Connecting Practice

A Commentary on Nature-Culture Keywords

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Preface

Connecting Practice is a joint exploration by IUCN (International Union for the Conservation of Nature) and ICOMOS (International Council on Monuments and Sites) that aims to learn about and develop new approaches to heritage designation and management that recognise the interconnectedness of natural and cultural values. Highly significant landscapes and seascapes – including those inscribed in the World Heritage List – are the specific focus of *Connecting Practice*.

The project is also part of ongoing efforts by IUCN and ICOMOS to improve outcomes for the conservation and recognition of cultural diversity through the development of new working methods in the context of the implementation of the World Heritage Convention.

Connecting Practice was launched in October 2013, and this *Commentary* forms part of the final report on its third phase (2019-2020). The three phases of *Connecting Practice* have contributed to an emerging conceptual framework that can be practically applied across places and landscapes. The concepts are not new, but the effort to work jointly to operationalise them has facilitated new understandings.

This version of the Commentary has been edited from the original version published as Annex 6 of the Final Report of Phase III, and it aims to be accessible to heritage practitioners and researchers who are interested in working in the interdisciplinary field that links natural and cultural heritage conservation beyond the network of participants and collaborators of *Connecting Practice*.

To find more information on the process and evolution of *Connecting Practice* and the *Commentary*, please consult the three reports and articles available in the ICOMOS Open Archive (http://openarchive.icomos.org).

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REPORTS AND ARTICLES AVAILABLE

Buckley, K., Badman, T., and Larsen, P.B. (2014), "Crossing Boundaries: exploring biocultural concepts and practices in the World Heritage system." Proceedings of the 18th ICOMOS General Assembly Scientific Symposium, Florence.

Buckley, K., Bourdin, G., Pelletier, M., Wigboldus, L., De Marco, L., and Badman, T. (2019), "Connecting Practice: operationalizing concepts and strategies for integrating natural and cultural heritage in the World Heritage Convention", in N.J. Mitchell et al. (eds), Proceedings of the 2018 US/ICOMOS Symposium, Forward Together: a culture-nature journey towards more effective conservation in a changing world, San Francisco, November 2018.

IUCN, "Connecting Nature and Culture", available at: https://www.iucn.org/theme/world-heritage/our-work/global-world-heritage-projects/connecting-nature-and-culture.

IUCN and ICOMOS (2015), Connecting Practice Project. Final Report [Phase 1], Gland and Paris, available at: http://openarchive.icomos.org/id/eprint/1561/

IUCN and ICOMOS (2017), Connecting Practice Phase II. Final Report, Gland and Paris, available at: http://openarchive.icomos.org/id/eprint/1841/

IUCN and ICOMOS (2020), Connecting Practice Phase III. Final Report, Gland and Paris, available at: http://openarchive.icomos.org/id/eprint/2477/

Leitão, L., Wigboldus, L., Bourdin, G., Badman, T., Tolnay, Z., Mthimkhulu, O. (2019), "Connecting Practice: defining new methods and strategies to further integrate natural and cultural heritage under the World Heritage Convention," in B. Verschuuren and S. Brown (eds), Cultural and Spiritual Significance of Nature in Protected Areas: governance, management and policy, 151-163. London: Routledge Earthscan

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1. Introducing *Connecting Practice Keywords*

In the work undertaken to date, *Connecting Practice* has uncovered situations where natural and cultural heritage practitioners use the same words and terms but understand them in quite different ways; or conversely, instances where we have realised that different words were being used by practitioners from different disciplines or organisational affiliations to describe similar phenomena or issues. This suggests that clarification of definitions can be beneficial, and part of the process of converging practices.

In Phases I and II, project participants had begun to use certain terms to guide and shape the dialogue. When planning Phase III of the project, the idea of preparing a brief glossary of shared terms seemed worthwhile. However, when we began to explore these deeper backgrounds and nuances of meaning, we realised that a 'glossary' in the sense of providing definitive meanings that all participants should share – was a premature objective, possibly even an impossible one. Based on intensive workshop discussions to find a direction for this work, we identified three 'keyword clusters' for further work. This has been the basis for this document, and the envisioned future work. The *Commentary* maps and documents a 'work in progress' which will continue to be changed and transformed.

In reaching this point of development, IUCN and ICOMOS acknowledge several major and obvious limitations, particularly in relation to language. The work has utilised academic and practice materials written predominantly in English. Working in English (or English and French)[1] fixes the dialogue within the available Western

1 In the World Heritage system, English and French are the working languages.

vocabulary about *naturecultures*[2] which unhelpfully divides nature and culture, and limits the ability to adequately recognise that linguistic diversity is often associated with the world's biological and cultural diversities.

Many languages have words to describe the entanglement of values and practices – and it is possible and potentially desirable that these could offer a different lexicon.[3] In addition to the importance of local languages, Western cultures are not homogeneous and there are differences in the use and translations of English words. Some of the current English words used in heritage discourses (including nature and culture) simply do not exist in other languages. Further work is therefore necessary to map how the 'keyword clusters' have navigated across scholarly realms that use other languages for dissemination.

A second obvious and important limitation is that only three keyword 'families' have been included in this version of the *Commentary* that were selected as the most dynamic within our current work, providing a way forward. Yet, many others could certainly follow.

With these two important caveats in mind, *Connecting Practice* has started the examination of the application of the keywords, aiming to better understand their origins and potential future uses within the current work in *Connecting Practice* and other nature-culture projects.

2 This neologism is sometimes used in the academic literature and is a shorthand that allows us to avoid phrases such as 'nature and culture', underscoring the divide. However, the limitations of this term, and the difficulties it presents for translations into languages beyond English are also acknowledged. Sources that refer to naturecultures are included in the References (e.g. Latimer and Miele, 2013; Brown, 2017; Ishizawa, 2018).

3 In the context of the ICCROM-IUCN World Heritage Leadership programme, there are efforts to collect and share words and their meanings from a growing number of languages that express the holistic concept more effectively than the English/French-dominated discourse, such as the Korean word *ipji*, the Japanese word *fuudo*, and the Hawaiian term *konohiki*.

THE WORLD HERITAGE CONTEXT

Although the objectives of *Connecting Practice* are not limited to the shared work of ICOMOS and IUCN in the implementation of the World Heritage Convention, this has provided the programme focus and context.

The implementation of the World Heritage Convention for almost fifty years has generated its own set of concepts and terms that have been progressively refined through their use. The conceptual framework is oriented toward the identification and maintenance of Outstanding Universal Value (see paragraph 49 of the Operational Guidelines). A raft of supporting concepts has emerged to assist the World Heritage Committee and its Advisory Bodies, such as *authenticity* and *integrity*. The World Heritage system currently focuses on processes of *management*, *protection* and *monitoring* as the means of ensuring the retention of Outstanding Universal Value.[4] Each of these World Heritage terms has been subject to debate and refinement over time.

By definition, *values* are always intangible as they are determined by present-day societies and communities based on cultural and scientific knowledge. Values are conveyed by *attributes* that can be physical features, socio-cultural arrangements, meanings and practices, and/or natural processes. There are often linkages between the tangible and intangible attributes (and between 'nature' and 'culture') that have co-evolved and shape the distinctiveness of heritage areas and places. Identification of attributes that convey the Outstanding Universal Value of a property is an essential part of its inscription on the World Heritage List, because these are subject to management, protection, monitoring and interpretation actions to

4 In addition to management and protection, IUCN adds the concept of governance in its frameworks for Protected Areas, but this has not yet been incorporated into the terminologies of World Heritage.

ensure that the Outstanding Universal Value is maintained over time. The discussion of values and attributes has therefore been a focus of the fieldworks of *Connecting Practice*.

HOW THE COMMENTARY WAS DEVELOPED

The foundations of this *Commentary* are provided by relevant international organisations and/or academic texts. Its development has been informed by a number of inputs during Phase III of *Connecting Practice* including a workshop where the three keyword 'families' were selected for further exploration. ICOMOS and IUCN have conducted research to better understand the disciplinary 'lineages' of these 'keyword clusters'. To clarify the different applications of these keywords in natural and cultural heritage conservation, relevant doctrinal and guidance texts have been reviewed. The outcomes are presented in Annex 1 of Annex 6 of the Final Report of Phase III (De Marco et al., 2020) where the reader can refer to find more details on how international organisations have been using these terms. The image below shows the terms identified during the workshop, and the keyword clusters selected for development.

USING THIS DOCUMENT

This document offers commentary on the functional lexicon developing within the *Connecting Practice* dialogue. However, even though *Connecting Practice* has its origins in the World Heritage system, and World Heritage properties have been utilised as a source of learning, the application and further development of these keywords is not limited to landscapes and places that have been designated as World Heritage. The *Commentary* has also been developed to contribute to other related processes and programmes such as World Heritage Leadership, the Post-2020 Global Biodiversity Framework (Convention on Biological Diversity), and the day-to-day work of many ICOMOS and IUCN members and groups addressing *naturecultures*. In opening the *Commentary* to a wider audience, *Connecting Practice* expects to contribute to *naturecultures* debates in heritage academic environments, capacity building activities and other attempts to support the dialogue between natural and cultural heritage practitioners.

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2. Three Keyword Families

As noted above, to aid the advancement of the objectives of *Connecting Practice*, three 'families' of keywords were given priority. They all address the co-evolved and changing systems that underpin considerations of natural and cultural heritage. Together these keywords comprise an emerging conceptual approach, rather than a fixed method.

2.1 Biocultural Keywords

The first 'keyword family' is composed of Biocultural keywords which relate to Biocultural approaches and Biocultural diversity. From its beginnings, *Connecting Practice* has focused on bringing an operational understanding of biocultural diversity to heritage management.[5] This requires exploration about the co-evolution of what we call nature and culture, and recognition of the inter-related natural, cultural, linguistic and spiritual diversities (Loh and Harmon, 2005; Maffi, 2014). Biocultural diversity complements other policy frameworks and conventions for cultural and biological diversity that underpin the conservation and management of natural and cultural heritage.

Moving from a focus on biocultural diversity toward biocultural approaches in our work aims to reconcile the tangible and intangible dimensions of cultural and natural heritage, highlighting the centrality of traditional knowledge systems. This means that we move from a static or descriptive status to an awareness of the dynamic processes for the management of these aspects.

5 From the beginning of the project, the support of The Christensen Fund has been a key influence in adopting a focus on the 'biocultural'. This is a longstanding cornerstone of its work, emphasising the inter-dependent and co-evolving character of landscapes, culture and ways of life.

In *Connecting Practice*, we understand that biocultural diversity and biocultural processes also includes geodiversity, recognising the critical links with geological/geomorphological characteristics and processes, connecting the earth and its non-living nature with culture, biology and ecology.[6] Adopting biocultural approaches in this way provides a means of facilitating the work of recognising and thinking about naturecultures – leading toward better practices.

Related terms include: *biological diversity*, *cultural diversity*, *agrobiodiversity*, *biocultural diversity*, *biocultural landscapes*, *biocultural heritage* and *biocultural approaches*. These are briefly outlined as a means of clarifying how biocultural approaches can be understood and formulated.

