so.

The following are some examples of possible elements for the discussion. Facilitators can consider organizing another session a few days or weeks after the assessment workshop to further promote discussion and identify next steps.

Discussion of scoring results

After summarizing the assessment scores, facilitators may display diagrams and the indicator score sheets on a wall, and stimulate discussion on strengths and weaknesses in landscape or seascape resilience. Facilitators may go over each resilience indicator question again, or cover each sub-category of the indicators. Participants should share their thoughts on the scores, their reasons, and practices used to respond to shocks and changes.

Discussing the results of the indicators scoring exercise in plenary, Khotont district, Mongolia

Tips:

The following is one option to process the collected scoring data:

- Calculate average scores of each sub-category of the resilience indicators.
- Draw a radar diagram on a big sheet of paper to help participants visualize the results during discussion.

Discussion on specific topics

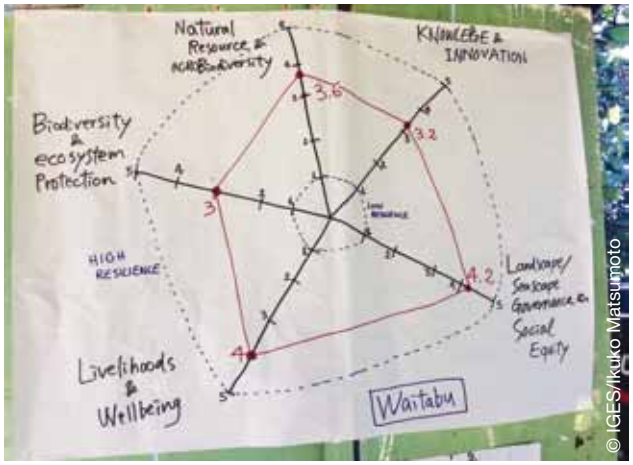
Facilitators can stimulate discussion to identify key topics for the community.

Key discussion topics may include:

- Key community concerns and threats to landscape or seascape resilience.
- Needs for improvement in current practices.

Discussion of potential action plans within communities

Once key topics have been identified, facilitators should encourage participants to discuss potential activities in the form of action plans for their communities. It is important that community members develop their own action plans to ensure community ownership.



Example of radar diagram from a workshop in Fiji

Tips:

The following four elements are key points when developing action plans:

- What needs to be done?
- Who will do it?
- Who will lead it?
- Who from outside the community can help implement activities?

Key elements of an action plan may include: reaching a common understanding of priorities for the landscape or seascape; facilitation of collaboration across different sectors; landscape or seascape strategy development; and adaptive management of the landscape or seascape. A multi-objective strategy, taking a holistic landscape or seascape approach, can be more effective than a narrow, sectoral approach.

COMMON CHALLENGES IN RESILIENCE ASSESSMENT

Allocating sufficient time for discussion

If facilitators do not take enough time to explain the purpose of the exercise, focusing, for example, on simply getting scores, there may not be enough discussion among the participants, making the workshop less effective for engaging local communities.

Managing expectations from communities

It is important to manage expectations from community members related to the resilience assessment workshop. Local communities should understand that an assessment workshop is one step in an ongoing, participatory process to improve resilience.

Encouraging participation of all stakeholders, including women

Particularly in large-scale landscapes and seascapes, sometimes only representatives of local cooperatives and communities, mostly men, may be invited to the workshop. If time and conditions allow, additional house visits to women are strongly advised to overcome gender barriers.

Evaluation of the workshop
It is often helpful to seek feedback from participants about the assessment workshop. This can help facilitators to make future workshops more effective based on the particular local context.

Allowing for sufficient follow-up discussions
In order to involve a larger number of community members, follow-up workshops at the local level can be organized to supplement the assessment workshop. These can serve to share findings and generate discussion in the community concerning the challenges ahead.

Tailoring the language of the indicators
It is essential to tailor the language of all content to meet the specific capacities of participants. The language used in the indicators may be too complex for many people to comprehend easily. Facilitators may have to simplify the terms and provide examples relevant to local communities to ensure all members understand the terms and concepts. Interactive mapping exercises and use of photos of the landscape or seascape can prove particularly successful in providing a spatial dimension to conservation priorities and encouraging relevant and practical solutions to SEPLS resilience.

3.3 Stage 3: Follow-up

In the weeks and months after an assessment workshop, facilitators should encourage follow-up dialogue among workshop participants and other stakeholders in the landscape or seascape in order to reflect on steps that can be taken to achieve greater SEPLS resilience, and if possible organize follow-up sessions.

How the follow-up is carried out as part of an ongoing process depends on the purpose and nature of the workshop. For example, results from a workshop held to help identify specific development projects to be funded by a national government or a donor may be used differently from the findings of a workshop held for academic research. The following are some examples of possible ways results may be used.

Assisting the Mongolian herders of Khotont district to understand the indicators

QUANTITATIVE, QUALITATIVE AND COMPARATIVE ANALYSIS TO IDENTIFY COMMUNITY NEEDS

Various types of quantitative, qualitative and comparative analysis can be applied to scoring results, each of which will identify different issues and needs. For example, past use of the indicators has shown that quantitative analysis of score values was useful in identifying risk perceptions shared among the communities in a landscape or seascape (such as loss of local crop varieties and poor ecosystem management), while qualitative analysis using discussion helped to focus on the perceived reasons for these (such as lack of awareness and ineffective government actions). Comparative analysis between communities where multiple assessments are carried out can provide hints as to what kinds of interventions may be effective in different areas. See Chapter 4, Example 4 for examples of data analysis.

Further analysis of assessment data and scoring

Scoring data collected at a workshop can be used for various types of qualitative, quantitative and comparative analysis. Further analysis can be useful for understanding trends, identifying more effective follow-up activities and strategies, and for scientific research.

Share the results of the assessment workshop with other stakeholders

The workshop results can be shared with other stakeholders. The facilitator can present perceived strengths and weaknesses in landscape or seascape resilience by displaying the diagrams and the indicator score sheets and sharing the discussion results.

Develop concrete action plans within communities

Strategy or concrete action plans can be further consolidated to plan and implement specific projects or activities to enhance SEPLS resilience.

It is also good to elucidate concrete steps that participants will take in implementing the action plans. It is important to remember that both short-term goals that can be achieved with currently-available resources and long-term goals to direct the continued development of the SEPLS should be considered.

INDICATORS IN ACTION

FOLLOW-UP

In the north-western part of Makawanpur district in Nepal, the results of a resilience assessment were effectively used to develop a landscape strategy for the area. The indicator scoring showed a relatively poor perception in the area of ecosystem protection, so the following were identified as important strategic issues in developing goals and objectives:

- Increasing connectivity
- Addressing marginality and inequality
- Diversification of land uses
- Respecting useful traditional knowledge and complementing it with new innovations
- Synergy building
- Gender and social Inclusion
- Market linkage

Importantly, the assessment also showed which earlier interventions had been beneficial in areas such as agricultural biodiversity, which helped guide the above priorities.

Repeated resilience assessment for adaptive management

For adaptive landscape/seascape management, the indicators may not be only used as a one-time exercise, but instead utilized throughout projects' lifetimes. Landscape or seascape strategies can be adjusted depending on periodic resilience assessments over a number of years. This requires allowing appropriate time for discussion and interpreting changes that the data reveal and adapting strategies accordingly. It is good to pay attention to any seasonal differences that might affect responses, and try to perform the scoring exercise at the same time each year if appropriate.

