Chapter 1

Enhancing effective area-based conservation through the sustainable use of biodiversity in socio-ecological production landscapes and seascapes (SEPLS)

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1. Introduction

Socio-ecological production landscapes and seascapes (SEPLS) are areas characterized by mosaic ecosystems that are utilized and managed in various ways by the local communities to meet their needs. The following aspects broadly describe SEPLS:

- SEPLS are complex, dynamic and adaptive systems;
- SEPLS management practices hinge on time-tested practices that may be adapted to suit current realities of ecological functioning and social demands;
- Management of SEPLS is anchored in local innovative practices and decentralized autonomous operations;
- SEPLS place a strong focus on "essence of place" linked to a sense of identity. This implies that heritage/cultural values should also be maintained beyond ensuring sustainability of production and use;
- SEPLS demonstrate high levels of biocultural diversity (Maffi & Woodley 2010) and re-connect people to nature;
- SEPLS buffer pressures from urbanization and social changes in rural areas especially through the use of agro-biodiversity. They also often serve as sites of refuge for endangered species;
- The resilience of SEPLS is influenced by production and consumption patterns. This, in turn, is influenced by the activities of multiple stakeholders and their commitment to maintain SEPLS; and
- SEPLS provide connectivity to various types of ecosystems and ecosystem uses. This includes not just the spatial use of a landscape or seascape, but also the various actors who have an interest in the site, across various scales of decision-making and landscape governance.

These SEPLS, despite their diversity, are linked by similar characteristics. First, they are socio-ecological systems that inherently thrive when both environmental components are healthy and well-functioning and social systems are resilient. This implies an innate need to engage in sustainable production activities to conserve biodiversity and strengthen local livelihoods by conserving natural resources through sustainable use of biodiversity and ecosystem services. A recent empirical analysis of International Partnership for the Satoyama Initiative (IPSI) members' case studies in Asia found that sustainable livelihoods based on sustainable use made up the highest proportion of solutions applied or proposed in IPSI member experiences in Asia (Kozar et al. 2018).

Table 1. Overview of the case studies

Chapter number (country)	Title (author)	Type of area conserved	Socio-ecological context and problems	Focus
Chapter 2 (Uganda, Tanzania)	Perceptions of resilience, collective action and natural resources management in socio-ecological production landscapes in East Africa (Bedmar Villanueva et al.)	Not within designated areas Secondary conservation	The absence of supportive government policies, agencies, and lack of local collective action pose challenges to the resilience of the SEPLS and ecosystem services.	Creation of spaces for informed, public discussion on resilience and management of SEPLS to motivate community efforts and local initiatives.
Chapter 3 (Spain)	The contribution of chestnut orchard recovery projects for effective area-based conservation: Two cases in Asturias (Díaz-Varela et al.)	One site within and another outside designated areas Secondary conservation	Increasing abandonment of chestnut orchards within public forests puts at risk the conservation of in situ endangered native cultivars, the associated landscape, and ethnographic and cultural values.	Revival and reintroduction of traditional knowledge for tree management, combined with modern techniques, and ensuring dissemination of this knowledge to the community.
Chapter 4 (Chinese Taipei)	Transformations towards sustainability – A SEPLS restored by the Gongrong community (Chao et al.)	One site is adjacent to another site which is situated partially in a National Park Primary, secondary and ancillary conservation	Environment degradation and loss of agricultural production due to improper land development, habitat degradation, pollution, decreasing income, aging, and depopulation, etc.	Measures to stop environmental degradation and revive agriculture to reinstate biodiversity and ecosystem services.

Chapter number (country)	Title (author)	Type of area conserved	Socio-ecological context and problems	Focus
Chapter 5 (Indonesia)	Conserving local marine and terrestrial biodiversity and protecting community resources through participatory landscape governance in Semau Island, Indonesia (Dwihastarini et al.)	Not within designated areas Secondary conservation	Pressures on small, lowland island ecosystem and its biodiversity from climate change, excessive use of agricultural chemicals and deforestation	Community-led projects to support sustainable livelihood activities, establish new institutions and networks, and negotiate new agreements to protect community resources and local biodiversity.
Chapter 6 (Ecuador)	Ensuring conservation, good governance and sustainable livelihoods through landscape management of mangrove ecosystems in Manabí, Ecuador (Obando et al.)	Within protected areas Primary and secondary conservation	A mangrove, estuary and mountain range ecosystem and production landscape and seascape threatened mainly by the use of chemical residue from agricultural and shrimp farming activities.	Communal organizations for mangrove and dry forest species reforestation. Improvement of local governance resulting in government recognition of community and private reserves, also enabling local income generation and various degrees of sustainability in SEPLS activities.
Chapter 7 (Colombia)	Conservation on Private Lands Integrating Sustainable Production and Biodiversity in the Mid Dagua River Basin, Colombia (Orjuela-Salazar et al.)	Includes several protected areas Secondary to primary conservation	Intensive and expansive agriculture has been threatening the ecosystem services of the basin. Lack of financial resources inhibits conservation actions in these production landscapes.	Conservation actions, participatory management associated with the conversion of private land into natural reserves of civil society recognized by the national government as protected areas with existing land titles and private property rights.
Chapter 8 (Kenya)	Sustainable use of biodiversity in socio-ecological production landscapes and seascapes (SEPLS) and its contribution to effective area-based conservation: The case of *Kaya* forests on the Kenyan Coast (Wekesa & Ndalilo)	Indigenous sacred forests as areas of effective conservation Primary and secondary conservation	Pressure on sacred forests (Kaya forests) due to demand for sand mining, wood products and other biological resources	Integrated landscape management, revival of traditional norms and institutions to preserve knowledge and crop diversity through establishment of cultural centers and domestication of wild foods and medicinal plants
Chapter 9 (Ecuador)	Tree microrefugia and community-based conservation in Tropandean mountainscapes: A bio-cultural approach for heritage management of "El Collay" protected forest in Southeastern Ecuador (Sarmiento et al.)	Includes protected areas (i.e. UNESCO World Heritage site) Secondary to primary, and ancillary conservation	Development encroaching into protected areas causing the loss of native biodiversity, natural resources and culturally significant land as well as degraded ecosystems	Socio-ecological approaches are promoted as management strategies, including application of the Payment for Environmental Services and Complex Adaptive Systems methodologies. Approaches aim to synergize understandings of community perceptions and valuations of these species with their capacity to withstand climate change.