6 To an extent, this mirrors a confusion in current discourse between biodiversity, and the wider concept of nature which is more useful for *Connecting Practice*.

BIOLOGICAL DIVERSITY/BIODIVERSITY

The development of conceptual understandings of biological diversity, or biodiversity, has had many foundations, but the best known is the 1992 Convention on Biological Diversity (CBD). The Convention defines biodiversity as:

> *The variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.* (CBD, Article 2)

Because this definition is widely used, there are opportunities to utilise it in heritage practice, with the obvious addition of a cultural dimension. It is therefore important to note that both IUCN and the CBD Secretariat have developed further definitions and approaches that include culture (particularly in relation to the rights and traditional knowledge of Indigenous peoples). The United Nations Environment Programme 'Bloom or Bust?' report adds another element of this definition with the inclusion of ecosystem services and the cultural values of nature:

> *Ecosystem services are the goods and services that biodiversity provides. They include soil formation, the provision of food and fibre, air quality and climate regulation, the regulation of water supply and quality and the cultural and aesthetic value of certain plants and species.* (UNEP, 2008, p. 4)

Other definitions of ecosystem services consider them to be co-produced by humans and ecosystems, rather than passively provided by biophysical systems. Operationalising these ideas for use in natural heritage identification and management, the

preamble of the Convention on Biological Diversity refers to *"the ecological, genetic, social, economic, scientific, education, cultural, recreational and aesthetic values of biological diversity and its components"*.

CULTURAL DIVERSITY

Cultural diversity is often mentioned as a critically important source and outcome of the conservation and management of cultural and natural heritage, but is not always explicitly defined. For example, the Operational Guidelines for the Implementation of the World Heritage Convention emphasise the importance of cultural diversity, and its interconnectedness with biological diversity, but do not provide a definition (UNESCO, 2019).

According to the UNESCO Convention for the Protection and Promotion of the Diversity of Cultural Expressions (2005, Article 4),

> *cultural diversity refers to the manifold ways in which the cultures of groups and societies find expression. These expressions are passed on within and among groups and societies. Cultural diversity is made manifest not only through the varied ways in which the cultural heritage of humanity is expressed, augmented and transmitted through the variety of cultural expressions, but also through diverse modes of artistic creation, production, dissemination, distribution and enjoyment, whatever the means and technologies used.*

UNESCO asserts that sustainable development is strongly influenced by cultural diversity. Cultural diversity is a mainspring for sustainable development for individuals, communities and countries. Thus, building an effective global approach to sustainable development and Education for Sustainable Development (ESD) needs to address

respecting, protecting and maintaining the cultural diversity of the world now and in the future.[7]

Many authors refer to the overlapping and/or integrated character of cultural and biological diversity, including the idea of co-evolution between cultures and their 'natural environments'. For example, in an overview article, Pretty et al. (2009) define cultural diversity as the diversity of human cultures, and argue that both biological and cultural diversity have the capacity to increase the resilience of social systems.

AGROBIODIVERSITY/AGRICULTURAL BIODIVERSITY

In Phase III of *Connecting Practice*, there has been a specific focus on landscapes of food production and gathering, including the heritage of traditional agricultural systems. In relation to agricultural landscapes, IUCN and the United Nations Food and Agriculture Organisation (FAO) have developed the concept of 'agrobiodiversity', which can be an objective for the management of some protected areas. Some of the commonly used definitions demonstrate that agrobiodiversity is understood to include wild plants, crops, cultivated plants and livestock, and as well as cultural knowledge and traditional practices.

> *Agricultural biodiversity is a broad term that includes all components of biological diversity of relevance to food and agriculture, and all components of biological diversity that constitute the agricultural ecosystem.* (COP decision V/5, appendix, Convention on Biodiversity)

> *Agricultural ecosystem... is the variety and variability of animals, plants and micro-organisms, at the genetic, species and ecosystem levels, which are necessary to sustain key functions of the agroecosystem, its structure and processes.* (COP decision V/5, appendix, Convention on Biodiversity)

Finally, moving from a descriptive to an operational definition of agrobiodiversity situates it as a potential objective for Protected Areas management, and explicitly links cultural practices with plant and animal species (both 'wild' and domesticated) and ecological processes.

> *Agrobiodiversity can be an objective of protected areas for crop wild relatives, traditional and threatened landraces, particularly those reliant on traditional cultural practices; and/or traditional and threatened livestock races, especially if they are reliant on traditional cultural management systems that are compatible with wild biodiversity.* (IUCN Glossary of Definitions).

BIOCULTURAL DIVERSITY

Building on an initial focus on biocultural diversity, *Connecting Practice* has broadened its work to specifically develop and apply biocultural approaches to the conservation and management of natural and cultural heritage.

Biocultural diversity has been variously defined, for example:

> *Bio-Cultural diversity refers to the continuing co-evolution and adaptation between biological and cultural diversities. It also involves the diversities of place and reflects people's ways of living with nature. This co-evolution has generated local ecological knowledge and practices across generations that allow societies across the world to manage their resources sustainably while also maintaining cultural identity and social structures.* (Ramsar Convention Bio-Cultural Diversity Thematic Group)

7 See: https://en.unesco.org/themes/education-sustainable-development/cultural-diversity

> ***Biocultural diversity*** *is the interweave of humankind and nature, cultural pluralism and ecological integrity. It arises from the continuing co-evolution and adaptation between natural landscapes and ways of life, and between biological processes and cultural endeavors. Biocultural diversity tends to be richest in locations where cultures have had long intimate connections with their landscapes, is reflected within languages and traditional ecological knowledge systems, and manifests beautiful ways through cultural and artistic expression.* (The Christensen Fund)

> ***Biocultural diversity*** *is a dynamic place-based aspect arising from the links between cultural and biological diversity. It results from the combination of historical and on-going environmental and land use processes and cultural heritage.* (FAO GIAHS Framework)

> ***Biocultural diversity*** *– the diversity of life in all its interdependent manifestations: biological, cultural, linguistic, and spiritual – is a fundamental component of environmental conservation, sustainable development, and decision-making at local, regional, and global scales.* (The North American Regional Declaration on Biocultural Diversity)

> ***Biocultural diversity*** *- the diversity of life in all its manifestations— biological, cultural, and linguistic— which are interrelated within a complex socio-ecological adaptive system.* (Maffi, 2005, p. 602)

> ***Biocultural diversity*** *is the relation between the diversity of nature and culture in a complex socio-ecological adaptive system.* (Ishikawa Declaration on Biocultural Diversity)

The concept of biocultural diversity was primarily developed within anthropology, with additional definitions found in fields like medicine, biology and ecology. Anthropologists have worked on understanding the inter-relationships between archaeological, biological, cultural and linguistic concepts within their theoretical frameworks for a century or more, and this work has informed the basis of cultural diversity concepts and policies. In more recent studies there has been a tendency to add further descriptors to the 'cultural' side of the merged duality, especially in relation to language (linguistic diversity). These have recognised the frequent co-existence of 'hot-spots' of both biological and language diversities, with the latter presumably used as a proxy for culture (see for example, Maffi, 2005; Loh and Harmon, 2005). The definitions presented above also emphasise the centrality of traditional knowledge, and the dimension of spirituality (see Verschuuren, 2012).

Working from these definitions, and acknowledging their breadth, biocultural approaches recognise the inextricable links between human societies, particularly their cultural sphere, and the natural and biophysical environments in which they exist. Seeing humans and their environments as tightly coupled – a dynamic unity rather than a series of separate realms – deviates from the predominant Western world view of a nature-culture divide (see Harrison, 2015). Overcoming this dichotomy invites better recognition of alternative world views, such as the knowledges and value systems of Indigenous peoples.

There are important relevant examples of the incorporation of ideas of diversity – biological, cultural and biocultural – into key international texts used in heritage regimes, including World Heritage (see for example UNESCO's Man and the Biosphere Programme and the Ramsar Convention).

In the policy realm, the concept of biocultural diversity started to become internationally recognised from 1998 when the *Declaration of Belém* was released at the First International Congress of Ethnobiology. It expressed the urgent need to stop the rapid loss of cultural and biological diversity and outlined strategies for its implementation,

including the strengthening of Indigenous communities. Increasing numbers of international organisations, programmes and policies followed these lines and recognised the connections between humans and nature, particularly in the natural heritage sector.

- The Convention on Biological Diversity (CBD) requires that the knowledge and practices of Indigenous and local communities that are relevant for the sustainable use of biological resources are respected and maintained.
- In 2010, UNESCO and the CBD launched a joint programme on biological and cultural diversity, which was followed by the recognition of the importance of biocultural diversity in the Florence Declaration (2014) and the Sharm El-Sheikh Declaration on Nature and Culture (2018) that proposed the establishment of an International Alliance on Nature and Culture.
- The United Nations Environment Programme (1999) has recognised the cultural and spiritual importance of biodiversity, including human cultural diversity in the definition of biodiversity.
- UNESCO's Man and the Biosphere Programme has acknowledged the importance of traditional forms of land use for the maintenance of biodiversity within cultural landscapes.

In various discourse analyses, "biocultural diversity has become dominating in the discourse linking different aspects of cultural diversity with use of natural resources and for identifying how these links promote and maintain both cultural and biological diversity" (Lennartsson et al., 2018, cited by Eriksson 2018, p. 2).

Related efforts to make these links include discussions of 'ecodiversity' and 'ethnobiology', although these have more limited and specific disciplinary connotations. For example, 'ecodiversity' emerged from landscape ecology and restoration ecology scholarship. Although it

explicitly includes a cultural dimension, it is not as frequently used as 'biological diversity', especially outside academic discourses (see Naveh, 1994). Ethnobotany was first discussed within the discipline of botany at the end of the 19th century, but has emerged as a thriving interdisciplinary field in its own right, drawing on scholarship from anthropology, botany, archaeology and other social sciences (Tipton-Allaband, 2018). These could be considered as part of the broader 'family' of biocultural keywords but have not yet been explored. Certainly, ethnobotany contributes importantly to an understanding of the impacts and uses of traditional knowledge, as well as the functioning of agricultural systems and their related agrobiodiversity.

The scientific literature relevant to emerging biocultural approaches can be roughly classified into different strands of research, depending on their primary focus, including studies relating to empirical, temporal, spatial and political dimensions of biocultural diversity. For the most part, these focus on empirical descriptions of specific components of biocultural diversity, such as linguistic diversity or specific forms of knowledge or practices and their connection to environments. For example, different uses and values that are connected to specific species or places are described, reflecting the orientations of different disciplines.

- Research engaging with the temporal dimensions often employs archaeological methods and historical analyses, such as economic history or linguistic-historical methods to gain a better understanding of biocultural history and heritage. Such studies look at past conditions or engage with the ideas of co-evolution through time to deepen the appreciation of present contexts (see Petrucci et al., 2018; Tello et al., 2018; Nebel and Heinrich, 2009).
- Research on the spatial dimensions of biocultural diversity is often linked to the natural sciences, using quantitative analyses. Such studies map components of biocultural diversity at different scales (Loh and

Harmon, 2005; Winter and Lucas, 2017). Research of this kind often uses the landscape as an empirical lens, which links to research on cultural landscapes and natural resource management, emphasising the long histories of interaction and the importance of maintaining traditional forms of management such as farming practices.