Possible post-assessment follow-up activities

For local communities and NGOs:

Propagating a common understanding of priority issues for the landscape or seascape:

- Hold discussions on the status of the landscape or seascape as perceived by local stakeholders in order to reach a clear understanding as a basis for priorities in collaborative actions.
- Facilitate communication on goals and expected outcomes at the landscape/seascape level.
- Identify priority issues to be addressed by communities.
- Identify key threats and intervention strategies to strengthen community resilience including livelihood improvement.

Facilitation of collaboration across different sectors:

- Identify possible allies for resilience strengthening activities in the landscape or seascape.
- Strengthen partnership among various actors and ensure sustainability and resilience of the landscape or seascape.

Landscape/seascape strategy development:

- Develop landscape/seascape resilience-strengthening strategies and action plans.
- Enhance community participation in the decision-making process on landscape/seascape management at local and national levels, and promote communication with policy-makers.
- Present outcomes of the workshop to key national stakeholders, and enhance communication with policy-makers in order to facilitate the incorporation of local landscape and seascape strategies into National Biodiversity Strategies and Action Plans and other development plans.

Adaptive management of the landscape or seascape:

- Use assessment results as a baseline for further monitoring changes in the landscape or seascape.
- Conduct resilience assessments periodically to enable adaptive management of the landscape or seascape.

For policymakers:

- Utilize the resilience assessment as a decision making tool to identify intervention priorities and develop strategies at the local and national level.
- Promote participatory landscape/seascape management among different stakeholders.
- Identify an integrated approach in the various project planning and project implementation stages in landscapes/seascapes.

Chapter 4 **Examples from the field**

4.1 Namibia
An overview of the process

Background

The following description of a resilience assessment workshop prepared and implemented in Namibia describes how results collected and discussion stimulated from the application of the indicators could be used for the formulation of participatory landscape strategies.

Priority area and rationale for selection

The Ipumbu-ya Shilongo Conservancy was selected by the SGP National Steering Commitee as a COMDEKS pilot landscape mainly due to its biodiversity, ongoing preservation efforts, sensitive ecosystem, and tourism potential. The Conservancy is located in the Oshana and Omusati regions of northern Namibia within the Cuvelai-Etosha Basin, a trans-boundary wetland system which consists of hundreds of drainage channels that are dry throughout most of the year. However, when flows do occur, they can range from very small trickles to large floods of water, making landscape conditions dependent on seasons and weather variability. Spreading across 154,800 hectares, it is one of approximately 70 conservancies in the country in which community members manage and benefit from their resources jointly on a local level. The area is also significant for its proximity to the Etosha National Park, a world-renowned wildlife sanctuary that is home to elephants and other African wildlife.

As a semi-arid area challenged by issues such as water availability for both sustaining wildlife grazing and agricultural production, the conservancy is highly vulnerable to the impacts of climate change and despite its protected status, is still underdeveloped agriculturally, ecologically, and economically. For these reasons, for several years UNDP has provided long-term engagement and systematic support to this landscape in terms of community-based climate change adaptation projects. Thus, COMDEKS activities in Namibia are expected to build on the lessons learned and on the networks of partners and stakeholders, as well as strengthened institutions, resulting from these previous efforts.

Preparation

A local NGO was awarded a grant to facilitate a workshop with members from the local community to conduct the baseline assessment. In order to raise awareness and mobilize support among community members, the primary means for mass communication in the region, were used, and preparatory visits were also made by the facilitators. Potential participants were also sought out through consultations with traditional authorities and other responsible parties in the conservancy. A wide range of local stakeholders, including farmers, natural resource monitors, government representatives and community leaders were invited to participate in the assessment with an eye

towards balanced representation of constituents in conducting the workshops. During the preparatory phase the indicators were translated by the facilitators into the local language, Oshiwambo, and hand-outs were prepared with the indicators in both English and Oshiwambo.

Assessment workshops

In March 2014, the initial two-day stakeholder assessment workshop to conduct a baseline assessment of the socio-economic and ecological resilience of the landscape and to identify key issues was held in a hotel conference room in the town of Oshakati. Thirty-eight community members, including 15 women and 23 men took part in the discussion, which was used to provide input for the development of the landscape strategy. One-on-one discussions were also held between the workshop facilitators and the other organizations working in the landscape such as the Namibia Development Trust, Creative Entrepreneur Services, the local NGO Omalundu Iimuna Kommitiye Elungameno (OIKE), and the Ministry of Environment and Tourism, to incorporate their viewpoints, lessons learned, and best practices from similar projects funded previously. A follow-up two day stakeholder workshop was later organized at the Engombe Agricultural Centre, where the formulated landscape strategy was presented and endorsed by community representatives.

Mapping exercise, scoring, and discussion

During the first day of the resilience assessment workshop, men and women were divided into two groups for a participatory mapping exercise in which each group drew a map of the conservancy and its resources, and then were asked to write their scores for the indicators on paper. The scores for the resilience indicators were collected and entered into a spreadsheet for analysis after the first day's session. Average scores for each category were written on large pieces of paper and put on the wall to facilitate discussion on the second day.

Participatory mapping exercise. A group of men creating their map during the baseline assessment mapping activity as a basis for assessing resilience

A group of women collaborate for the mapping activity

The second day of the workshop consisted of a discussion of the previous day's results. An overall explanation of the sub-categories of the resilience indicators and their results (on a scale of excellent, good, fair, poor, and very poor) was given by the facilitators. Facilitators also discussed the following with members for each category: 1) what the situation is, 2) what activities are being done now, and 3) what activities might be needed in the future. While the conservancy was generally given high marks in some areas such as agricultural biodiversity, it was perceived to be lacking in ecosystem protection, with people tending to agree on the need for more enforcement and compliance with regulations. Areas for improvement were found in nearly all measured categories.

Explanation and scoring of the target landscape using the SEPLS indicators during the baseline assessment

The different groups represented often had differing opinions based on their own situation; for example, it was perceived that people living near the edges of the conservancy had a different perspective on the situation inside the conservancy than those from near the center, and that women had less interest in the salt pans as a natural resource than men because traditionally women are not allowed to go into the salt pans to collect salt.

Suggestions for improvements included socio-economic infrastructure-related concerns, with the idea that more institutional capacity was needed to enforce rules in place, such as a larger budget for natural resource monitors. Workshop members also indicated a desire to establish a market to sell local products and tourist lodges to promote ecotourism of the area. Other suggestions focused on awareness-raising about the need to improve landscape resiliency, with people calling for more training in sustainable production techniques and more effort to create a culture of mutual cooperation, through promoting visits to other conservancies and exchange of best practices.

One of the major themes emerging from the discussion was the need for better community-based governance, as the community itself is not responsible for making the decisions needed to preserve the ecosystem. The participants seemed to agree that younger generations are less engaged in the conservancy effort due to high rates of out-migration for school and then work.

Participants engage in discussion

Wrap-up

After these discussions, the facilitators wrapped up the workshop by again stressing that this workshop was meant as the beginning, not the end, of a process. Beyond the immediate development of the landscape strategy and identification of projects to be carried out directly through COMDEKS or other donor funding, the indicators will be used as an adaptive management tool, with a plan to hold another assessment workshop within the next few years to identify trends in perceived resilience and to evaluate the effectiveness of the strategy.