Chapter number (country)	Title (author)	Type of area conserved	Socio-ecological context and problems	Focus
Chapter 10 (Worldwide)	Contributions of socio-ecological production landscapes and seascapes to the achievement of Aichi Biodiversity Target 11 in the Group of Like-Minded Megadiverse Countries (LMMCs) (Leles et al.)	Protected Areas Primary to secondary, and ancillary conservation	Ensure that SEPLS are acknowledged in national policies and international landscape conservation management strategies	Illustrate, through official reports, the relevance of SEPLS in achieving the various objectives of Aichi Target 11 in the LMMC group.

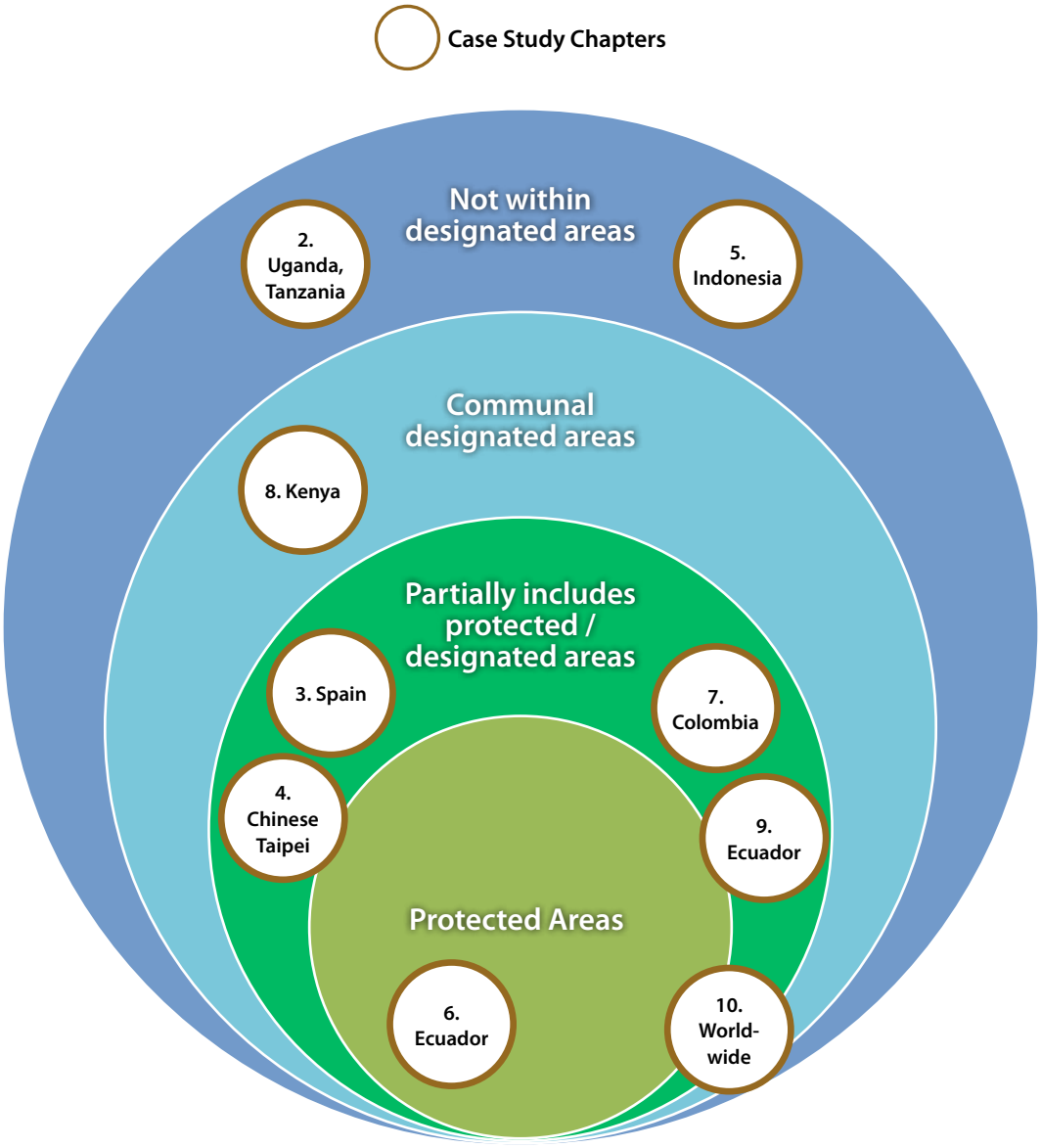

Figure 1. Types of areas conserved by the case studies

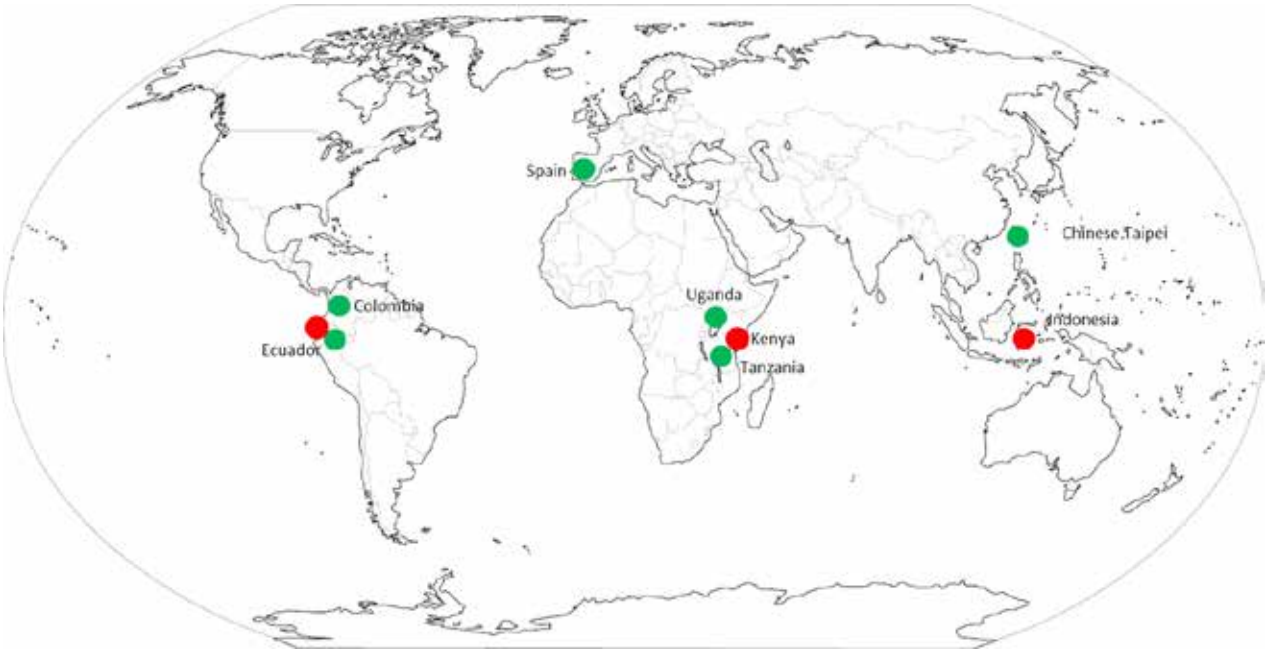

Figure 2. Locations of the case studies presented in the Satoyama Initiative Thematic Review Volume 4 (green: landscape; red: mixture of landscape and seascape)

The case studies in this volume highlight these aspects in different socio-ecological and political contexts. Table 1 gives an overview of the case studies, Figure 1 summarises the types of areas conserved, and Figure 2 illustrates the locations of the landscapes and seascapes covered.