Closely related to studies on biocultural landscapes is research on biocultural conservation. Many of these argue for the consideration of human and cultural dimensions in order to improve biodiversity conservation outcomes; although some are oriented toward the need to maintain biocultural diversity in its full sense (see Hill et al 2019). For example, one of the most cited papers on biocultural approaches (Gavin et al 2015) defines principles for the adoption of biocultural perspectives in conservation, such as the incorporation of distinct rights and responsibilities of all stakeholders and respect toward different worldviews and knowledge systems. This strand of biocultural conservation is complemented by some of the scholarship on biocultural restoration that advocates for the restoration of ecosystems along with the revitalisation of culture.

Political dimensions are poorly addressed in the literature and only a small number of papers engage biocultural ethics, rights and sovereignty (e.g. Rozzi, 2012; Srinivas, 2012; Baldy, 2013). While in general, the consideration of justice and empowerment are integral parts of biocultural approaches, these have received comparatively little attention in scientific research.

Most recently, the application of biocultural approaches has been broadened to reflect more dynamic systems, urban conditions and non-Indigenous cultures. This includes discussions about harnessing biocultural approaches for transformation and development or enforcing urban green infrastructure in times of transformation. Using existing biocultural diversity to foster creativity, empower people and overcome dominating and unsustainable paradigms to face the current challenges of global environmental change makes biocultural approaches powerful tools for transforming societies into just and environmentally friendly futures.

BIOCULTURAL HERITAGE

Less commonly used is the term 'biocultural heritage'. Based on the definitions of biological diversity and ecosystem services, biocultural heritage is defined as:

> *Biocultural Heritage: ...knowledge, innovations, and practices of Indigenous and local communities that are collectively held and inextricably linked to, and shaped by, the socioecological context of communities.* (Gavin et al., 2015, p. 1)

> *Biocultural Heritage reflects the holistic approach of many [I]ndigenous peoples and local communities. This holistic and collective conceptual approach also recognizes knowledge as 'heritage', thereby reflecting its custodial and intergenerational character. The cultural landscapes inscribed under the World Heritage Convention are examples of biocultural heritage.* (Secretariat of the Convention on Biological Diversity, 2018, p. 6)

> *Biocultural Heritage is a complex system of interdependent parts centred on the relationship between Indigenous Peoples and their natural environment. Its components include biological resources, from the genetic to the landscape level; and long standing traditions, practices and knowledge for adaptation to environmental change and sustainable use of biodiversity. Biocultural heritage is held collectively, sustains local economies and is transmitted from one generation to the next. It includes thousands of traditional crop and livestock varieties, medicinal plants, wild foods and wild crop relatives.*

> *These precious resources have been conserved, domesticated and improved by communities over generations — and sometimes millennia*. (IIED website)

Biocultural heritage is broadly applied, based on the "values, cultural memory and ways of life that are tied to and reflected in the places in which communities live" (Poole, 2018, p. 56). It draws on "local knowledge, land-use practices and heritage values to define sustainability and resilience from the perspective of local inhabitants" (Ekblom et al., 2019, p. 1).

UNESCO defines biocultural heritage as "living organisms or habitats whose present features are due to cultural action in time and space" (2008, p. 8). UNESCO recognises areas of interdependencies between biological and cultural diversity, "thus forming the basis of biocultural heritage: language and linguistic diversity, material culture, knowledge and technology, modes of subsistence (which includes land use), economic relations, social relations and belief systems" (Eriksson, 2018, p. 2).

Biocultural heritage applies to both genetic diversity and biodiversity within landscapes, and also intersects with the diversities of culture, language and traditional ecological knowledge. Due to these inter-relationships, biocultural heritage reflects cultural worldviews and practices, and the perspective of 'heritage' emerges because of the continuity and transmission of these through generations via localised cultural and spiritual belief systems and values. Biocultural heritage can therefore include cultural adaptations to environmental change, and the importance of biodiversity for food security, encompassing traditional crops and livestock, medicinal plants and wild foods (see the definition above from IIED). Also included are the biological manifestations of heritage, such as the distribution of species and vegetation patterns arising from past management regimes (both continuing and relict).

As advocated by Luisa Maffi and others in the emerging biocultural conservation movement, biocultural heritage reflects the diverse ways of being between human communities and their local environments. Whereas biocultural diversity refers to the deep and co-constitutive relationships between biological and cultural diversity, biocultural heritage specifically represents the rich history of language, tangible components of the environment and its biological and geological resources, cultural memory, and traditional ecological knowledge.

BIOCULTURAL APPROACHES

To an extent, the earlier sections of exploration of the 'biocultural family' of keywords demonstrates the evolving dialogue of *Connecting Practice*. Although these terms and their supporting literature seem inter-related and relevant, they reflect different starting points, different disciplines and communities of practice, and different purposes. This exploration is hardly begun, and yet it has brought a sharper focus on the need for biocultural approaches in the work of international practices for natural and cultural heritage conservation, management and protection.

Developing biocultural approaches has informed much of the central work of *Connecting Practice* throughout all three Phases, and *Connecting Practice* has in turn promoted an awareness of biocultural approaches. This focus has enabled experimentation with field work methods of documenting values and attributes, based on the formation of multi-disciplinary fieldwork teams. Although the links and signs of long-standing co-evolution are often manifested in specific values, knowledge and practices in Indigenous communities, biocultural approaches are considered to be applicable across every kind of landscape, including agricultural areas, areas that exhibit naturalness, and large settlements and cities.

Academically, biocultural approaches emerged in the social sciences (particularly anthropology), ethnobiology and conservation biology, and have been picked up in other disciplines and fields of inter-disciplinary research during the last decades. For example, in the field of medical anthropology, the term 'biocultural approaches' is used to describe assessments of the effects of social environments on human health.

Increasingly, biocultural approaches are transdisciplinary. They unite research beyond disciplinary boundaries and also explicitly incorporate non-scientific forms of knowledge from non-academic actors and stakeholders, which enables co-creation of knowledge. Biocultural approaches now integrate research from the social sciences, the natural sciences and humanities, including anthropology, ethics, philosophy, political sciences, geosciences, biology, environmental sciences, agriculture and forestry and employ qualitative and quantitative methods of inquiry. The foundations of research applying biocultural approaches have been laid by ethnobiological studies on traditional ecological knowledge systems describing uses of species and ecosystems and their transmission through languages. In the 1990s, the research focus shifted from describing the connection between Indigenous and local cultures and their environments, with an increasing recognition of patterns of geographic overlap and common threats from global change.

Within discourses of nature conservation and sustainable development, biocultural approaches have emerged from attempts to operationalise and apply understanding of socio-ecological systems. In these contexts, biocultural approaches are culturally grounded and specific to place (Sterling et al 2017). The biocultural approach provides a novel viewpoint from which to discuss the deterioration of local and traditional ecological knowledge and the consequences that development policy and practices have on ecological knowledge

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Biocultural Keywords

and values for communities living in urban, rural and non-urbanised environments. It is of interest that further elaborations of biocultural approaches have been used to develop indicators of well-being and sustainable development (see McCarter et al., 2018; Dacks et al., 2019; Sterling et al., 2020). These support participatory or rights-based dimensions within biocultural approaches, especially in relation to bridging large-scale and local (or 'place-based') ways of knowing.

Connecting Practice has made reference to integrated concepts related to biocultural approaches throughout much of its work, including its fieldwork practices, experimentation with new/adapted methods, identification of values and attributes, and in the objectives of management (including measurement of effectiveness). Each phase of the project has enabled a deeper adaptation and awareness, although a true inter-disciplinarity must be acknowledged as a continuing 'work in progress'. Phase III, with its focus on cultural landscapes, biocultural practices, and management systems, has emphasised the importance of biocultural approaches and the use of this for future work.

2.2 Resilience Keywords

Connecting Practice has used concepts of 'resilience' in relation to the development of management systems that reflect biocultural approaches. In these contexts, resilience is an objective of management, but relies on a clear articulation of the values and attributes that comprise the natural and cultural heritage of identified landscapes and seascapes.

Finding the means to understand resilience as an objective or outcome of conservation, protection and management of heritage is an active focus of the dialogue of *Connecting Practice*. Therefore our aim is to better understand resilience as an approach to heritage management. Consideration of resilience also involves analysis of vulnerability, which is important for identifying priorities for allocation of resources and developing more precise notions of sustainability. The understanding and practical application of 'resilience thinking' to natural and cultural heritage has been further informed by the work of the Stockholm Resilience Centre.[8] Resilience thinking represents a needed shift that can incorporate change, recognising the dynamic processes that both support conservation and drive transformation.

8 https://www.stockholmresilience.org/

Connecting Practice A Commentary on Nature-Culture Keywords

Resilience Keywords

The literature reviewed for Phase III has a focus on the resilience of ecosystems, the resilience of human communities, the resilience of foodways, and the resilience of the urban and peri-urban systems, where so much of the world's population will live in the 21st century. As previously noted, resilience is also commonly used within disaster risk reduction strategies and post-disaster responses. Extending these understandings to more explicitly encompass cultural heritage within these frameworks is therefore a priority.

The term originated in the 1600s, meaning to rebound, to recoil or to spring back, and in relation to other general terms including elasticity, flexibility and resistance. In more recent times, there has been a shift in the use of 'resilience' to include fields of psychology, social sciences, and social anthropology. Resilience is used across a wide range of issues and disciplines; and the term has grown dramatically in its usage in the 21st century (Michel et al., 2010). In psychology, it is the capacity of a human to withstand abuse or stress; in engineering it is the capacity of a material to return to its original shape after a disturbance; and in disaster management, it is the capacity of a system to recover after a catastrophic event. The term has been increasingly used in public policy discourses across a range of issues, reflecting the perceived importance of resilience at the levels of the personal/self, group, society and physical locality in the face of various present and future challenges. In the contexts of nature conservation and cultural landscapes, the concept of resilience has been derived mostly from ecology, conservation, and disaster risk reduction discourses, but its application within cultural heritage remains vague.

Resilience has become a focus of land management, including management of Protected Areas, in what is termed the socio-ecological systems that support sustainability and conservation. The consideration of social-ecological systems acknowledges the complex interplay between human actions and decisions (including

their cultural bases), and the ability of ecosystem services to function. In this context, the definition of resilience has been broadened to include the ability to embrace or absorb change and to manage it while maintaining fundamental features (implying the recognition of values). Resilience in this field emphasises the ability to adapt in the face of change and disturbance, or to transform at a turning point from something undesirable into something new and different. A commonly used source states that, *"resilience reflects the ability of people, communities, societies, and cultures to live and develop with change and with ever-changing environments. It is about cultivating the capacity to sustain development in the face of change, incremental and abrupt, expected and surprising."* (Folke, 2016: p. 3)

The progress made in applying notions of resilience to the management of natural heritage and protected areas is documented in several international documents and conventions and can be consulted in Annex 1 of Annex 6 of the Final Report of Phase III (De Marco et al., 2020). Biggs, Schluter and Schoon (2015) have identified seven generic principles for enhancing the capacity of social-ecological systems to support ecosystem services that can be readily considered in relation to the arrangements in place for management and governance: maintain diversity and redundancy; manage connectivity; manage slow variables and feedbacks; foster understanding of the systems; encourage learning and experimentation; broaden participation; and promotion of polycentric governance systems.