Follow-up

After the baseline assessment, a follow-up session was held to present the landscape strategy to stakeholders for validation and endorsement. In addition to constraints and challenges, the stakeholder consultation process also identified many opportunities for the landscape such as the potential for tourism and protection of biodiversity due to the landscape's close proximity to the Etosha National Park.

The types of community projects identified by stakeholder participants that may be supported by COMDEKS and/or other donor funding in the Ipumbu-ya-Shilongo Conservancy include activities that will improve freshwater retention, for both human consumption and agricultural use, rehabilitation of wells, and the development of "conservation tillage" as an agricultural practice, which would allow water to penetrate the soil and nourish crops for a longer period of time. Other activities may focus on increasing the use of indigenous crop varieties or the creation of wildlife preservation zones, which would sustain regional biodiversity while creating a source of revenue for the local community through ecotourism.

Lessons learned and challenges identified during the process

1 **Discussion through interpreters may not flow as smoothly as, and may take longer than, expected** – Discussion during the assessment workshop was often hampered by the need to translate between English and Oshiwambo. In order to save time and circumvent the need of translating all the proceedings between English and the local language, one possible solution may be to divide participants into smaller groups.

2 **The facilitator must ensure ample time for explanation of Satoyama and SEPLS resilience and overall sustainability of ecosystem biodiversity and services** – Explaining these concepts so that all stakeholders understood them took a great deal of time. Effort must be made so that key concepts are understood by the community, to ensure acceptance and participation by community members in the process. Again, it may be more productive to split into smaller groups for those who need a closer explanation in their local language.

3 **Sufficient time should also be allocated for completion of the mapping activity** – Although it was time-intensive, the mapping process proved particularly successful in providing a spatial dimension to conservation priorities, allowing for a more concrete discussion of landscape issues and encouraging relevant and practical solutions to landscape resilience. The extra time taken in this case was considered worthwhile.

4 **The importance of integrating gender perspectives, even in a community with relatively high gender equality should be stressed** – During the workshop, there was some resistance to divide scoring groups by gender, with the argument that there is relatively high gender parity in the community. In some nearby ethnic groups, women are

held in a much lower position than men, but in the Ipumbu-ya-Shilongo Conservancy, while it may not be exactly equal, women speak their opinions openly in the presence of men and even hold positions of authority. However, even though there is not a great disparity between men and women, men and women did highlight different elements and aspects at the landscape level, such as differences in attitudes towards salt pans as a natural resource. Although not always necessary to divide groups along gender lines, workshop facilitators should encourage the active participation of all stakeholders, including women and marginalized communities, in the discussion.

5 **Various community interests and incentives can require sensitivity to balance** – Among the issues discussed during the resilience assessment was a proposal to turn the southern part of the conservancy into a zone exclusively for sustainable wildlife management, including regulated big-game hunting. This would increase tourism revenue, but cattle-grazing activities in this area would have to be moved to the central area of the conservancy. In cases like this, it is important to make sure all community interests have representation when formulating a landscape strategy, so that the negotiated strategy will be as broadly-supported as possible. Relatively neutral exercises, such as mapping and scoring indicators, can be useful in this regard by encouraging collaboration and agreement about landscape conditions before moving on to contested topics involving changes in land-uses.

4.2 Fiji
Identification of concrete community actions

Local community members on Taveuni Island, Fiji, were able to identify possible actions to strengthen the resilience of their communities' landscapes and seascapes through assessment workshops held by Bioversity International (see "Indicators in Action: Sample assessment workshop timetable" on page 37 for the workshops' design). Two assessment workshops were held in the villages of Lavena and Korovou, with participants from four villages in the Bouma National Heritage Park on Taveuni Island: Korovou, Lanvena, Vidawa and Waitabu. The Bouma National Heritage Park covers about 15,000 hectares of rainforest including strict conservation areas known as the Nature Reserve (communities cannot take anything from this area), and the Forest Reserve (communities can take natural resources from this area only for their subsistence). All four villages are located along the coast, and most of the villagers are involved in both agriculture and fishing. Thus, villagers' awareness of connectivity between different components of the landscape and seascape is relatively high. The four villages have been also involved in community-based ecotourism since 1990, with funding assistance from the New Zealand Aid Programme. Thus, the communities have been actively involved in natural resource management, particularly related to ecotourism.

Through discussions of the group scores for each indicator, the villagers were able to share their perceptions of the status of their landscapes and seascapes, and to reach common understanding among elders, youth, men and women. After finishing the group scoring, they discussed ways to strengthen landscape and seascape resilience based on this understanding, which allowed them to come up with concrete ideas for actions that could be implemented at the village level.

For example, participants from Waitabu village reached agreement on the following group scores for each indicator.[1]

1 The resilience Indicators used in the Fiji workshop were a previous version slightly different from the set of indicators found in this toolkit.

Map of the Bouma National Heritage Park in Taveuni Island

Table 2. Group scoring from Waitabu village, Taveuni Island, Fiji

Questions for scoring	Common understanding of the group	Group Score/ trend
Landscape/seascape biodiversity and ecosystem protection		**3**
1 Landscape/seascape diversity		
Is the landscape/seascape composed of diverse natural ecosystems (terrestrial and aquatic) and land uses?	The establishment of a Marine Protected Area covering part of the village fishing grounds has produced substantial benefits to the community.	4 ↑
2 Ecosystem protection		
Are there areas in the landscape or seascape where ecosystems are protected under formal or informal forms of protection?	Seascape protection is done through the Marine Protected Area, but none of the landscape is protected besides the Nature Reserve, where access to natural forest is restricted in the northern part of the village.	2 ↑
3 Ecological interactions between different components of the landscape/seascape		
Are ecological interactions between different components of the landscape or seascape considered while managing natural resources?	The importance of connectivity is understood, but villagers are still poaching and using herbicides and pesticides in agriculture.	3 ↑
4 Recovery and regeneration of the landscape/seascape		
Does the landscape or seascape have the ability to recover and regenerate after extreme environmental shocks?	After a hurricane, landscapes/seascapes will recover. However, it will take some time. For example, recovery of coconut trees, taro and coral reef take 3, 2 and 2 years respectively.	3 ↑
Biodiversity (including agricultural biodiversity)		**3.6**
5 Diversity of local food system		
Does the community consume a diversity of locally-produced food?	There is a high diversity of local foods. However, villagers' diets and preferences have been changing and villagers have started buying food in stores, such as canned fish, flour, noodles etc.	5 ↓
6 Maintenance and use of local crop varieties and animal breeds		
Are different local crops, varieties and animal breeds conserved and used in the community?	Local varieties still exist, but these are slowly being replaced by commercial ones (e.g. taro), and villagers are not interested in maintaining local varieties.	3 →
7 Sustainable management of common resources		
Are common resources managed sustainably?	Fishing practices are improving, but are still not sustainable.	3 ↑