This volume contains: 2 case studies from Asia; 3 from Africa; one from Europe; and 3 from South America. It also includes one global case study on Like-Minded Megadiverse Countries (LMMCs), a group that includes the following 20 countries: Bolivia, Brazil, China, Colombia, Costa Rica, Democratic Republic of Congo, Ecuador, Ethiopia, Guatemala, India, Indonesia, Iran (Islamic Republic of), Kenya, Madagascar, Malaysia, Mexico, Peru, Philippines, South Africa, and Venezuela (Bolivarian Republic of).

1.1 How do SEPLS connect to global policy?

The concept of SEPLS, as highlighted in the introduction, is strongly linked to the emerging dialogue among the international community on recognizing the critical role of decentralized, endogenously-led conservation activities, in other words, those led by local communities themselves (CBD 2018; Jonas et al. 2017). Areas covered by this type of activity may be within or part of existing protected areas, or spatially distinct from protected areas, but can demonstrate effective area-based conservation. In this volume, we seek to highlight how SEPLS contribute to global conservation goals and identify various challenges and trade-offs. At the same time, we aim to highlight emerging and feasible options being explored to ensure socio-ecological resilience. We focus specifically on Aichi Biodiversity Target 11 (hereafter referred to as "ABT 11"), as SEPLS are linked to several of the specific objectives of this target.