Demonstrating the fluidity of the discourse about resilience, a chronology of the application of resilience in ecology and disaster response has been outlined by Manyena, Machingura and O'Keefe (2019). Their analysis of scientific publications has discerned the following phases:

1. from the 1970s, resilience was conceptualised as persistence and absorption;

2. from the 1980s the focus was on 'bouncing back' and returning to equilibrium;

3. from the 1990s, resilience was understood in terms of prevention, anticipation and adaptation;

4. from the 2000s, there was a shift to focus on transition, flexibility, 'bounce-forward', and transformability; and,

5. in the past decade, there has been critique of resilience as a neoliberal construct.

Resilience thinking embraces learning and the notion that humans and nature are interconnected within social-ecological systems. There is a high degree of consensus in the literature that operationalisation of resilience within cultural heritage is vague and under-developed. Writing from the perspective of environmental humanities, Vardy and Smith (2017, p. 175) remark that resilience has

> *(...) rapidly become the most used and abused term in contemporary policy and decision making (...) it incorporates multiplicities of difference into a single and apparently incontrovertible consensus. Who could possibly disagree with making social, economic, and ecological 'systems' more resilient in the face of our current environmental problems, especially global climate change? Surely resilience and the ability to 'adapt' to adversity by 'bouncing back' is in everyone's interest.*

RESILIENCE IN *CONNECTING PRACTICE*

For the purposes of the work of *Connecting Practice*, the concept of resilience has been derived largely from ecology, nature conservation, anthropology and disaster risk reduction, and its increased use has been supported in part by sustainability discourses. Within heritage

frameworks, resilience is most often used in the context of ecosystems and natural heritage. In the World Heritage Operational Guidelines, resilience is mentioned in relation to socio-ecological systems of properties, and in relation to climate change, risk and disaster management (UNESCO, 2019). For purposes of this *Commentary*, the use of this term builds on this work, with the aim of ensuring that our approach fully considers aspects of cultural, anthropological and historic resilience.

In its common English usage, resilience is understood to mean *the capacity to recover quickly from difficulties; toughness; and/or the ability of a substance or object to spring back into shape; elasticity.* The breadth of the application of this word can be seen in Google's list of synonyms: *flexibility, pliability, suppleness, plasticity, elasticity, springiness, spring, give; durability, ability to last, strength, sturdiness, toughness; strength of character, strength, toughness, hardiness, adaptability; buoyancy; flexibility, ability to bounce back*. Interestingly, the list of antonyms is shorter, and possibly more immediately useful: *rigidity, fragility, vulnerability, weakness*.[9]

While it is unsurprising that the idea of resilience offers some appeal, in the context of the work of *Connecting Practice*, it could benefit from more specific articulation and application. As noted above, the framework of ecology and ecosystems provides some definitions that are our starting point. Most general definitions of resilience include the concept of the capacity of a system to undergo changes and adaptations, the main theory being that all systems have limits of change (tipping points). Within these limits, the systems can tolerate and adapt to perturbations while still sustaining normal functions. Going beyond these thresholds, however, can result in the destabilisation of the system (Pilgrim and Pretty, 2010). What happens

9 See https://www.google.com/search?q=dictionary

to identified natural and cultural heritage values beyond these 'tipping points' offers various transformative possibilities that require further reflection and research in order to be usefully incorporated into the relevant systems of management and governance. However, it is important to recognise that the conceptualisation of nature in relation to 'tipping points' is based on a specific world view, and that others could conceptualise this differently.[10]

Currently, definitions of resilience emphasise slightly different aspects and processes, as the following examples demonstrate:

> **Resilience** is the *capacity of a system to absorb or even benefit from changes to the system and so persist without a qualitative change in structure.* (Pilgrim and Pretty, 2010)

> **Resilience** is the *capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks.* (Walker et al., 2004)

> In relation to ecology and ecosystems, ***resilience*** *is defined as the capacity of systems to reorganize themselves (and evolve) as a consequence of stress phenomena.* (Besana et al., 2018)

> Similarly, in the field of heritage studies, **resilience** has been defined as *the capacity to deal with change and continue to develop.* (Holtorf, 2018)

> Finally, **resilience** is about *cultivating the capacity to sustain*

10 We acknowledge the suggestion of Diane Menzies on this point. She refers to the five different world views described by M. Thompson, R. Ellis & A. Wildavsky (1990) *Political Culture, Cultural Theory* (Waterview Press, Boulder). The world view underpinning ecology is only one, and others could conceptualise resilience very differently

> *development in the face of expected and surprising change and diverse pathways of development and potential thresholds between them. The evolution of resilience thinking is coupled to social-ecological systems and a truly entwined human-environment planet.* (Folke, 2016)

Many uses of ideas of resilience have implied the return of a system to a previous state after disturbance, although in recent resilience discourses, the focus is less on 'bouncing back' and more on an ability to transform or 'bounce forward', involving more focus on *absorption, learning, adaptation and transformation than on specific outcomes in relation to a previous status quo* (Holtorf, 2018, p. 639). However, for these ideas to be usefully applied, more sense of the directionality of these transformations is needed, including the limits of change within a system and the implications for the identified values.

RESILIENCE THINKING

The understanding of resilience has evolved into the development of an understanding of resilience thinking based on the view that social-ecological systems, humans and their environments are interlinked and connected. Resilience thinking goes beyond using resilience as an objective or set of guiding principles for management and governance. It implies more than simply sustaining areas as they are, enabling a focus on understanding processes of change.

C.S. Holling (1973) introduced resilience as a concept to understand how ecosystems can absorb change. Holling's idea built on empirical observations that ecosystems are constantly changing and that they can have different possible stable states or configurations. They are also unpredictable in that one same disturbance or occurrence in a system can lead to different outcomes. Social-ecological systems

are part of and depend on the biosphere. Social-ecological resilience thinking stems from this biosphere-based worldview and focuses on social-ecological systems and seeing humans and the biosphere as intrinsically connected, and it broadens the definition of resilience beyond recovering or bouncing back.

Resilience thinking begins with the assumption that social-ecological systems are complex adaptive systems that are ever changing, based on their ability to self-organise. Rather than viewing a system as rigid or static, resilience thinking acknowledges that it is always developing. Resilience then is the capacity of a system to keep developing in the face of disturbances, while retaining essentially the same functions, structure and feedbacks – that is, without losing its identity. Resilience requires being able to learn, self-organise and develop while faced with uncertainty and surprise.

Two elements that are inter-related to resilience at multiple scales demonstrate processes of changes within social-ecological systems: adaptability and transformability.

> Resilience... *is the capacity of a social-ecological system to continually change and adapt yet remain within critical thresholds.* ***Adaptability*** *is part of resilience. It represents the capacity to adjust responses to changing external drivers and internal processes and thereby allow for development along the current trajectory (stability domain).* ***Transformability*** *is the capacity to cross thresholds into new development trajectories. Transformational change at smaller scales enables resilience at larger scales.* (Folke et al., 2010, p. 1)

> ***Adaptability*** *is the capacity of actors in the system to influence resilience*, and relates to the capacity of biological and human

> actions.[11] Adaptability also relates directly to learning, innovation and responses to system changes (for example, through adaptive governance and adaptive resource management). ***Transformability*** *is the capacity to create a fundamentally new system when ecological, economic, or social structures make the existing system untenable.* Transformability speaks to necessary or desirable changes within a system to assist with continued support of the system itself, particularly when previous frameworks or structures are no longer viable. Transformability may not be seen as an optimal form of resilience, but it may be necessary in some instances. (Walker et al., 2004)

As part of resilience thinking, it should be noted that "*some loss of resilience, at some scales, is an inevitable feature of the cross-scale dynamics in complex adaptive systems*" (Walker et al., 2004), and that sometimes change can be desired on a larger scale to ensure the management of an entire resilient system. This illustrates a main aspect of the above definition: resilience, adaptability and transformability are dynamic and constantly evolving. The adaptability (and therefore resilience) is not fixed, and can be enhanced or diminished by human decisions.

It is clear that the articulation of resilience entering the dialogue about heritage is heavily influenced by concerns about global environmental challenges. However, it is also important to recognise that **persistence** is also a core component of resilience, and is pertinent in the context of nature-culture work.

11 https://www.iucn.org/commissions/commission-ecosystem-management/our-work/cems-thematic-groups/resilience

RESILIENCE IN HERITAGE

As noted above, resilience is applicable to and used in the natural and cultural heritage sectors, although these are generally treated separately. A brief description of how resilience relates within these heritage structures and is used in IUCN and ICOMOS documentation is provided below.

Resilience in Natural Heritage

- The Intergovernmental Panel on Climate Change (IPCC 2008) defines **resilience** as *the ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organisation, and the capacity to adapt to stress and change.*[12]

- IUCN defines **ecosystem resilience**, where ecosystems are able to adapt and recover from natural disturbances (such as fires or flooding) and also includes an ecosystem's *capacity to approximately return to the state prevailing prior to the disturbance* as well as the ability of ecosystems to continue to provide ecosystem services while systems or conditions are changing (IUCN Glossary).[13]

- Another definition from IUCN: **Resilient ecosystems** *sustain biological diversity and human livelihoods in times of severe and wide-ranging change, and the concept of resilience-based ecosystem stewardship helps people to enhance the resilience of the ecosystems within which they live, and upon which their livelihoods and wellbeing depend.*[14]

12 https://www.iucn.org/downloads/search_resilience_briefing_june_2011_v2.pdf

13 https://www.iucn.org/downloads/en_iucn__glossary_definitions.pdf

14 https://www.iucn.org/commissions/commission-ecosystem-management/our-work/cems-thematic-groups/resilience

Although definitions and terms related to resilience in natural heritage often focus on ecosystems and ecological systems, links also exist to the broader concepts of biocultural diversity.

- The Ishikawa Declaration on Biocultural Diversity committed to integrating conservation, sustainable use and sharing of benefits from nature by *strengthening the resilience of local biocultural diversity, including by enhancing and supporting local and traditional knowledge systems, technologies and cultural practices*.
- The Florence Declaration also mentions resilience within biocultural landscapes, stating that the involvement of local communities and their traditional knowledge and practices at sites *can assist in more effective management and governance of multifunctional biocultural landscapes, and contributes to their resilience and adaptability*.
- In the IDS Working Paper entitled 'Biocultural Approaches: Opportunities for Building More Inclusive Environmental Governance' (Apgar 2017), resilience within *local biocultural systems is linked to their capacity to govern through use of their traditional and now hybrid institutions, leadership and connection to their land*.