Questions for scoring	Common understanding of the group	Group Score/ trend
Knowledge and innovation		**3.2**
8 Innovation in agriculture and conservation practices		
Does the community develop, improve and adopt new agricultural, fisheries, forestry and conservation practices and/or revitalize traditional ones to adapt to changing conditions, including climate change?	Agroforestry practices, such as avoiding clear-cutting, help resilience in the face of hurricanes. However, these practices are not enough.	3 ↑
9 Traditions and knowledge related to biodiversity		
Are local knowledge and cultural traditions related to biodiversity transmitted from elders and parents to young people in the community?	Some knowledge is passed down through collective work on farms. Kava sessions (drinking kava) among villagers are occasions to share knowledge.	3 ↑
10 Documentation, access and exchange of agricultural biodiversity		
Is agricultural biodiversity and associated knowledge documented, accessed and exchanged?	Agricultural biodiversity and knowledge is accessed and exchanged among villagers, but no documentation exists. Documentation is not part of the culture. Documentation in the area has been done by the government, but villagers don't always have access to documents.	3 ↑
11 Women's knowledge		
Are women's knowledge, experiences and skills recognized and respected at household, community and landscape/seascape level?	Women gave a score of 4, while men gave a score of 5. Understanding between men and women was different.	4 ↑
Governance and social equity		**4.2**
12 Right in relation to land/water and other natural resource management		
Does the community have customary and/or formally recognized rights over land (seasonal) pastures, water and natural resources?	Villagers feel that they have a certain freedom over land and water resources, although the system in place limits the allocation of farm land for each family. The fishing ground is common property shared by two other communities.	5 ↑
13 Community-based governance		
Are governance mechanisms by local communities and institutions effective for sustainable natural resources and biodiversity management?	There is a committee that looks after natural resources. The committee is supported by the national government and fisheries department, which are promoting sustainable development.	4 ↑

Questions for scoring	Common understanding of the group	Group Score/ trend
14 Social capital in the form of cooperation across the landscape/seascape		
Is there connection, cooperation and coordination within and between communities for the management of natural resources?	Cohesion within the community is good, but not between communities.	4 ↑
15 Gender equity		
Do women have the same opportunities as men in decision making, access to resources, education, information and innovation?	Inequalities are only seen in decision-making processes in clan meetings. Women's position in decision-making is weak.	4 ↑
16 Social equity		
Is access to resources and other opportunities fair and equitable for all community members?	Each clan has an equal share of resources. However, among the three clans in the village, some have smaller populations than others and so have more resources per person.	4 ↑
Livelihoods and well-being		**4**
17 Socio-economic infrastructure		
Is the socio-economic infrastructure adequate for the needs of the community?	Roads in the village are in poor condition, which is one of the priorities for improvement.	4 ↑
18 Health of people and environmental conditions		
What is the general health situation of local people taking into consideration the prevailing environmental conditions?	The village is kept clean and tidy. Waste is separated, and plastic is burned. Every Monday, those that are sick are taken to the nurse. Biofilters have been installed in two community water tanks for drinking water. Flush toilets are in every household.	5 ↑
19 Income diversity		
Are households in the community involved in a variety of sustainable, income-generating activities?	Reliance on agriculture (taro and cassava) is too high (60-70%). Tourism in the Marine Park and handicraft (mats, fans, virgin coconut oil) are potential other sources of income.	3 ↑
20 Opportunities for biodiversity-based livelihoods		
Does the community develop innovative use of local biodiversity for its livelihoods?	The Marine Park is an attempt not only to improve the conservation status of the coral reef and benefit from spillover effects on surrounding areas, but also as a main tourist attraction.	4 ↑

After reviewing this common understanding of the status of the landscape/seascape, the group selected priority discussion topics to identify possible actions for the village. The four discussion topics were as follows:

1 Reduction of chemical use in agricultural activities
2 Reforestation in areas with heavy clearing for agroforestry
3 Revitalization of traditional knowledge including farming practices
4 Promotion of more income-generating activities

The villagers discussed each topic and came up with the following ideas for concrete actions in the village.

Table 3. Ideas for actions in Waitabu village, Taveuni Island, Fiji

Topic	What needs to be done?	Who will do it?	Who will lead it?	External support
1	• Revive traditional collective work (*balebale*) in the village to reduce use of chemicals	village men	village headman, village chief	Tete Taveuni (local NGO promoting use of organic fertilizers), Ministry of Agriculture (national gov't)
2	• Organize village meetings where the village chief and elders can tell the community about the importance of reforestation	village chief	plantation committee of each village	Forestry Department (national gov't), because it has native seeds
3	• Discuss revival of traditional knowledge including farming practices during collective work • More dialogue between elders and youth to share knowledge with young villagers, for example during the collective work • Documentation of traditional knowledge • Traditional farming practices include: – Farming diversity: planting not only taro and cava, but also other products – Planting taro every 4 months: taro takes 8 months to harvest. Thus, 4 months after planting, villagers plant again so that they can harvest taro every 4 months – Practice agroforestry to protect marine resources	youth groups, elders	village headman, village chief	Ministry of Agriculture (national gov't), Ministry of iTaukei ("indigenous") Affairs (national gov't)
4	Plant taro in the off-season, since villagers can grow taro at any time on Taveuni Island, so that villagers can sell it in the off-season (April and May) in a market where taro can be sold at a higher price Find good markets for local handicrafts (sewing, *tapa* cloth, mats and others), for example in a visitor centre in the village or resort hotels on the island Plant more *Pandanus* to produce more mats	villagers, women	village headman, village chief	

4.3 Turkey
Development of a landscape/seascape strategy

Background

The following case study from COMDEKS activities in Turkey highlights how the indicators can be used for empowering local communities in the management of their landscapes through the formulation of participatory landscape and seascape strategies. Through the COMDEKS programme, UNDP is encouraging a highly participatory and inclusive approach to formulation of landscape and seascape strategies, built around a community-driven vision for restoring and maintaining SEPLS resilience.

After the identification of the target landscape for COMDEKS activities in Turkey - selection made on the basis of several criteria, the most important of which was the demonstrated interest and engagement of the communities themselves - a resilience assessment was held in the Datça-Bozburun Peninsula in the Muğla province of Southwest Turkey to assess the current situation in the target SEPLS and to better understand local communities' perceptions. This baseline assessment led to the preparation of a COMDEKS Country Programme Landscape Strategy, a comprehensive document which outlines the landscape profile, expected goals and outcomes, and key measures and strategies for community-based actions.

The Datça-Bozburun Peninsula is recognized as a Key Biodiversity Area (KBA)[1] as it represents one of the most pristine lowland forest and coastal landscapes in the Mediterranean. The targeted area spans 247,700 hectares and includes the peninsula and its surroundings, with a northward extension covering the rich marine habitats of Gökova Bay. It is a diverse hilly landscape with harbours and bays along its coasts. The steep cliffs prevent the expansion of the road network to some extent and provide patches of habitat for wildlife.

About 90 percent of the Datça-Bozburun Peninsula is protected under natural parks, wildlife reserves and natural and archaeological sites, as well as six "No-Take Zones" (NTZs) and two Special Environmental Protection Areas (Gökova SEPA and Datça-Bozburun Peninsula SEPA). However, Datça-Bozburun is at risk of losing its valuable protected status, which to date has reduced threats to the landscape.

The Datça-Bozburun peninsula is recognized as a Key Biodiversity Area

1 "Key biodiversity areas are places of international importance for the conservation of biodiversity through protected areas and other governance mechanisms. They are identified nationally using simple, standard criteria, based on their importance in maintaining species populations." (Source: www.iucn.org)

Fishing is one of the key livelihood activities in Gokova Bay

Preparation

Information collection and stakeholder identification

The team of experts supporting the baseline assessment prepared information regarding the status of conservation and livelihood activities in the area, taking into account for example the continuous decrease in populations of vulnerable Mediterranean species.