2. Methodology

We undertake our analysis of sustainable use in SEPLS and effective area-based conservation through nine case studies submitted by members of the International Partnership for the Satoyama Initiative (IPSI). This chapter aims to provide a synthesis of the case studies presented in this volume, with material taken both from the manuscripts themselves and from discussions at an authors' workshop held from 22 to 24 May 2018 at the United Nations University Headquarters in

By 2020, at least 17 per cent of **terrestrial and inland water areas** and 10 per cent of **coastal and marine areas**, especially areas of particular importance for biodiversity and ecosystem services, are conserved through **effectively and equitably managed**, **ecologically representative** and **well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascape**. (COP 10 Decision X/2, Strategic Plan for Biodiversity 2011-2020). (*Bold text indicates the objectives to which SEPLS relate.*)

Tokyo, Japan. The principal authors of the case studies were invited to the workshop to present their cases and to discuss how the sustainable use of biodiversity as practiced in well-managed SEPLS can contribute to effective area-based conservation of biodiversity. In this context, the workshop discussions addressed the following two key questions:

- How and under what conditions can we ensure sustainable management and use of biodiversity in SEPLS and their contribution to effective area-based conservation?
- How can such effective area-based conservation contribute to the goals of the global conservation agenda, especially in the context of the CBD and its ABT 11?

These questions helped to contextualize the challenges and opportunities faced by SEPLS in achieving biodiversity conservation and sustainable development. These include: i) ensuring actual biodiversity conservation benefits from the sustainable management of production landscapes and seascapes, ii) establishing equitable institutional frameworks, iii) incorporating interests of various stakeholders, iv) gaining recognition of SEPLS as area-based conservation measures, and v) contributing to Aichi Biodiversity Targets and other global conservation goals. The workshop covered a wide range of linked drivers, and associated opportunities and challenges, that impact society and nature in production landscapes and seascapes.

3. SEPLS and other effective area-based conservation measures

While the process of identifying the definition and characteristics of "other effective area-based conservation measures" (OECMs) as mentioned in ABT 11 is ongoing, the conclusions of the 22nd Meeting of the Subsidiary Body on Scientific Technical and Technological Advice (SBSTTA-22) of the Convention on Biological Diversity (CBD) in July 2018 recommended defining an OECM as follows (CBD 2018):

> A geographically defined area other than a Protected Area, which is governed and managed in ways that achieve positive and sustained long-term outcomes for the in situ conservation of biodiversity[1], with associated ecosystem functions and services and, where applicable, cultural, spiritual, socio-economic, and other locally relevant values.[2]

Through an examination of the descriptions of both OECMs and SEPLS, this section highlights how the two concepts are aligned. In the above definition, criteria for identifying OECMs can be broadly organized into four categories: (1) the area is not currently recognized as a protected area; (2) the area is governed and managed; (3) the area's governance and management achieve positive and sustained long-term outcomes for the in-situ conservation of biodiversity; and (4) the area contributes to conservation of associated ecosystems and services, and cultural, spiritual, socio-economic, and other locally relevant values. We discuss the relevance of each criterion to SEPLS as follows.

3.1 Criterion 1: The area is not currently recognized as a protected area

This is one of the most important criteria, as SEPLS also are *not necessarily protected areas*. SEPLS are production landscapes with strong anthropogenic characteristics, emphasizing a harmonious relationship between humans and nature. They demonstrate the concept of *humans in nature* as a "social-ecological system", defined in part as "a coherent system of biophysical and social factors that regularly interact in a resilient, sustained manner" (Redman et al., 2004). Descriptions of the characteristics and linkages of socio-ecological systems mostly attempt to emphasize the existence of local knowledge, people and technology, and property rights institutions, besides ecosystems as such (Berkes et al., 2000). OECMs that are relevant to SEPLS, following the IUCN WCPA (2018), achieve at least one of the following:

(1) primary conservation, referring to areas that may meet all elements of the IUCN definition of a protected area, but are not officially recognized as such because the governance authority does not want the area to be designated as a protected area by the relevant national government;
(2) secondary conservation, achieved through the active conservation of an area where conservation outcomes are a secondary management objective; and
(3) ancillary conservation, referring to areas that deliver conservation outcomes as a by-product of management activities, even though biodiversity conservation is not a management objective.

3.2 Criterion 2: The area is governed and managed

Spatial characteristics of SEPLS, meaning their structure and position as governed and managed areas within the wider landscape, can contribute to their role in area-based conservation. In this sense, there are at least two ways in which they function to conserve biodiversity: (1) They can increase connectivity as corridors for animal and plant species, allowing for movement of species that require

large home ranges and migrating species; and (2) They can provide a buffering function between strictly protected areas and human settlements, such as when an agricultural landscape adjacent to a protected area makes the protected area itself more effective for conservation of biodiversity and ecosystem services.

Case studies in this volume prove that the SEPLS they cover are mostly governed and managed to serve these two purposes: as corridors and as buffer zones. From the spatial point of view, the restored chestnut orchards in North-West Spain (Chapter 3) function as corridors as well as buffer zones between protected areas and the immediate rural environment. Likewise, the Gongrong and Ankang communities in Chinese Taipei (Chapter 4) are physically and biologically connected to the Yangmingshan National Park (YNP). The agricultural landscape expands the effective conservation area of the YNP and buffers it from anthropogenic pressures such as habitat degradation, without any additional cost for the establishment and maintenance of a corridor. In the Páramo grasslands of the tropical Andes (Chapter 9), ledges on steep mountainsides have been protected from fire and grazing, and they also support a greater plant diversity than adjacent grazed lands. The ledges could effectively be construed as microrefugia OECMs, and the integration of such OECMs with protected areas such as the Sangay National Park, Rio Negro-Sopladora National Park, and Cajas Massif Biosphere Reserve, is consistent with community-based conservation, local cultures, and management that fosters biocultural diversity.