Resilience in Cultural Heritage

Resilience in the context of cultural heritage is a complex subject, since it focuses on the systems, relationships and dynamic qualities of heritage that are living and/or developing. It therefore applies differently across the range of cultural heritage places – from tightly delineated individual monuments to entire urban areas; from places of primarily intangible cultural meaning to landscapes of diverse human uses, and so on. The uses of resilience in cultural heritage have therefore been partial to this point, focused on disaster risk management, and on heritage landscapes and places that are explicitly oriented toward ecosystem services. However, understanding the physical, cultural, social and political contexts in which conservation occurs can enable a more widespread implementation of resilience thinking, including both tangible and intangible elements.

In many cases, the opportunity to understand resilience as both 'bouncing back' and 'bouncing forward' is evident when thinking about its application to cultural heritage. Some useful definitions that can inform the needed further reflection on how resilience thinking can be widely applied within cultural heritage include:

- Albaeco states that for cultural heritage, ***resilience***... *"emphasises the ability to adapt in the face of change and disturbance, or to shift into something new and different to transform out of something undesirable."* (Hård af Segerstad and Haeggman, 2019, p. 1)
- While not the same thing as **cultural heritage,** cultural resilience is described as *"the capability of a cultural system (consisting of cultural processes in relevant communities) to absorb adversity, deal with change and continue to develop. Cultural resilience thus implies both continuity and change: disturbances that can be absorbed are not an enemy to be avoided but a partner in the dance of cultural sustainability."* (Holtorf, 2018, p. 636)
- According to UN Habitat, **urban heritage resilience** *"refers to the ability of any urban system to maintain continuity through all shocks and stresses while positively adapting and transforming towards sustainability."*[15]
- And finally, within social, ecological and sustainable development, resilience can be understood as *"the attitude of a territory, a city, or*

15 https://unhabitat.org/resilience/

a complex organized system to adapt and to respond positively to the changes and demands of the context, or 'the capacity to lead to a continued existence by incorporating change', is recognized as one of the primary values in a sustainable evolutionary perspective." (Besane et al., 2018, p. 184)

MANAGEMENT AND RESILIENCE

Resilience within protected areas and with respect to landscape management has increasingly become a focus of the consideration of resilience within heritage. These refer to different points of resilience – from the landscape itself, to the communities that live in and utilise them.

- The ICOMOS-IFLA Principles Concerning Rural Landscapes as Heritage states: *"Heritage can contribute to sustaining and increasing the adaptation and* ***resilience*** *of rural landscapes by supporting rural and urban inhabitants, local communities, governments, industries, and corporations as integral aspect to managing the dynamic nature, threats, risks, strengths, and potentialities of such areas."* In this text, resilience is connected with ideas of 'dynamic conservation' and 'sustainable transformation', and includes the consideration of 'limits' or tolerance to change.
- The Globally Important Agricultural Heritage System (GIAHS) Programme of the FAO outlines that agricultural and farming practices assist in the production of biodiversity-rich and resilient landscapes.
- The Man and the Biosphere (MAB) Programme proposes that *"biosphere reserves act as models to explore, establish and demonstrate innovative approaches that foster the* ***resilience*** *of communities."* (2017, p. 18)

Management of the qualities and values of landscapes is a key theme for the *Connecting Practice* project as a whole. Social-ecological systems that have interconnections and interwoven processes among nature, culture and social elements often incorporate and reflect concepts of resilience thinking. The resilience of people and communities can be supported and enhanced through sustaining their cultural heritage and the associated social-ecological systems. However, the reverse is also true - that social-ecological systems and resilience of heritage and landscapes are improved through recognition of, and interaction with, people.

Management of cultural heritage can promote resilience of people and local communities in distinct ways: for example, through involvement in risk/disaster preparedness and responses, or through the continuation of a collective identity and cultural rights within the contexts of change and recovery. These influences can operate in more than one direction (van Oudenhoven et al., 2011):

(...) traditional communities in which the integrity and diversity of language, social institutions, cultural traditions and land use practices are maintained very likely also contribute to the diversity and resilience of their surrounding ecosystems.

In this way, both cultural and natural practices *...emerge as a result of social-ecological interactions, in which human communities adapt to their environment and change that environment in the process. Practices can be seen as instances of self-organization that contribute to the structure and function of the landscape as a system. The* ***resilience*** *of this system, therefore, depends as much on these practices (the links between human and ecological components), as it does on ecological characteristics (biodiversity, habitat, ecosystem services) and social ones (institutions, networks, education).*

In their efforts to create a framework for Disaster Resilience, Manyena et al (2019) have identified five 'resilience capacities': preventive, anticipative, absorptive, adaptive and transformative. These give some sense of the scale of change and the role of human and non-human agency.

RESILIENCE AS A FUTURE-FOCUSED CONCEPT

At this stage, the work on the *Commentary* reveals that further work is needed to link resilience and management needs. However, it is clear that applying resilience requires approaches that are dynamic, reflecting situations and contexts that are constantly changing, adapting and transforming. It is also clear that applying resilience to heritage requires a deeper consideration of 'transformation', highlighting the limits to transformation (in relation to the heritage values to be safeguarded). In the current context, in which all systems for heritage protection and management are seeking to better reflect and respond to issues of global environmental change and the goals of sustainability, such a shift is widely applicable.

> *Resilient systems and processes can be said to be sustainable in the sense that they have the capacity to persist over long time periods, i.e. without undermining their own preconditions. Arguably, all sustainable systems or processes are characterized by their capability to absorb adversity and continue to develop* (Holtorf, 2018, p. 639).

> Future efforts must focus on *resilience analysis, adaptive resource management, and adaptive governance* (Walker et al., 2004).

> *...the future success of conservation will depend on our ability to understand, harness and support those practices that are beneficial to the maintenance of the diversity and resilience of natural ecosystems, while changing those that are not* (van Oudenhoven et al., 2011).

Resilience thinking is therefore relevant to questions about how cultural, natural, social, financial and human capital can assist with building system resilience across the diversity of cultural and natural heritage.

To conclude, Holtorf provides a fitting summary of the importance of continuing to work with the concept of resilience in heritage discussions:

> *Much as cultural heritage witnesses how people in the past have proven to be resilient and been capable of absorbing adversity in various ways, it can inspire people today and in the future to embrace change and transformation through successful adaptation* (Holtorf, 2018, p. 644).

Connecting Practice A Commentary on Nature-Culture Keywords

Resilience Keywords

2.3 Traditional Knowledge Keywords

Connecting Practice has a focus on traditional knowledge – as an important facet of the values of natural and cultural heritage places and landscapes, as an attribute that should be sustained and safeguarded, and as a key component of conservation and management effectiveness. This section provides an overview of the 'family' of terms around the core concept of traditional knowledge.

In Phase III of *Connecting Practice*, the opportunity to work in collaboration with the United Nations Food and Agriculture Organisation's (FAO) Programme for Globally Important Agricultural Heritage Systems (GIAHS) and other partners has allowed a specific focus on the heritage of landscapes of food production including agriculture, pastoralism, fishing and hunting. Including both natural and cultural dimensions of these landscapes encompasses ideas such as agrobiodiversity, and food security, but also focuses on traditional cultural practices, knowledge and belief systems.

The work of many organisations has contributed to the development of concepts of traditional knowledge, traditional ecological knowledge, Indigenous cultural knowledge, and traditional cultural expressions. The Convention for Biological Diversity recognises the role of traditional knowledge and practices of Indigenous peoples[16] and local communities in sustaining biological diversity, and highlights the importance of equitable benefit sharing arising from the uses of traditional knowledge.[17] The UNESCO Convention for the Safeguarding of Intangible Cultural Heritage identifies five 'domains', including social practices, knowledge concerning nature and the universe, and traditional craftsmanship.[18] Finally, the World Intellectual Property Organisation (WIPO) has worked to define traditional knowledge and traditional cultural expressions as part of its work to develop international legal instruments for their protection.[19]

The work of these international organisations has informed the recognition of the importance of traditional knowledge for many World Heritage properties. Traditional knowledge has the potential to be used in every step of heritage conservation processes. Traditional knowledge and cultural expressions can be the focus of the Outstanding Universal Value of World Heritage properties, but it can also be recognised as an attribute. Often, traditional knowledge is the basis of traditional management of inscribed properties. Traditional knowledge provides avenues for recognising and supporting cultural diversity and contributes to sustainable development. As a concept, traditional knowledge provides a point of departure for enabling the recognition of the many links between nature and culture.

16 Note that it is our practice to capitalise the word 'Indigenous' as an indication of respect when referring to First Peoples.

17 https://www.cbd.int/traditional/

18 https://ich.unesco.org/en/intangible-heritage-domains-00052

19 https://www.wipo.int/tk/en/tk/

Related terms include: Traditional Ecological/Environmental Knowledge (TEK), Indigenous Knowledge, Indigenous Biocultural Knowledge, and Local Knowledge. The term Traditional Cultural Expressions (TCE) is also widely used. Turner et al. (2000) also include the concept of Traditional Ecological Knowledge and Wisdom to emphasise a holistic view of the term. Our review of academic and policy texts suggests that these are often used interchangeably, but with different emphases and purposes. Traditional knowledge seems to be the most commonly and broadly used. Some sources prefer the more broadly inclusive term Cultural Knowledge, since it avoids what can be stereotypic assumptions about what is 'traditional'. Similarly, use of 'traditional knowledges' (in plural) in a number of disciplines is also valid for our purposes because it recognises the cultural diversity that underpins concepts of knowledge throughout the world.

Traditional knowledge is widely used within anthropology and sociology, and relates to agricultural, technical, medicinal, scientific and biodiversity-related knowledge structures which have been passed on through generations by individuals or groups of people. Additional texts on traditional knowledge are based in education, medicine, engineering, business and economics.

There are significant examples of the incorporation of ideas of traditional knowledge into key international texts used in heritage regimes for both natural and cultural heritage protection and management (including World Heritage). This demonstrates a wide range of applications to ideas of traditional knowledge, and the need to recall that traditional knowledge is dynamic, always adapting and changing through interactions with natural processes. This interplay between cultural and natural systems explains the diversity of expressions in the regions of the world.

In the policy realm, the concept of traditional knowledge has been applied internationally through a wide range of mechanisms and programmes, and is linked to environmental policies, heritage management, and rights discourses in an effort to incorporate cultural rights and non-western perspectives and knowledge systems. This is particularly evident in relation to the rights, knowledge and interests of Indigenous peoples. Most of these uses separately define traditional knowledge and traditional cultural expressions, yet find them inextricably linked.

> The 2007 United Nations Declaration on the Rights of Indigenous Peoples (Article 31.1) clearly links cultural rights, cultural heritage and traditional knowledge: *Indigenous peoples have the right to maintain, control, protect and develop their cultural heritage, **traditional knowledge** and **traditional cultural expressions**, as well as the manifestations of their sciences, technologies and cultures, including human and genetic resources, seeds, medicines, knowledge of the properties of fauna and flora, oral traditions, literatures, designs, sports and traditional games and visual and performing arts. They also have the right to maintain, control, protect and develop their intellectual property over such cultural heritage, traditional knowledge, and traditional cultural expressions.*

> The World Intellectual Property Organisation (WIPO) defines **traditional knowledge** as *a living body of knowledge passed on from generation to generation within a community. It often forms part of a people's cultural and spiritual identity*. WIPO links Traditional Knowledge with traditional cultural expressions and genetic resources, and acknowledges that traditional knowledge is often oral, and unprotected by conventional intellectual property systems.[20]

20 The WIPO Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore has been working toward a text to ensure the effective protection of traditional knowledge (TK), traditional cultural expressions (TCEs) and genetic resources (GRs).