A literature review, assessment of local capacities, site visits and consultations with local stakeholders were conducted. Local stakeholders included representatives of local villages, municipalities and city councils; cooperatives and unions for agriculture, fisheries, tourism and infrastructure; individual farmers, fishermen, hotel owners, tourism operators, animal keepers and local residents; local and national protection-oriented NGOs working on nature conservation and agricultural biodiversity; and local academics researching marine protection.

Participants

Three workshops were held in the peninsula in order to maximize key local stakeholders' participation. In total, more than 70 stakeholder representatives from 17 target communities were involved in the workshops.

Due to the large size of the area and the high population on the peninsula, only representatives of local cooperatives and communities, mostly men, were invited to these workshops, although if time and conditions allow, additional house visits to women are strongly advised to overcome gender barriers in such cases.

Local fisherwoman in Datça-Bozburun Peninsula

One challenge was adapting the terminology to the community's needs. As the language used in the indicators was difficult for most of the participants to comprehend, the COMDEKS team translated and simplified the terminology and provided examples relevant to local communities to ensure that all members would understand the terms and concepts.

Assessment workshops

The assessment workshops lasted 3-4 hours, including an introductory presentation and exercises to create a more informal, participatory and communicative atmosphere. The assessment of the landscape situation was based on 1) an interactive mapping exercise, 2) scoring of the resilience indicators, and 3) a problem tree analysis, which was produced from discussions during the process.

Prior to the workshops, participants were asked to mark important assets, values, threats and conflict areas by sticking notes and photos onto a map of the landscape. The composed map not only provided valuable information on key characteristics of the area, but also underlined sensitive areas of interest, problems, opportunities and threats.

After the mapping exercise, the three resilience assessment workshops were held, and later key stakeholders who did not appear at the meetings were visited individually. Then, a follow-up session was organized to discuss problem analysis.

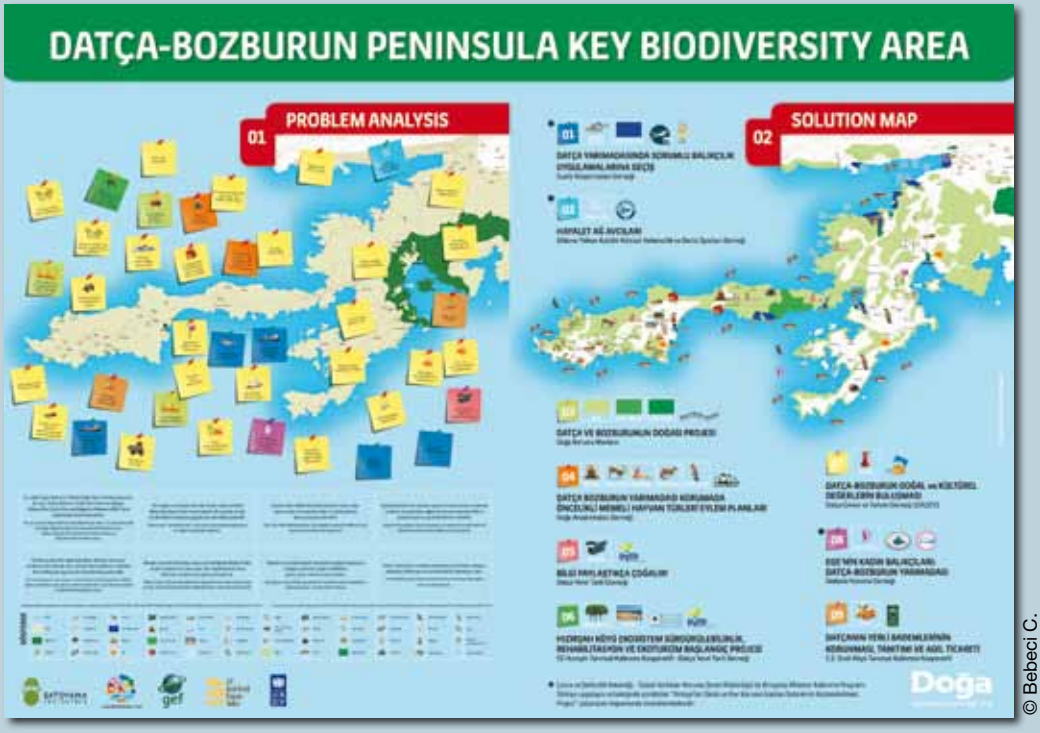
Based on the interactive mapping exercise and indicator assessment, local communities identified threats and problems in the areas. They found that, as a result of increasing development pressures such as urbanization, pollution and habitat destruction in terrestrial and marine ecosystems, the degradation level of the landscape is increasing. Important problems highlighted in the problem tree analysis included a loss of local agricultural products such as fig and mastic, abandonment of traditional fishing and diving practices in favour of conventional products with higher profit margins, destruction of valuable forests and decreasing wildlife population. Literature also shows that populations of vulnerable Mediterranean species continue to shrink despite protection status.

Landscape strategy and action plan

The series of consultations undertaken on Datça-Bozburun provided a snapshot of the current situation of the landscape from the perspective of key stakeholders. In addition, a landscape-level perspective was very helpful for local communities to have an opportunity to visualize how their actions affect the landscape, and how those actions link together. The process generated a list of values, opportunities and threats, from which the strategy to enhance landscape resilience was developed.

Based on these consultations, stakeholder representatives developed the COMDEKS Country Program Landscape Strategy with four desired outcomes: 1) to improve and/or maintain ecosystem services by strengthening participatory land use planning and management practices; 2) to increase resilience of agriculture through conservation of plant genetic resources and implementation of agro-ecological practices using traditional knowledge; 3) to improve the livelihoods of the people through eco-friendly community-based enterprises that reduce impacts on the ecosystem and scenic value of the landscape; and 4) to create and/or strengthen institutional governance mechanisms through more inclusive and participatory decision-making processes at the landscape level.

During the consultative process for the development of the Landscape Strategy, participants also identified



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Landscape poster with information on landscape elements and COMDEKS funded activities developed during the baseline assessment in Turkey

This poster, titled "Challenges and solutions to enhance the resilience of the Datça-Bozburun Peninsula's socio-economic production landscape and seascape" was produced through the assessment process. It is used as an educational tool for local communities and for building awareness among visitors to the area.

The left side of the map simulates the interactive mapping exercise held during the assessment, in which community members were asked to mark important assets, including key biodiversity and local products, as well as threats and challenges such as sea pollution, overfishing and ghost nets. The right side outlines the nine community-based projects identified through the resilience assessment workshops, and currently supported by COMDEKS, which focus on both landscapes and seascapes of the peninsula. Below the annotated map, eight messages welcome visitors in both Turkish and English and present ways to respect the landscape's natural features by avoiding disturbance to animal habitats, supporting sustainable fishing, and empowering local cooperatives to ensure conservation of the Datça almond and other local products.

the kinds of local interventions needed to achieve these outcomes and guide the design and selection of specific community projects for direct grant funding – either from COMDEKS or other donors. Based on this community-driven landscape planning process, the SGP National Steering Committee in Turkey selected nine projects in the Datca-Bozburun Peninsula, all of which are administered by community organizations and are designed to improve the livelihoods of local populations while strengthening the resilience of surrounding ecosystems in the target landscape. For example, the "*Transition to Responsible Fishing Practices in Datça Peninsula*" and "*Ghost Net Hunters*" projects aim to protect biodiversity and improve ecosystem services by combating overfishing, the lack of regulatory enforcement and illegal harvesting within no-fishing zones, while the "*Ecosystem Sustainability, Rehabilitation and a Start for Ecotourism at Hacetevi Hill" and "The Conservation, Promotion and Fair Trade of Datça Almonds*" projects are working towards developing resilient agricultural systems. All of the projects take a holistic approach to sustainable community-based development and create synergies throughout the target landscape.