3.3 Criterion 3: The area's governance and management achieve positive and sustained long-term outcomes for the *in-situ* conservation of biodiversity

The efficiency of a protected area can be improved when surrounding SEPLS are governed and managed sustainably, because the effective conserved area is increased. Community engagement, in turn, raises awareness in the protected area and the efficiency of production through sustainable practices. SEPLS are also cost-effective, because production activities can generate revenue for communities, incentivizing them to sustainably manage the SEPLS.

Notwithstanding the fact that there are fewer public areas to declare as new protected areas, it is essential to think about other strategies for conservation on private lands. One successful case is the NRCS (Natural Reserves of Civil Society) in Colombia (Chapter 7), which registered 13 natural reserves of civil society and signed 20 conservation agreements with private owners, creating a corridor of about 640 ha that connects the territory in all aspects, linking private owners with protected areas.

3.4 Criterion 4: The area contributes to conservation of associated ecosystems and services, and cultural, spiritual, socio-economic, and other locally relevant values

Biodiversity and ecosystem services, including those related to cultural, spiritual, socio-economic and other locally relevant values, are vital to SEPLS. SEPLS can include production activities in various economic sectors particularly those directly related to natural resource use and management as described in various chapters in this volume – agriculture, forestry, fisheries, wildlife utilization, and tourism. When integrated into the wider landscape or seascape, SEPLS can facilitate interactions between stakeholders in these and other sectors, as well as cultural identity. SEPLS are heritage territories where landscape memory for local communities is recorded, where people rely on emotional ties, and where domesticated and heirloom varieties are obtained by applying traditional ecological knowledge and practices, further emphasizing their cultural and social relevance.

3.5 How are SEPLS linked to ABT 11?

While ABT 11 refers to protected areas and other effective area-based conservation measures, protected areas can include areas that allow sustainable use consistent with the protection of species, habitats and ecosystem processes. In addition to protected areas, areas conserved by indigenous and local communities, as well as privately protected areas, may also be included, provided that the following conditions are met. The area conserved should:

- include areas of particular importance for biodiversity and ecosystem services
- be ecologically representative, containing adequate samples of the full range of existing ecosystems and ecological processes
- be effectively and equitably managed with planning measures in place to ensure ecological integrity and the protection of species, habitats and ecosystem processes, with the full participation of indigenous and local communities, and in a manner that costs and benefits emerging from the management of the areas are fairly shared between the different actors.
- be well-connected to the wider landscape or seascape using corridors and ecological networks to allow connectivity, adaptation to climate change, and the application of the ecosystem approach (which implies having conservation interventions applied ecosystem-wide rather than having fragmented measures) (CBD 2013).

Table 2 summarizes how the OECM criteria above relate to the cases in this volume.

Table 2

OECM criteria	Examples from this volume
Criterion 1: Not currently recognized as a protected area	
	Serves as primary, secondary and ancillary conservation (Chapters 2 and 5).
Criterion 2: Governed and Managed	
2.1. Geographically defined space	Obscured definition for large-scale landscape particularly in defining indirect beneficiaries and ecosystem services impacts. Mostly clear boundary of interventions induced by the management systems (Chapter 9).
2.2 Legitimate governance authorities	Autonomous, decentralized government structures that have formally agreed to collaborate in the maintenance of rural livelihood (Chapter 10).
2.3 Managed	Self-managed by communities as ancillary conservation (Chapters 4 and 5), private natural reserves (Chapter 7).
Criterion 3: Achieves positive and sustained long-term outcomes for the *in-situ* conservation of biodiversity	
3.1. Effective	Cost-effective in conservation of biodiversity and ecosystem services (Chapters 4 and 5).
3.2. Sustained over long-term	Time-tested, biocultural territorial planning (Chapters 9 and 10) and reflecting future community visioning.
3.3. Information and monitoring	For the most part, there is a lack of robust monitoring due to OECMs being considered non-primary targets for conservation and not the main habitats for charismatic species.
Criterion 4: Contributes to conservation of associated ecosystem functions and services and cultural, spiritual, socio-economic and other locally relevant values	
4.1. Ecosystem services	Wildlife corridor, particularly for mega species, providing connectivity (Chapter 8), and functioning as microrefugia and better watershed services, (Chapter 9), buffer zones (Chapters 3 and 4).
4.2. Cultural, spiritual, socio-economic and other locally relevant values	Passing on indigenous, traditional knowledge and reinforcing cultural identities through preserving traditional culture and arts (Chapter 8).

Source: (for OECM criteria) Convention on Biological Diversity (CBD) 2018, Recommendation adopted by 22nd Meeting of Subsidiary Body on Scientific Technical and Technological Advice 22/5: Protected Areas and Other Effective Area-Based Conservation Measures (CBD 2018).

All of the above conditions can apply to SEPLS, which contribute to ABT 11's fundamental elements of connectivity, equitable management and representation. Examining how well-managed SEPLS can contribute to ABT 11 also helps us to identify various contexts in which SEPLS exist, how they are managed, what kind of institutional arrangements are involved in their governance, what kind of challenges and emerging issues they face, and what combinations of solutions and approaches can be used to tackle the trade-offs arising from these challenges.