The text of the 1992 Convention on Biological Diversity (article 8(j) – Traditional Knowledge, Innovations and Practices) asks contracting parties to: *respect, preserve and maintain knowledge, innovations and practices of [I]ndigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of the benefits arising from the utilization of such knowledge innovations and practices* (see also Secretariat of the Convention for Biological Diversity 2019).

The working definition of Traditional Ecological Knowledge (TEK) developed by the Secretariat for the Convention on Biological Diversity refers to the *knowledge, innovations and practices of [I]ndigenous and local communities around the world.* There is a specific emphasis on the fact that this knowledge is collected, developed and changed based on *experiences gained over the centuries and adapted to the local culture and environment.*

The Operational Guidelines for the implementation of the World Heritage Convention support the recognition of traditional protection and management (par. 97), and recommend research into traditional and Indigenous knowledge (par. 215).

In its GIAHS Programme,[21] the FAO focuses on the importance of traditional knowledge and practices *and the biocultural dynamics that maintain unique agro-ecological systems (...); making use of the cultural dynamics and traditional institutions and practices that enhance agrobiodiversity, food security, livelihood sustainability and water and soil management in the face of climate, environmental and social change.*

21 Globally Important Agricultural Heritage Systems are remarkable land-use systems and landscapes rich in globally significant biological diversity that have evolved from the coadaptation of a community with its environment and its needs and aspirations for sustainable development. (www.fao.org/nr/giahs/en/).

In the academic literature, the terms Traditional Knowledge (TK) and Traditional Ecological Knowledge (TEK) have been widely used and developed. One of the most widely accepted definitions of Traditional Ecological Knowledge (TEK) is provided by Berkes et al (2000: p. 1252): *a cumulative body of knowledge, practice and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment*. Here, TEK is described as a 'knowledge-practice-belief complex' that depends on the important interconnection between people and their environment, as well as the memory, knowledge, and practices that help people to relate to, and work within, their natural world.

In the specific context of agricultural landscapes, Traditional Ecological Knowledge is defined by van Oudenhoven et al. (2011) as a *"detailed knowledge of local agro-ecological conditions, characteristics of plants and animals, and resources and ecological processes on which they depend for sustenance and lifeways,"* with knowledge that comes from interactions between humans, their landscapes, natural areas, plants, animals and spirits.

Many studies focus specifically on the traditional knowledge of Indigenous peoples, giving rise to some further variations in the terminology. For example, Grenier (1998, p. 1) defines Indigenous Knowledge as *"unique, traditional, local knowledge existing within and developed around the specific conditions of men and women Indigenous to a particular geographic area."* Importantly, this

definition begins to recognise that there are knowledge-holders, and that this can be determined by gender and other cultural distinctions.

Traditional knowledge is dynamic and is an important aspect of cultural diversity, as it has "*shaped ways of life, worldviews, and sense of place, serving material as well as psychological and spiritual needs*" (Harmon 2014: p. 4). Definitions of traditional knowledge have been expanded by scholars working in different contexts. For example, based on work with tribal communities in India, Singh et al (2009) emphasise the importance of a connection with nature to enable knowledge-holders to adapt to local environmental changes and characteristics. Others, such as Turner et al. (2000, p. 1275) attempt to identify the large range of features that comprise traditional knowledge:

> *Knowledge of ecological principles, such as succession and interrelatedness of all components of the environment; use of ecological indicators; adaptive strategies for monitoring, enhancing, and sustainably harvesting resources; effective systems of knowledge acquisition and transfer; respectful and interactive attitudes and philosophies; close identification with ancestral lands; and beliefs that recognize the power and spirituality of nature.*

Methods in researching traditional knowledge are frequently multi-disciplinary. Berkes et al. (2000, p. 1252) state that there are three main aspects to the analysis and understanding of traditional knowledge systems that include "*a component of local observational knowledge of species and other environmental phenomena, a component of practice in the way people carry out their resource use activities, and further, a component of belief regarding how people fit into or relate to eco-systems.*"

An important element of traditional knowledge is the means by which knowledge is culturally and socially constructed, adapted and transmitted by those knowledge holders who actively contribute to and disseminate knowledge received from their ancestors. This is always a dynamic process, and knowledge that is transmitted through cultural processes is never static. The Convention on Biological Diversity acknowledges that traditional knowledge is transmitted from generation to generation, often through the use of oral elements (including songs, stories, folktales, proverbs, and myths); and often has a place in a community's cultural values, rituals, spiritual beliefs, local laws, and language. This recognises the vitally important connection between traditional knowledge and language.

Broadening the scope of how traditional knowledge can be considered within different land use contexts, the CBD Secretariat points out that the transmission of knowledge also relates directly to "*agricultural practices, including the development of plant species and animal breeds* and is often used in a *practical nature, particularly in such fields as agriculture, fisheries, health, horticulture, and forestry.*"[22] It can also include practices and knowledge relating to handicrafts, food/cuisine, medicines, home gardening practices, species management, rotation of crops and other resources, and land-use, as well as other elements within a community's cultural identity.

Demonstrating the inter-disciplinary nature of work on traditional knowledge, the processes of transmission are a central focus for the safeguarding of intangible cultural heritage in the UNESCO Convention on Safeguarding Intangible Cultural Heritage: "*The viability of intangible heritage practices relies on the ongoing transmission of the special knowledge and skills that are essential for their enactment or embodiment.*"[23] Traditional knowledge is

22 https://www.cbd.int/tk/material.shtml

23 https://ich.unesco.org/en/transmission-00078

specifically embedded in experience, and cultural learning and teaching practices. The traditional knowledge of individual cultures and communities has been created through constant, innovative changes and cumulative knowledge, as well as *generations of experiences, careful observations, and trial-and-error experiments* (Grenier, 1998, p. 1).

There is therefore an assumption that traditional knowledge is found in contexts where communities have long continuities within particular localities/landscapes, and in relation to resource use. Thus there are questions about the role of traditional knowledge in contexts of rupture and rapid social, economic and environmental transformations.

> *Where changes are unlike those captured in the collective memory of a community, traditional knowledge by itself may be inadequate and direct a community toward inappropriate adaptive responses that endanger ecosystems and/or livelihood security* (van Oudenhoven et al., 2011).

This view is controversial, since it suggests an unintended caveat on the relevance of traditional knowledge. However, this is a potential limitation of *all* systems of knowledge including the western sciences. Rather than pitting knowledge systems 'against each other', this point is better understood as pointing to the challenges posed to all knowledge systems by sudden change and transformation.

The application of traditional knowledge to the systems of protection and management of natural and cultural heritage are well established within the World Heritage system, although these have not been specifically articulated beyond their application to individual cases. It is clear that traditional knowledge systems share some similarities to adaptive management structures "*with its emphasis on feedback learning, and its treatment of uncertainty and unpredictability intrinsic to all ecosystems*" (Berkes et al., 2000, p. 1251). Traditional knowledge is increasingly recognised within conservation practices and can be used in conjunction with international scientific knowledge to assist the conservation of biological diversity, protection of rare species and ecosystems, management of protected areas and sustainable use of natural resources (Sterling et al., 2017). It is acknowledged as having importance in the "*management of local resources, in the husbanding of the world's biodiversity, and in providing locally valid models for sustainable living*" (Turner et al., 2000, p. 1275).

Traditional knowledge is also strongly linked to the conceptual apparatus of sustainability/sustainable development, in part due to assumptions that cultural communities have developed and used their traditional knowledge to sustainably use their lands and resources over long periods. However, these assumptions can be subjected to critical analysis, given that "*not all traditional practice and belief systems were ecologically adaptive in the first place; some became maladaptive over time due to changing conditions*" (Berkes et al., 2000, p. 1252). Traditional knowledge can also be more usefully applied in specific contexts of sustainable development. For example, in its efforts to expose the importance of traditional knowledge throughout the spectrum of the 2015 Sustainable Development Goals, UNESCO (2017) considers that traditional knowledge underpins and contributes to community resilience, particularly in response to disasters (in SDG 13).

Conceptually, traditional knowledge is critical to the work of *Connecting Practice*. A focus on traditional knowledge within fieldwork practices provides a culturally grounded and localised approach to understanding the values and uses of landscapes and seascapes, as well as a source for sustainable management. The work of Phase III has been specifically oriented toward valuing and utilising traditional knowledge.

Connecting Practice A Commentary on Nature-Culture Keywords

Traditional Knowledge Keywords

3. Conclusion and way forward for the Commentary

Towards the development of a connected practice within the implementation of the World Heritage Convention, this *Commentary* reflects a dialogue between disciplines within the heritage field, and intends to develop a basis for common understanding of relevant terms among cultural and natural heritage professionals. The *Commentary* does not presume to be complete, but instead, to be a 'work in progress' that could be useful for heritage practitioners working with an interdisciplinary language. It is intended that the *Commentary* will remain open – a 'living' document that can continue to be improved. In this first attempt to find common ground, ICOMOS and IUCN have focused only on three 'keyword families' which were selected as the most relevant within the recent work of *Connecting Practice*.

'Biocultural', 'resilience' and 'traditional knowledge' are those 'keyword families' explored here which interconnect the conservation of cultural and natural heritage. Each of these families have influenced the work of *Connecting Practice* as the project has engaged with the Christensen Fund, the Stockholm Resilience Centre, the Convention on Biological Diversity and the FAO, expanding sectorial and disciplinary boundaries. In working with more organisations, *Connecting Practice* expects to continuously involve diverse disciplinary perspectives in its work enabling cross-sectoral exchange and further understandings of *naturecultures*.

In the understanding that terms are not only used in different ways, but also constantly evolving in their usage and meanings, the *Commentary* illustrates a current panorama. Further work is foreseen in relation to the uses in cultural and natural heritage of a 'landscape' keyword cluster, given that terms such as 'landscape scale', 'landscape approach', 'protected landscape/seascape', 'historic urban landscape', 'associative landscapes', 'spiritual landscape', 'sacred landscape', 'natural landscape' and 'cultural landscape' are frequently used in our work. Each of these has been the subject of substantial debate and a range of applications.[24]

In the first instances, further work on 'resilience' will be undertaken in Phase IV of *Connecting Practice*. The dissemination of the *Commentary* and feedback will enable a broader range of uses – such as in capacity building programmes. Further development of the *Commentary* to incorporate greater cultural and language diversity, and according to non-Western ontologies or world views are potential next steps.

24 For example, the 'historic urban landscape' is not considered to be a landscape 'type', but is an approach to the conservation of the heritage values of urban areas (see UNESCO 2011; WHITR-AP 2016).