Stakeholder-driven planning processes and the practical application of the indicators, based on community perspectives, are effective tools for reaching common understanding of threats and solutions and for defining strategies to enhance SEPLS resilience through community-based activities.

The COMDEKS Turkey Landscape Strategy serves as a collaborative adaptive management tool to protect Datça-Bozburun Key Biodiversity Area while improving the livelihoods of local communities. After the use of the Resilience Indicators as a tool for communities to assess their landscape, identify desired ecological, social and economic outcomes, and plan activities to build resilience, the COMDEKS project in Turkey soon began the process of conducting an ex-post baseline assessment in order to measure results and achievements at the landscape level, assess change in perceptions, and adapt planning for subsequent management practices that will reflect lessons learned.

Divers from the "Ghost Net Hunters" project

4.4 Kenya
Results analysis for researchers

Background

The following description of workshops prepared and implemented in Kenya by Bioversity International serves to highlight how results collected from workshops may be analysed by researchers to help elucidate the range of perception of risks faced by the community and the existing degree of innovation to cope with changes and development needs. While the indicators used in this study are an earlier version and are slightly different from the latest set of indicators, the overall process shows how the indicators can be useful not only for developing management strategies, but also as a research tool.

Assessment workshops

The field-testing in Kenya involved 5 communities which were selected among partners located in different agro-climatic conditions that had been involved in previous Bioversity research activities with good and long-term partnerships. In consideration of gender and age balance, a group of 6-7 participants who are able to represent each community were invited for the exercise. Information was collected from a total of 34 individuals (Table 4). This number was determined for coordination purposes to obtain good commitment from the participants. In addition, in order to make logistical arrangements smooth (such as starting the focus group discussions right away), a Bioversity representative went to all communities one week before to identify the participants and make arrangements including the venue, food, etc.

The Focus Group Discussion (FDG) consisted of two parts: an introduction/brainstorming session, and indicator question/discussion session. One day was allotted for each village to conduct its FGD. The introduction/brainstorming session took up the first 2 hours, and the indicator session, answering all 20 indicator questions and discussion, took about 4-5 hours. In each FGD, before starting, simple demographic information such as full name, age and gender of the participants was also recorded.

The facilitator first introduced and explained the main objectives of the day

A participatory mapping exercise was organized in the brainstorming session to create a common understanding of the scale of the community landscape, landscape contents and ecosystem services. The resulting community map served as a first step to identify the scale of the landscape and location of the major landscape characteristics within the community. After mapping, the facilitator allowed the participants to engage in a discussion of major components of the landscape, climate-related calamities, a historical calendar of major events and calamities, major food crops, livestock, wild foods, trees, crop lands, recent landscape changes and access and control over resources. Key technical terms such as “landscape”, “agricultural

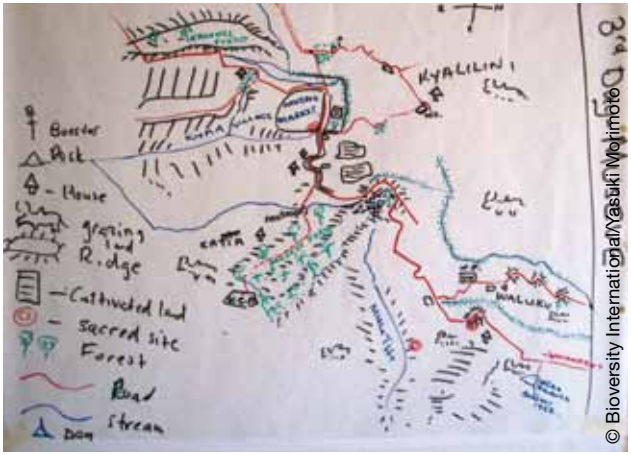
Table 4. Village location and number participating in the Focus Group Discussion

District	Village	Latitude	Longitude	Elevation (m)	Major Ethnic community	Total paticipants	Gender		Age		
							M	F	Average	Max	Min
Kikuyu	Ruku	-1,207	36,693	1.978	Kikuyu	6	3	3	48,8	80	29
Mbeere	Njarange	-0,461	37,814	850	Mbeere	7	3	4	48,7	70	23
Kitui	Museve	-1,325	38,071	1.283	Kamba	7	3	4	53,4	70	23
Kitui	Nzewani	-1,386	38,015	1.130	Kamba	7	2	5	43,3	68	22
Machakos	Kisaani	-1,438	37,438	1.344	Kamba	7	3	4	48,6	74	35
						34	**14**	**20**	**48,6**	**80**	**22**

biodiversity", and "resilience" were also described in local languages. Information was written on a big sheet of paper, which was helpful during the following scoring of the indicators (Table 5a and b). At the end of the exercise, one representative presented the map to all the other participants which were invited to add what was missing on the map. This exercise did not aim to obtain a geographically correct map, but rather to help participants create a focus for their discussions.

The facilitator explains the different elements of the landscape

A section of the region around Museve was drawn on the map, including two sub-locations and 10 villages.



The map created during the participatory mapping exercise

Table 5a. Major landscape components and calamities identified in Museve village, Kenya

Category	Description
Major landscapes and landmarks	Hills, ridges, forests, large trees and rocks, swamps, dams and water points including wells, roads, schools, houses, dispensaries, churches, seasonal rivers and streams, radio and telephone boosters, crop fields, grazing lands
Protected landscapes and areas	Forests, water dams, cultural sites and sacred places, schools, markets, churches, dispensaries, roads
Crops	Maize, beans, sorghum, cassava, sweet potatoes, cocoyam (*Xanthosoma* sp.), sugarcane, bananas, kale, black nightshade (*Solanum* sp.), carrots, pumpkins, edible gourds (*Lagenaria siceraria*), onions, coriander, pigeon peas, cowpeas, climbing beans, green gram, bambara beans, watermelon, finger millet, pearl millet, custard apples (*Annona reticulata*), tomatoes, avocadoes, passion fruit, mangoes, oranges, pawpaw, tangerines, guava
Trees	*Cupressus* sp., *Eucalyptus* sp, *Grevillia robusta*, *Senna siamea*, *Vitexpayo*, *Croton macrostachys* (kitundu), *Antidesma venosum* (kikala), miklanginga
Livestock	Cows, goats, sheep, donkeys, chickens
Wild animals	Monkeys, nzonga, squirrels, rabbits/hares, rats, mice, mongoose, impala, snakes
Climate-related calamities	Prolonged dry season (drought), overgrazing, floods, land erosion, crop pests such as army worms, bush fires, interference of people, diseases (animal and human)
Social calamities	Poverty, unemployment, malnutrition and hunger, drug abuse, lack of morality among youth, Indigenous trees cut down and not planted again

Table 5b. Example translations of landscape terms prepared for the discussion in Kikamba (a local language)

English	Kikamba
Landscape	nzi/nthi, wmbowanthi/nzi ("nature of country")
Resilience	kwiyumiisyo, kwingangiiya
Diversity	mbulanio, kivathkanyo

The population of this landscape was estimated to be 6-7,000 people in 750-800 households, with the perceived scale of the landscape varying among the five communities surveyed.