4. Challenges and Opportunities

4.1 Challenges in sustaining SEPLS in a changing world

Some of the significant challenges identified by the authors relate to drivers of change, perceptions of risk and institutional redundancies. Below, we also highlight how these challenges are being addressed within the different SEPLS contexts.

4.1.1 Drivers of change

Changes to resource use patterns and SEPLS, whether positive or negative, are driven by social, economic and environmental factors, such as migration and dynamic changes caused by both humans and nature. These can include changes in demographics, perceptions of values, policy, climate, and natural disasters, among others. From the case study experiences, changes in SEPLS use and management have been affected by recent developments in migration, demographic change, changes in people's values related to nature, pollution, and production/conservation policies. The challenge lies therefore in anticipating and adapting to the impacts of the various drivers (see Table 3).

4.1.2 Perceptions of future risk

The sustainable management of SEPLS relies on perceptions, both local communities' local perceptions and those of external stakeholders, of the threat of degradation on the one hand, and common benefits from sustainable

management on the other. Often though, the perception of future risk is lower relative to planning for present needs, meaning that actions are generally planned and executed based on near-term priorities, and may not help achieve longer term sustainability in the SEPLS. Therefore, any intervention needs to demonstrate intermediate benefits to cover short-term needs, as these serve to motivate communities towards desired long-term planning. This is well illustrated in some of the cases. For example, after restoring abandoned farmlands and cleaning up the degraded environment, farmers in the Gongrong community in Chinese Taipei (Chapter 4) were able to expand activities to "new" agricultural production practices such as crop diversification, growing of traditional crops, and eco-friendly farming practices, which have helped to increase their average annual income. These successes have motivated more residents to practice sustainable farming, which was significant as most of them are young farmers who are beginning to see a future in farming in that area. This is the fruit of the comprehensive Rural Regeneration Plan, which was able to translate environmental conservation efforts into economic benefits for the local community. In some of the autonomous, decentralized governments of the El Collay Commonwealth in Ecuador (Chapter 9), environmental restoration measures and adaptation to climate change supported the establishment of the community-conserved area of El Collay, mainly to provide localized conservation of some Andean tree species and orchids, as well as to secure the continuing contributions of nature to people captured with mechanisms of payments for ecosystem services (PES) related to hydroelectricity production. It is also observed that communities can plan for future risks when given appropriate tools and information, for example participatory discourse and assessment on resilience, risk, and likely benefits in the short, medium, and long-term. An example of such a tool is the "Toolkit for the Indicators of Resilience in Socio-ecological Production Landscapes and Seascapes", as demonstrated in the case studies of Uganda and Tanzania (Chapter 2), that provided space for communities to deliberate on and discuss the challenges affecting their

Table 3. Drivers and impacts of change

Driver	Changes and impacts	Examples from this volume
Migration	Immigration could bring about changes in resource and land use, resulting in conflict due to differing perceived value of the site. On the other hand, out-migration of people from a site often results in insufficient population available to maintain the SEPLS.	In the case of the El Collay Commonwealth site in Ecuador (Chapter 9), immigration of people for purposes of "amenity tourism" had increased the perceived value of the site, but on the other hand triggered a conflict between the production and real estate values of the site. Immigration also results in bringing in people who do not have the same degree of connectedness with the site and resources, with consequent issues arising in the use and management of resources. In the Gongrong community of Chinese Taipei (Chapter 4), young people began to move to cities seeking better job opportunities due to reduced livelihood options as a result of environmental degradation, thus leaving the community with an aged population and decreasing productivity.
Demographic change influencing changes to value perceptions of nature	The motivations of older and younger populations, and of different actors in the maintenance of SEPLS, varies, and could have positive or negative consequences.	In Rakai village, Uganda (Chapter 2), residents lament that the progressive decrease of resources brought about by population increase has in turn also diluted "community identity", with a resultant neglect of natural resources. It was observed that in some cases (Chapter 9), the youth who returned home to the SEPLS after working elsewhere, whether on holiday or to relocate, were interested in investing in maintaining the sites and improving their sustainability.
Policy changes	Policy decisions and support from national and multi-lateral levels could bring about change in the management of SEPLS.	In the Mid Dagua River Basin (MDRB) region of Colombia (Chapter 7), the conversion of private land into Natural Reserves of Civil Society (or NRCS) recognized within management categories of the National System of Protected Areas (SINAP), is introduced as a voluntary process whereby the owner of a private farm linked to conservation processes can turn the property into a government-recognised protected area, but keeps the land titles and private property rights.
Under-utilization	Under-utilization of natural resources due to abandonment of agricultural land caused by environmental degradation and/or demographic change could further degrade biodiversity and ecosystem services.	In the Gongrong and Ankang communities in Taiwan (Chapter 4), agricultural land had been abandoned due to environmental degradation caused by pollution. Also in the villages of Caranga Baxu and Villamorei of North-West Spain (Chapter 3), abandonment of the primary sector and a demographic shift to an aged population had brought about the abandonment of chestnut orchards.