References

Agnoletti, M. and Rotherham, I. (2015), "Landscape and Biocultural Diversity", *Biodiversity Conservation* 24: 3155-3165.

Apgar, M. (2017), *Biocultural Approaches: Opportunities for Building More Inclusive Environmental Governance*. IDS Working Paper, 502, available at: https://www.ids.ac.uk/publications/biocultural-approaches-opportunities-for-building-more-inclusive-environmental-governance/

Baldy, C. R. (2013), "Why we Gather: traditional gathering in native Northwest California and the future of bio-cultural sovereignty", *Ecological Processes* 2 (1): 1-10. DOI: 10.1186/2192-1709-2-17

Berkes, F., Colding, J. and Folke, C. (2000), "Rediscovery of Traditional Ecological Knowledge as Adaptive Management", *Ecological Applications* 10 (5): 1251-1262.

Besana, D., Greco, A., and Morandotti, M. (2018), "Resilience and Sustainability for the Reuse of Cultural Heritage", *TECHNE: Journal of Technology for Architecture and Environment* 15: 184-192.

Biggs, R., Schlüter, M. and Schoon, M.L. (eds) (2015), *Principles for Building resilience: sustaining ecosystem services in social-ecological systems*. Cambridge, U.K.: Cambridge University Press

Bridgewater, P. B. (2002), "Biosphere Reserves: special places for people and nature", *Environmental Science & Policy* 5 (1): 9-12.

Brown, J. and Kothari, A. (2011), "Traditional Agricultural Landscapes and Community Conserved Areas: an overview", *Management of Environmental Quality* 22 (2): 139-153.

Brown, S. (2017), "Enmeshed in Naturecultures: a personal-global journey", *The George Wright Forum* 34 (2): 216–228.

Caillon, S., Cullman, G., Vershuuren, B. and Sterling, E. (2017), "Moving Beyond the Human-Nature Dichotomy Through Biocultural Approaches: including ecological well-being in resilience indicators", *Ecology and Society* 22 (4): 27. https://doi.org/10.5751/ES-09746-220427.

Calvet-Mir, L., Riu-Bosoms, C., González-Puente, M., Ruiz-Mallen, I., Reyes-Garcia, V. and Molina, J.L. (2016), "The Transmission of Home Garden Knowledge: safeguarding biocultural diversity and enhancing social-ecological resilience", *Society & Natural Resources* 29 (5): 556-571.

Cocks, M. (2006), "Biocultural Diversity: moving beyond the realm of "indigenous" and "local" people", *Human Ecology* 34 (2): 185-200.

Cocks, M. L. and Wiersum, F. (2014), "Reappraising the Concept of Biocultural Diversity: a perspective from South Africa", *Human Ecology* 42(5): 727-737.

Colding, J. (1998), "Analysis of Hunting Options by the Use of General Food Taboos", *Ecological Modelling* 110 (1): 5-17.

Dacks, R., Ticktin, T., Mawyer, A., Caillon, S., Claudet, J., Fabre, P., Jupiter, S.D., McCarter, J., Mejia, M., Pascua, P., Sterling, E., and Wongbusarakum, S., (2019), "Developing Biocultural Indicators for Resource Management", *Conservation Science and Practice*, pp. 1-11, https://doi.org/10.1111/csp2.38.

Davidson-Hunt, I.J., Turner, K.L., Te Pareake Mead, A., Cabrera-Lopez, J., Bolton, R., Idrobo, J.C., Miretski, I., Morrison, A., and Robson, J.P. (2012), "Biocultural Design: A new conceptual framework for sustainable development in rural indigenous and local communities", *Sapiens* 5 (2): 32-45.

Ekblom, A., Shoemaker, A., Gillson, L., Lane, P. and Lindholm, K-J. (2019), "Conservation Through Biocultural Heritage - Examples from Sub-Saharan Africa", *Land* 8 (5): 1-15.

Elands, B.H.M., Vierikko, K., Andersson, E., Fischer, L.K., Goncalves, P., Haase, D., Kowarik, I., Luz, A.C., Niemela, J., Santos-Reis, M. and Wiersum, K.F. (2019), "Biocultural Diversity: a novel concept to assess human-nature interrelations, nature conservation and stewardship in cities", *Urban Forestry & Urban Greening* 40: 29-34.

Elmqvist, T., Folke, C., Nyström, M., Peterson, G., Bengtsson, J., Walkter, B., and Norberg, J. (2003), "Response Diversity, Ecosystem Change, and Resilience", *Frontiers in Ecology and the Environment* 1 (9): 488–494.

Ens, E.J., Finlayson, M., Preuss, K., Jackson, S. and Holcombe, S. (2012), "Australian Approaches for Managing 'Country' using Indigenous and Non-Indigenous Knowledge", *Ecological Management & Restoration* 13 (1): 100-107.

Eriksson, O. (2018), "What is biological cultural heritage and why should we care about it? An example from Swedish rural landscapes and forests", *Nature Conservation* 28: 1-32.

FAO (2002), "*GIAHS Informational Package*", available at: http://www.fao.org/3/a-bp772e.pdf

FAO (2009), "*FAO and Traditional Knowledge: the linkages with sustainability, food security and climate change impacts*", Rome: FAO.

Folke, C., Carpenter, S., Walker, B., Scheffer, M., Elmqvist, T., Gunderson, L. and Holling, C.S. (2004), "Regime Shifts, Resilience, and Biodiversity in Ecosystem Management", *Annual Review of Ecology, Evolution and Systematics* 35: 557–581.

Folke, C., Carpenter, S., Walker, B., Scheffer, M., Chapin, T., Rockstrom, J. (2010), "Resilience Thinking: integrating resilience, adaptability and transformability", *Ecology and Society* 15 (4): 20.

Folke, C. (2016), "Resilience", *Oxford Research Encyclopedia of Environmental Science*. Online. pp. 1-63. DOI: 10.1093/acrefore/9780199389414.013.8.

Gavin, M.C., McCarter, J., Mead, A., Berkes, F., Stepp, J.R., Peterson, D. and Tang, R. (2015), "Defining Biocultural Approaches to Conservation", *Trends in Ecology & Evolution* 30 (3): 140-145.

Gadgil, M., Berkes, F., and Folke, C. (1993), "Indigenous Knowledge for Biodiversity Conservation", *AMBIO* 22 (2-3): 151-156.

Green, L. (2008), "'Indigenous Knowledge' and 'Science': reframing the debate on knowledge diversity", *Archaeologies* 4 (1): 144-163.

Grenier, L. (1998), "Working with Indigenous Knowledge: a guide for researchers", International Development Research Centre, Ottawa.

Gunderson, L.H. and Holling, C.S. (2001), *Panarchy: Understanding Transformations in Human and Natural Systems*. Island Press.

Hanspach, J. (2019), "Biocultural approaches", Unpublished.

Hård af Segerstad, L. and Haeggman, M. (2019), "Defining and clarifying the evolution of resilience", Unpublished.

Harmon, D. (2014), *Biocultural Diversity Toolkit Volume 1* - Introduction to Biocultural Diversity, Terralingua.

Harrison, R. (2015), "Beyond "Natural" and "Cultural" Heritage: Toward an Ontological Politics of Heritage in the Age of Anthropocene", *Heritage & Society* 8 (1): 24–42.

Hay-Edie, T., Howard, P., Martin, G. and McCandless, S. (2011), "The Roles of Local, National and International Designations in Conserving Biocultural Diversity on a Landscape Scale", *International Journal of Heritage Studies* 17 (6): 527-536.

Heckenberger, M. (2010), "Biocultural Diversity in the Southern Amazon", *Diversity* 2 (1): 1-16.

Hill, R., Nates-Parra, G., Quezada-euán, J.J.G., et al (2019), "Biocultural Approaches to Pollinator Conservation", *Nature Sustainability* 2 (3): 214-222.

Hill, R., Cullen-Unsworth, L.C., Talbot, L.D. and McIntyre-Tamwoy, S. (2011), "Empowering Indigenous Peoples' Biocultural Diversity through World Heritage Cultural Landscapes: a case study from the Australian humid tropical forests", *International Journal of Heritage Studies* 17 (6): 571-591.

Holling, C. S. (1973), "Resilience and Stability of Ecological Systems", *Annual Review of Ecology and Systematics* 4: 1–23.

Holling, C.S. (1986), "The Resilience of Terrestrial Ecosystems: local surprise and global change", in W.C. Clark and R.E. Munn (eds), *Sustainable Development of the Biosphere* (pp. 292–317). Cambridge University Press.

Holling, C.S. (1987), "Simplifying the Complex: the paradigms of ecological function and structure", *European Journal of Operational Research* 30: 139-146.

Holtorf, C. (2018), "Embracing Change: how cultural resilience is increased through cultural heritage", *World Archaeology* 50 (4): 639-650.

Hosagrahar, J. (2017), "Culture: at the heart of SDGs", *UNESCO Courier*, April-June 2017, available at: https://en.unesco.org/courier/april-june-2017/culture-heart-sdgs

Huntington, H.P. (2000), "Using Traditional Ecological Knowledge in Science: methods and applications", *Ecological Applications* 10 (5): 1270-1274.

ICCA Consortium (2017), "Community Conserved Areas in India: an overview," available at: https://www.iccaconsortium.org/wp-content/uploads/2017/06/CCADirectory-India_Overview.pdf

ICOMOS-IFLA (2017), *ICOMOS-IFLA Principles Concerning Rural Landscapes as Heritage*. New Delhi: ICOMOS. available at: https://www.icomos.org/images/DOCUMENTS/Charters/GA2017_6-3-1_RuralLandscapesPrinciples_EN_adopted-15122017.pdf

IUCN (nd), "Glossary of Definitions", available at: https://www.iucn.org/sites/dev/files/iucn-glossary-of-definitions_en_2021.05.pdf

IUCN (nd), "*Resilience*", available at: https://www.iucn.org/commissions/commission-ecosystem-management/our-work/cems-thematic-groups/resilience

IIED (nd), "*Biocultural Heritage*", available at: https://biocultural.iied.org

IPCC (2007) "IPCC Fourth Assessment Report: Climate Change 2007", available at: https://www.ipcc.ch/assessment-report/ar4/

Ishizawa, M. (2018), "Cultural Landscapes Link to Nature: learning from satoyama and satoumi", *Built Heritage* 4: 7-19.

Johannes, R.E. (1998), "The Case for Data-less Marine Resource Management: examples from tropical nearshore fisheries", *Trends in Ecology and Evolution* 13: 243-246.

Latimer, J. and Miele, M. (2013), "Naturecultures? Science, Affect and the Non-human", *Theory, Culture & Society* 30 (7–8): 5–31.

Lennartsson, T., Eriksson, O., Iuga, A., Larsson, J., Moen, J., Scholl, M., Westin, A., Crumley, C.L. (2018), "Diversity in Ecological and Social Contexts", in Crumley, C.L., Lennartsson, T. and Westin, A. (eds) *Essays in Historical Ecology: Is there a Future for the Past?* Cambridge University Press, Cambridge, 182–239.