Results analysis

After the workshop, researchers carried out further analysis using the collected scores, helping to identify risks faced by the five communities. Local innovations and challenges were shown to have implications for potential community development.

Three types of analytical method were utilized: quantitative, qualitative and comparative. The following are examples of results found through each of the different methods. Table 6 shows the proportion of respondents scoring 1 (explained as "high risk" in these workshops) to 5 (explained as "good state") for each of the 20 indicators in the five communities.

Table 6. Percentages of respondents with different scores and trends, mean scores and trends in the five communities, indicating degree and variation of perception scores and trends for the 20 indicators

		Score (%)					Mean score *					Trend (%)					Mean trend *				
Indicators		1	2	3	4	5	Ruku	Njarange	Museve	Nzewani	Kisaani	↓	↘	→	↗	↑	Ruku	Njarange	Museve	Nzewani	Kisaani
1	Heterogeneity and multifunctionality in the landscape	6	21	41	21	12	3.0 a	3.7 a	3.9 a	2.6 a	2.4 a	0	59	12	26	3	2.5 a	2.4 a	2.3 a	4.0 b	2.4 a
2	Areas protected for their cultural and ecological importance	21	59	18	3	0	1.0 a	2.1 b	2.7 b	2.1 b	2.0 b	6	47	24	24	0	3.0 b	1.9 a	2.4 ab	4.0 c	2.0 a
3	Sustainable use of resources	0	56	38	6	0	3.0 bc	2.0 a	3.1 c	2.4 ab	2.0 a	0	59	9	32	0	2.5 ab	2.0 a	3.1 ab	4.0 c	2.0 a
4	Environmental security and safety	0	32	59	9	0	3.3 b	2.1 a	3.0 b	2.7 ab	2.7 ab	0	26	6	68	0	3.5 b	2.0 a	3.6 b	4.0 b	4.0 b
5a	Local crops, varieties and animal breeds used in a community	3	6	76	15	0	2.8 ab	2.6 a	3.3 ab	3.4 b	3.0 ab	0	32	3	65	0	3.0 ab	2.1 a	3.7 b	3.7 b	4.0 b
5b	Agricultural biodiversity documented and conserved in community classification systems and community seed banks	62	32	6	0	0	1.0 a	1.0 a	1.4 a	2.3 b	1.4 a	0	0	26	71	3	3.0 a	3.9 b	3.9 b	4.0 b	4.0 b
6	Diversity of local food system	0	50	41	9	0	3.5 b	2.1 a	2.3 a	2.4 a	2.7 ab	3	21	3	74	0	3.7 b	1.9 a	3.9 b	4.0 b	4.0 b
7	Innovation in agricultural biodiversity management for improved resilience and sustainability	0	38	47	12	3	4.0 c	2.1 a	2.1 a	3.0 b	2.9 b	0	9	6	76	9	4.0 ab	3.1 a	3.9 ab	4.3 b	4.0 ab
8	Access and exchange of agricultural biodiversity	0	53	26	18	3	4.2 c	2.1 a	2.0 a	3.0 b	2.4 ab	0	21	6	74	0	3.8 b	2.1 a	4.0 b	3.7 b	4.0 b
9	Transmission of traditional knowledge from elders, parents and peers to the young people in a community	3	32	56	9	0	3.3 c	3.1 bc	2.4 ab	2.7 ac	2.0 a	0	38	3	59	0	2.0 a	2.3 a	4.0 b	3.6 b	4.0 b
10	Cultural traditions related to biodiversity	0	26	62	12	0	2.7 a	2.9 a	3.1 a	2.4 a	3.1 a	6	65	6	24	0	2.0 ab	2.4 b	1.7 ab	4.0 b	2.1 ab
11	Number of generations interacting with the landscape	0	0	38	53	9	4.2 b	3.6 ab	4.1 b	3.3 ab	3.4 ab	0	97	3	0	0	2.0 a	2.1 a	2.0 a	2.0 a	2.0 a

Indicators		Score (%)					Mean score *					Trend (%)					Mean trend *				
		1	2	3	4	5	Ruku	Njarange	Museve	Nzewani	Kisaani	↓	↘	→	↗	↑	Ruku	Njarange	Museve	Nzewani	Kisaani
12	Practices of documentation and exchange of local knowledge	41	21	35	3	0	1.0 a	3.1 b	1.4 a	2.9 b	1.4 a	0	0	21	79	0	3.0 a	4.0 b	3.9 b	4.0 b	4.0 b
13	Use of local terminology or indigenous languages	0	3	18	47	32	5.0 d	4.1 bc	4.6 cd	3.6 ab	3.3 ab	0	76	24	0	0	2.7 b	2.0 a	2.4 ab	2.0 a	2.1 ab
14	Women's knowledge about biodiversity and its use	0	3	59	32	6	3.3 ab	3.3 a	4.1 b	3.4 ab	2.9 a	0	3	3	85	9	4.5 b	3.7 a	3.9 ab	4.0 ab	4.0 ab
15	Local resource governance	38	18	32	12	0	1.0 a	1.0 a	3.6 d	3.0 c	2.1 b	0	0	29	71	0	3.5 b	3.0 a	4.0 c	4.0 c	4.0 c
16	Autonous access to indigenous land and natural reoserces	0	0	0	21	79	5.0 b	5.0 b	5.0 b	5.0 b	4.0 a	0	18	82	0	0	2.0 a	3.0 b	3.0 b	3.0 b	3.0 b
17	Gender	0	9	68	21	3	3.2 a	2.9 a	3.1 a	3.7 a	3.0 a	0	0	24	76	0	3.5 a	4.0 a	3.9 ab	3.7 a	3.7 a
18	Social infrastructure	0	32	50	18	0	4.0 c	2.1 a	2.6 ab	2.7 ab	3.0 b	0	3	3	91	3	4.0 a	3.6 a	4.1 a	4.0 a	4.0 a
19	Health care	0	24	56	21	0	4.0 c	3.1 b	2.3 a	2.6 ab	3.0 b	0	0	0	100	0	4.0 a	4.0 a	4.0 a	4.0 a	4.0 a
20	Health risk	9	56	26	9	0	3.5 b	1.9 a	2.3 a	2.0 a	2.3 a	0	24	6	71	0	3.8 b	2.0 a	4.0 b	3.6 b	4.0 b
Total (%) / Mean *		9	27	41	17	7	3.14 a	2.67 a	2.98 a	2.92 a	2.63 a	1	28	14	55	1	3.14 ab	2.74 a	3.41 b	3.69 b	3.40 ab

Quantitative analysis
The proportion of each score given by participants was calculated for each indicator to identify specific areas the community perceived as more risky.

In total, the proportion of respondents giving a score of 3 was the highest at 41%, but 36% of the total respondents answered with scores of 1 and 2. For trends, the highest rate was seen as “some increase” (↗), with 55% of total respondents.