Driver	Changes and impacts	Examples from this volume
Pollution	Chemical pollution or sedimentation, due to excessive chemical use from expansion of agricultural and aquaculture activities, could bring about environmental degradation and loss of biodiversity and traditional livelihood options.	In the Balian Stream of Chinese Taipei (Chapter 4), degradation of the upstream environment, together with problems within the midstream settlement, including mismanagement of domestic wastewater, overuse of chemical fertilizer and pesticides, increasing abandonment of agricultural land, overfishing and improper stream construction, and clearing of riparian vegetation, had resulted in a dying stream and degradation of production landscapes. On Semau Island in Indonesia (Chapter 5), biodiversity on the island and the surrounding sea is threatened by the excessive use of chemicals in agriculture, which decreases soil fertility and results in chemicals in the soil being carried to the ocean through rainwater. The use of chemicals in agriculture rose in the last two decades and has increased ever since the community was introduced to vegetable seedlings and hybrid corn. At the mouth of the Chone and Portoviejo rivers in Ecuador (Chapter 6), fisheries harvests had significantly reduced due to sedimentation and pollution mainly caused by the chemical effluent from agricultural and shrimp-farming activities.
Economic development	Economic development, such as expansion of a particular industry competing for natural resources and land at the expense of traditional ones, could bring about biodiversity loss.	The communities of Rakai in Uganda and Lushoto in Tanzania and the Kaya forests of Kenya (Chapters 2 and 8) are under extreme pressure from sand harvesting and the extraction of building poles, as well as encroachment on forest areas in search of more fertile land for crop farming and livestock grazing. The communities switched to domestication of plants naturally growing in Kaya forests to relieve pressure on the forests, hence contributing to the conservation of the existing biodiversity. The loss of natural cover and ecosystem services associated with the Dagua River in Colombia (Chapter 7) due to agricultural expansion, had led to the cutting of natural forest to establish crops or pastures to feed livestock and for timber. More than 80% of the mangroves in the Chone River Estuary and Portoviejo River Estuary in Manabí Province, Ecuador (Chapter 6) had been destroyed to make way for pools for the shrimp industry.
Revival of traditional knowledge and cultural values	Local communities are starting to recognize and revalue traditional knowledge in managing their SEPLS and natural resources, not only for biodiversity and environmental conservation, but also to effectively utilise resources for economic gains, foster social cohesion and preserve cultural identity.	The Mijikenda community in the Kilifi and Kwale counties on the Kenyan Coast (Chapter 8), through collective action, established cultural villages adjacent to each of the Kaya forests as an alternative source of income and to ensure Mijikenda cultural practices are not lost. The cultural villages provide centralized venues for showcasing Mijikenda cultural ceremonies, rituals and biodiversity-conservation related practices.
Integrating science with traditional knowledge	Traditional knowledge coupled with modern technology and science could bring about more efficient ways of management suited to the human-resources capacity of a site.	In the villages of Caranga Baxu and Villamorei in North-West Spain (Chapter 3), restoration of abandoned chestnut forests used traditional knowledge combined with modern techniques for operations like reclamation of trees, conservation and maintenance of the orchard.
Climate change	Pressures from climate change compel local communities to switch to different production methods and patterns, but in some cases communities count on experience-based wisdom and traditional resources to diversify their risks.	The low-lying Kenyan coastal region (Chapter 8) has been experiencing frequent droughts, floods and increased incidences of pests and diseases as a result of climate change. These impacts of climate change, coupled with rapid population growth and overdependence on natural resources by local communities, are causing extensive degradation of natural resources leading to loss of biodiversity and low food productivity. The responding strategies to conserve biodiversity in light of changing climatic conditions include diversification of traditional crop varieties by planting different crop varieties in the same season on the same piece of land, as well as domestication of wild plants for income, medicine, and food security, and planting large areas of resilient traditional crop varieties.

landscape resilience and possible local solutions in the wake of ongoing socio-economic, ecological and climatic changes. In the case of Manabi province, Ecuador (Chapter 6), the resilience evaluation provided the local communities and organizations the opportunity for debate and analysis on the strengths and weaknesses of the SEPLS, which helped them develop priority action plans to address key threats and weaknesses, thereby reinforcing the resilience of the SEPLS against future risks.

4.1.3 Limited or even nonexistent positive value internalization of negative externalities

SEPLS, as multifunctional landscapes, produce provisioning (food, fodder, fiber, and others), regulating, supporting, and cultural ecosystem services, along with spiritual elements that provide benefits to local communities and external beneficiaries (Wiggering et al. 2006; Lambin & Meyfroidt 2010). While the intangible benefits contribute greatly to human welfare, as they are rarely traded in markets or financially priced, their values are barely noticed in many socio-economic systems. Consequently this lack of value awareness contributes to the degradation of ecosystem services and results in overconsumption of common-pool resources (Lant, Ruhl & Kraft 2008). Thus, enabling policies and instruments that facilitate capturing the tangible and intangible values of SEPLS, while also taking into consideration local perceptions and cultures, is critical (Leimona, Chakraborty & Dunbar 2018).

4.1.4 Institutional and governance inefficiency

The case studies in this volume show that common governance problems exist in the way SEPLS are managed and utilized. Problems that result in institutional and governance inefficiency range from corruption to changing administrations that substantially shift priorities for management. In this case, multi-stakeholder involvement with quantifiable indicators of good governance is still considered to be one of the best institutional elements in managing SEPLS (Daily et al. 2009; Howe et al. 2014).