The highest proportion of respondents scored 1 (“high risk”) and 2 (“risky”) for “Agricultural biodiversity documented and conserved in community classification systems” (94%), followed by “Areas protected for their cultural and ecological importance” (79%), and “Health risk” (65%). On the other hand, the highest proportion of respondents saw trends of 1 and 2 for “ Number of generations interacting with the landscape” (97%), followed by “Use of local terminology or indigenous languages” (76%), and “Cultural traditions related to biodiversity” (71%). This shows that participants shared a risk perception of losing local crops, varieties, classification knowledge and cultural systems that manage the ecosystem and landscape diversity, the young generation tends to disregard local institutions, cultural practices, religions and communal property. Comparison of scores (i.e., the proportion of each score) among different age, gender, and community groups was useful for further analysis.

Qualitative analysis
During the assessment, facilitators documented participants’ comments and explored the direction of the communities’ development. In the discussions, a number of problems faced by the community, causes of the problems, local solutions, potential intervention activities and major stakeholder institutions were captured on cards and categorised by root cause, problems and local actions.

Some of the key comments were documented on cards during the assessment and used for the follow-up session in discussions about potential action plans within the communities

Discussion among community members was a fundamental element of this study and useful to understand the context of actions with high ecological or social impact. In the discussions, a number of community intervention activities and actions taken by community-based institutions were described regarding natural resources, empowerment of the people, creation of ecological awareness and protecting the environment. On the other hand, the lack of government action and policy implementation was articulated as a weakness. Individual community members did not feel they had the influence to prevent other community members from cutting trees, making charcoal, converting to crop fields, harvesting sand, taking animals to the watering place etc. Continuare questa frase con quella sopra e Sostituire tutto questo paragrafo con: The main causes of this were seen as population increase and colonial influence, which have greatly weakened both traditional community punishment and cultural systems that prevented activities such as cutting trees without permission from the community authority. This situation is worsened by the fact that most information

related to agricultural and ecosystem biodiversity has been passed on only through oral tradition and there has been a lack of educational materials describing local biodiversity in local languages.

Comparative analysis

For a comparative study, target communities need to be identified strategically in consideration of their agro-climatic, geographical (location, distance to markets or towns, altitude etc.), and socio-cultural characteristics.

In this case, an interesting observation was seen for indicators related to documentation and exchange of local knowledge, from comparative analysis between the communities. The Kisaani community had better perceived risk compared to the other communities, which was considered to be a result of earlier community efforts. In Kisaani between 2001 and 2002, with help from Bioversity International, a group of women known as the Kyanika Women's Group undertook a project to safeguard the diversity of gourd and cowpea varieties and local knowledge about their many uses. During this project, they visited different parts of Kenya, collecting many types of gourd and cowpea varieties and recording people's knowledge about them. The fruits, seeds and information were stored and exhibited in a special building, a kind of community resource centre, which acts as a source of seeds and an education centre.

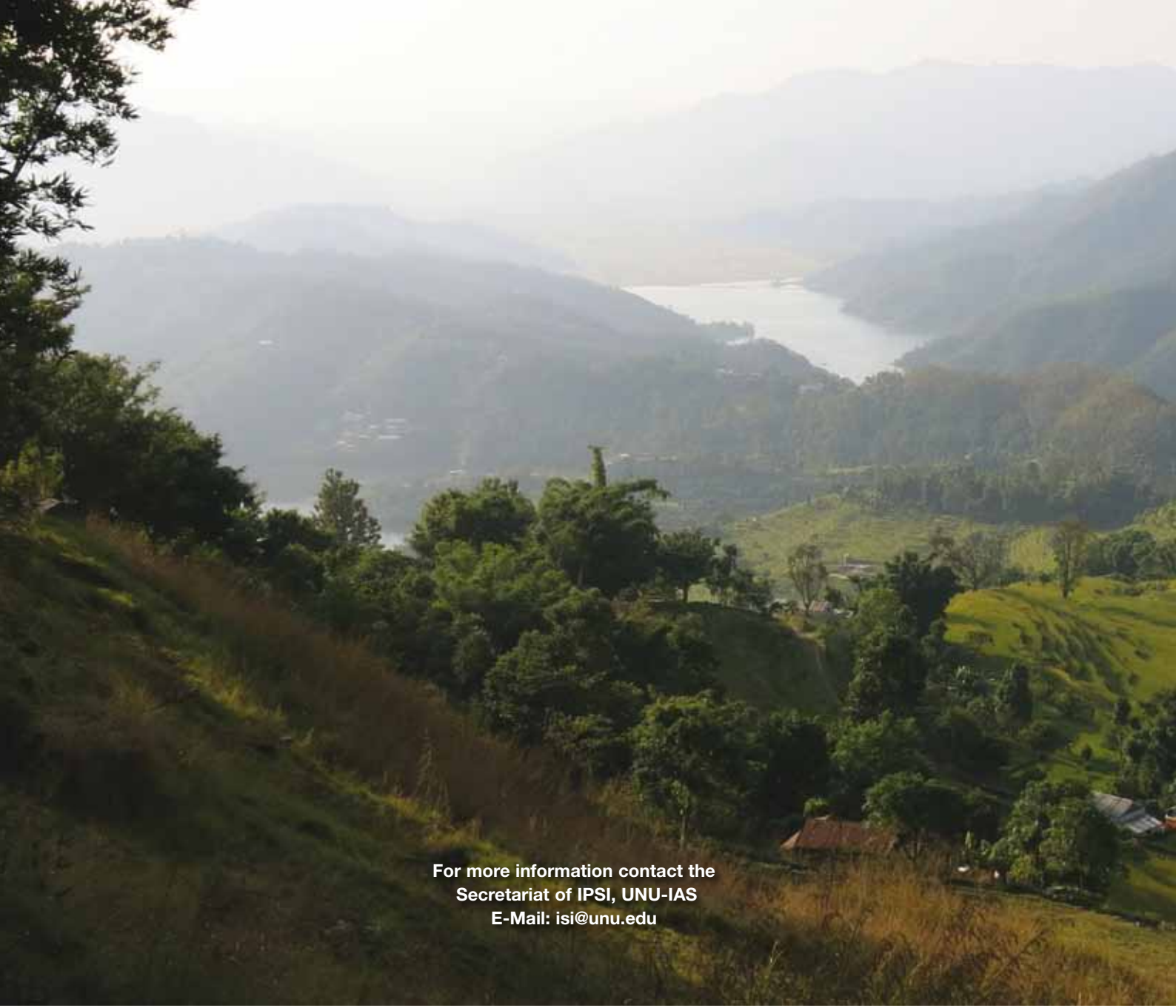
Comparative analysis in this case helped to show the real effectiveness of past interventions, and thus provide evidence for what types of interventions should be pursued in the future.

Findings of the results analysis

The indicator workshops and results analysis helped to identify perceived risks and potential development options for securing ecosystem services and sustainable production systems through enhancing social cohesion, human capital and farmers' knowledge regarding management of locally-available agricultural diversity. This process, including continued interaction, can raise self-motivated awareness and local ownership in decision-making and creation of action plans to implement community-based interventions and thus strengthen resilience in the landscape.

Some practical lessons learned from conducting this study:

- A group of 6-7 participants was found to be appropriate for managing and facilitating discussions but insufficient for statistical data assessment of scores. In order to understand community perceptions from statistical analysis, a larger number of participants from various social backgrounds need to be selected from a broader range of the population.
- Working out potential options requires a lot of time. The research team and facilitators therefore need to identify the ideal number of participants for this exercise. Around 15-20 active participants are the maximum number that one facilitator can handle. If two pairs of facilitators and note takers are available, two separate discussions can be organized, possibly divided by gender.



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