4.2 Opportunities

In spite of changes, SEPLS still continue to be well managed in harmony with nature. The distinct social and ecological characteristics of a landscape or seascape point to locally-relevant solutions for their management and use. A wealth of related knowledge and approaches for their deployment is already available (UNU-IAS & IGES 2015). It is also noteworthy that rather than individual interventions, a cohesive set of coherent solutions is required to address concerns in SEPLS. In relation to the Andean landscapes (Chapter 9), the case study's author has suggested that the world "managed" is made up of two parts: "man" and "aged", implying that human priorities over time determine appropriate approaches, referring to what geographers call spatiality and historicity (Sarmiento 2000). Several opportunities for SEPLS management can be identified from the case studies in this volume:

- Greater diversity makes SEPLS more resilient to socio-economic, environmental, and political shocks. Diversity of resources and the mosaic character of SEPLS enable various livelihood activities and enhance socio-economic and environmental resilience.
- Authors observe that the young generation can be classified into two types of people: native youth residing in the community or who return from working elsewhere; and migrants from other places. Both types require support from the resident community to connect with the landscape or seascape and local culture.
- Communities should be recognized as agents of change and as having the capacity for strategic management of SEPLS.
- The linkages between science and practice, if fostered by co-production of knowledge and co-learning, ensure that communities have better capacities for managing SEPLS and integrating traditional knowledge and modern technologies.
- It is important to foster social connections and social capital for SEPLS management; likewise, participatory toolkits foster greater connections, peer-to-peer learning, and south-to-south cooperation.
- Nested policy approaches should be pursued that allow decision-making at multiple levels and on multiple scales, from individual plots to national and regional scales.

SEPLS, as the foregoing shows, are important sites for conservation of natural resources and exemplify human-nature interactions with broadly positive outcomes for conservation goals and human well-being. It is in this way that SEPLS contribute to ABT 11, which seeks to ensure area-based conservation in a manner that is effective and equitably managed, and integrated into the wider landscape and seascape. In line with the criteria for identification of OECMs described in section 3 above, stakeholders in SEPLS adapt their management practices to take into account different land use mixes and demonstrate effective solutions for the sustainable use of biodiversity by varying the scale, ecosystem or policy response type (economic, social, technical, etc.) of solutions and their combinations of use (Kozar et al. 2018). The case studies here demonstrate that it is possible through diverse approaches to ensure ecosystem integrity and sustainable use of biological resources.

4.2.1 Practical opportunities to overcome identified challenges

In addition to the challenges identified in section 4.1, authors experienced difficulties including visualising the spatial extent of conservation effects and motivating stakeholders towards desirable action. Some opportunities to face these suggested by the case studies are identified below.

- Setting up appropriate analytical scales spatially and socially to provide pertinent solutions:

  Considering that SEPLS operate within multiple time and space scales, distinctions between potential uses of spatial and socio-ecological data and information and their scales are essential to efficiently and effectively provide solutions at the right scales. In the case of valuation of ecosystem services, Costanza et al. (2014) list some of the potential uses of such solutions differentiated by types of values, spatial scales, and precision needed. The potential uses can range from raising awareness, national income and well-being accounting, specific policy analyses, land use planning, PES, and detailed analysis of other policy choices and scenarios. Further, stakeholders at different scales attach different values to ecosystem services, and consequently their interests in ecosystem services also differ (Hein et al., 2006). In this case, roadmaps and indicators developed inclusively through community discourse activities allow for the community's ownership of SEPLS management.

- Raising awareness with tailored messages and lessons from the ground:

  Tailoring messages for decision makers, users of commodities and services, and producers requires a good understanding of their respective priorities, perceptions, and motivations to action. It is useful to link communication messages to good practices and efforts towards their replication by others in similar circumstances. This helps faster uptake and mainstreaming, both across communities and across levels of governance.

- Monitoring and evaluation for diversification and certification of products based on minimum standards:

  The management of SEPLS can add value to agricultural and nature-based products by certification and labelling, but only if the benefits and socio-ecological services provided by SEPLS can be proven and made visible to both producers and consumers through regular monitoring and evaluation. Monitoring and evaluation are meaningful only with the setting of baselines, indicators, targets, and carefully selected methodologies to systematically collect data and interpret the results. The monitoring and evaluation process should involve multiple stakeholders, and the economic returns from these products should benefit the community and the management of SEPLS.

- Building partnerships, sharing experiences, and learning lessons from each other:

  Partnerships between various stakeholders not only bring in differing expertise, but also promote effort sharing and ensure diverse interests and equity issues are addressed, which in turn ensures commitment. Thus, in building partnerships, it is important that the process first promotes an inclusive dialogue among stakeholders on equity and shared values, including traditional values and human rights values. Partnerships should also aim to empower different segments of the communities, in particular encouraging youth engagement, through capacity building and training, environmental sensitization, and enhancement of cooperation. Authors also suggested that youth-related organizations working with the CBD should be encouraged to engage with the Satoyama Initiative. There should be platforms in place to disseminate knowledge on co-production to build understanding of common language and common interests amongst stakeholders involved in the management of SEPLS.

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[1] As defined by Article 2 of the Convention on Biological Diversity (CBD) and in line with the provisions of the Convention.

[2] SBSTTA-22 was held in Montreal, Canada from 2-7 July 2018. This definition was based on the work of the Technical Expert Workshop on OECMs for Achieving ABT 11, held in Montreal, Canada from 6-9 February 2018.