Loh, J. and Harmon, D. (2005), "A Global Index of Biocultural Diversity", *Ecological Indicators* 5: 231-241.

Man and the Biosphere Programme (2017), "*A New Roadmap for the Man and the Biosphere (MAB) Programme and its World Network of Biosphere Reserves*", available at: http://rerb.oapn.es/images/PDF_publicaciones/Estrategia_MaB-Pal.Decl.Lima_Ing.pdf

Maffi, L. (2005), "Linguistic, Cultural, and Biological Diversity", *Annual Review of Anthropology* 34: 599–617.

Maffi, L. and Woodley E. (2010), *Biocultural Diversity Conservation: A Global Sourcebook*. Earthscan, London.

Manyena, B., Machingura, F. and O'Keefe, P. (2019), "Disaster Resilience Integrated Framework for Transformation (DRIFT): a new approach to theorising and operationalising resilience", *World Development* 123: 1-30.

McCarter, J., Sterling, E.J., Jupiter, S.D., Cullman, G.D., Albert, S., Basi, M., Betley, E., Boseto, D., Bulehite, E.S., Harron, R., Holland, P.S., Horning, N., Hughes, A., Jino, N., Malone, C., Mauli, S., Pae, B., Papae, R., Rence, F., Revo, O., Taqala, E., Taqu, M., Woltz, H. and Filardi, C. E. (2018), "Biocultural Approaches to Developing Well-Being Indicators in Solomon Islands", *Ecology and Society*, pp. 1-12, https://doi.org/10.5751/ES-09867-230132.

Michel, J-B., Shen, Y., Aiden, A., et al (2010) "Quantitative Analysis of Culture Using Millions of Digitized Books", in *Science*, 331 (6014): 176-82. [https://books.google.com/ngrams]

Naveh, Z. (1994), "From Biodiversity to Ecodiversity: a landscape-ecology approach to conservation and restoration", *Restoration Ecology* 2 (3): 180-189.

Nebel, S. and Heinrich, M. (2009), "Ta chòrta: a comparative ethnobotanical-linguistic study of wild food plants in a graecanic area in Calabria, Southern Italy", *Economic Botany* 63 (1): 78-92.

North American Dialogue on Biocultural Diversity (2019), "The North American Regional Declaration on Biocultural Diversity. The Atateken Declaration", available at: https://www.cbd.int/portals/culturaldiversity/docs/north-american-regional-declaration-on-biocultural-diversity-en.pdf.

Oldfield, M. and Alcorn, J. (1987), "Conservation of Traditional Agroecosystems", *BioScience*. 37 (3): 199-208.

Petrucci, N., Lema, V.S., Pochettino, M.L., et al (2018), « From Weeds to Wheat: a diachronic approach to ancient biocultural diversity in the Santa María valley, northwest Argentina", *Vegetation History & Archaeobotany* 27 (3): 229-239.

Pilgrim, S. and Pretty, J. (2010), *Nature and Culture: Rebuilding Lost Connections*. Earthscan: New York.

Poole, A.K. (2018), "Where is Goal 18? The Need for Biocultural Heritage in the Sustainable Development Goals", *Environmental Values* 27: 55–80.

Pretty, J., Adams, B., Berkes, F., Ferreira de Athayded, S., Dudleye, N., Hunnf, E., Maffi, L., Miltonh, K., Rapporte, D., Robbinsi, P., Sterling, E., Stoltonk, S., Tsingl, A., Vintinnerk, E. and Pilgrim, S. (2009), "The Intersections of Biological Diversity and Cultural Diversity: towards integration", *Conservation and Society* 7 (2): 100-112.

Ramsar Regional Center - East Asia (2017), "The Designation and Management of Ramsar Sites – A practitioner's guide", available at: https://www.ramsar.org/sites/default/files/documents/library/designation_management_ramsar_sites_e.pdf.

Rozzi, R. (2012), "Biocultural Ethics: recovering the vital links between the inhabitants, their habits, and habitats". *Environmental Ethics* 34: 27-50.

Scheffer, M., Carpenter, S., Foley, J.A., Folke, C. and Walker, B. (2001), "Catastrophic Shifts in Ecosystems", *Nature* 413 (6856): 591–596.

Secretariat of the Convention on Biological Diversity (CBD Secretariat) (2013), "Biodiversity A-Z", available at: http://www.biodiversitya-z.org/themes/terms?s=home-icons.

Secretariat of the Convention on Biological Diversity (2018), "Glossary of Relevant Key Terms and Concepts within the context of Article 8(j) and Related Provisions". Sharm El-Sheikh.

Singh, R.K., Pretty, J. and Pilgrim, S. (2010), "Traditional Knowledge and Biocultural Diversity: learning from tribal communities for sustainable development in northeast India", *Journal of Environmental Planning and Management* 53: 511–533.

Smith, D. (nd), "Development and Application of a Resilience Framework to Climate Change Adaptation", *SEARCH Project – Briefing Paper*, IUCN: Switzerland, available at: https://www.iucn.org/downloads/search_resilience_briefing_june_2011_v2.pdf.

Srinivas, K.R. (2012), "Protecting Traditional Knowledge Holders' Interests and Preventing Misappropriation - Traditional Knowledge Commons and Biocultural Protocols: Necessary but Not Sufficient?", *International Journal of Cultural Property* 19 (3): 401-422.

Sterling, E.J., Filardi, C., Toomey, A., Sigouin, A., Betley, E., Gazit, N., Newell, J., Albert, S., Alvira, D., Bergamini, N., Blair, M., Boseto, D., Burrows, K., Bynum, N., Caillon, S., Caselle, J.E., Claudet, J., Cullman, G., Dacks, R., Eyzaguirre, P.B., Gray, S., Herrera, J., Kenilorea, P., Kinney, K., Kurashima, N., Macey, S., Malone, C., Mauli, S., McCarter, J., McMillen, H., Pascua, P., Pikacha, P., Porzecanski, A.L., de Robert, P., Salpeteur, M., Sirikolo, M., Stege, M.H., Stege, K., Ticktin, T., Vave, R., Wali, A., West, P., Winter, K.B. and Jupiter, S.D. (2017), "Biocultural Approaches to Well-Being and Sustainability Indicators across Scales", *Nature Ecology & Evolution*, pp. 1-9, https://doi.org/10.1038/s41559-017-0349-6.

Sterling, E.J., Pascua, P., Sigouin, A. et al (2020), "Creating a Space for Place and Multidimensional Well-Being: lessons learned from localizing the SDGs", *Sustainability Science*, pp. 1-18, https://doi.org/10.1007/s11625-020-00822-w.

Tello, E., Jover, G., Murray, I., Fullana, O. and Soto, R. (2018), "From Feudal Colonization to Agrarian Capitalism in Mallorca: peasant endurance under the rise and fall of large estates (1229-1900)", *Journal of Agrarian Change* 18 (3): 483-516.

The Christensen Fund, "Explore - Biocultural Landscape", available at: https://www.christensenfund.org/experience/biocultural-landscape/.

Thompson, M., Ellis, R. & Wildavsky, A. (1990) *Political Culture, Cultural Theory* (Waterview Press, Boulder)

Tipton-Allaband, C. (2018), "Ethnobotany," Encyclopedia of Food and Culture, available at: https://www.encyclopedia.com/food/encyclopedias-almanacs-transcripts-and-maps/ethnobotany

Turner, N.J., Ignace, M.B. and Ignace, R. (2000), "Traditional Ecological Knowledge and Wisdom of Aboriginal Peoples in British Columbia", *Ecological Applications* 10 (5): 1275-1287.

United Nations (1992), "Convention on Biological Diversity", available at: https://www.cbd.int/doc/legal/cbd-en.pdf.

UN Habitat, "*Resilience*", available at: https://unhabitat.org/resilience/.

UNEP (1999) "Cultural and Spiritual Values of Biodiversity", available at: https://www.unep.org/resources/publication/cultural-and-spiritual-values-biodiversity

UNEP FI (2008) "Bloom or Bust?", available at: https://www.unepfi.org/fileadmin/documents/bloom_or_bust_report.pdf.

UNEP (2018), "The Sharm El-Sheikh Declaration on Nature and Culture. 14th Conference of the Parties to the Convention on Biological Diversity", CBD/COP/14/INF/46, available at: https://www.cbd.int/doc/c/8b76/d85e/c62f920c5fd8c4743e5193e1/cop-14-inf-46-en.pdf.

UNESCO Intangible Cultural Heritage, "*Transmission*", available at: https://ich.unesco.org/en/transmission-00078.

UNESCO, "Man and the Biosphere Programme", available at: http://www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/man-and-biosphere-programme/about-mab/.

UNESCO (1972), "Convention Concerning the Protection of the World Cultural and Natural Heritage", available at: https://whc.unesco.org/archive/convention-en.pdf.

UNESCO (2005), Convention on the Protection and Promotion of the Diversity of Cultural Expressions, available at https://en.unesco.org/creativity/sites/creativity/files/passeport-convention2005-web2.pdf

UNESCO (2008), *Links Between Biological and Cultural Diversity*. Report of the International Workshop organized by UNESCO with support from The Christensen Fund. 26-28 September 2007. Paris, available at: https://unesdoc.unesco.org/ark:/48223/pf0000159255?posInSet=1&queryId=N-EXPLORE-d8e511de-6165-4605-9692-16fea5e207a9.

UNESCO (2017), "UNESCO moving forward the 2030 Agenda for Sustainable Development", available at: https://en.unesco.org/creativity/sites/creativity/files/247785en.pdf. UNESCO (1972), "Convention Concerning the Protection of the World Cultural and Natural Heritage", available at: https://whc.unesco.org/archive/convention-en.pdf.

UNESCO (2019), *Operational Guidelines for the Implementation of the World Heritage Convention*, Paris, available at: https://whc.unesco.org/en/guidelines/.

UNESCO-SCBD (2014), *Florence Declaration on the Links Between Biological and Cultural Diversity*. First European Conference for the Joint Programme on Biological and Cultural Diversity, Florence, Italy, available at: https://www.cbd.int/portals/culturaldiversity/docs/21040410-declaration-florence-en.pdf.

UNESCO-SCBD (2016), *Ishikawa Declaration on Biocultural Diversity*. First Asian Conference on Biocultural Diversity, Nanao City, Japan, available at: https://www.cbd.int/portals/culturaldiversity/docs/20161028-declaration-ishikawa-en.pdf.

United Nations Department on Economic and Social Affairs, "UN Declaration on the Rights of Indigenous Peoples", available at: https://www.un.org/development/desa/indigenouspeoples/declaration-on-the-rights-of-indigenous-peoples.html.

van Oudenhoven, F.J.W., Mijatovic, D. and Eyzaguirre, P.B. (2011), "Social-Ecological Indicators of Resilience in Agrarian and Natural Landscapes", *Management of Environmental Quality* 22 (2): 154-173.

Vardy, M. and Smith, M. (2017), "Resilience", *Environmental Humanities* 9 (1): 175-179.

Verschuuren, B. (2012), "Integrating Biocultural Values in Nature Conservation: perceptions of culturally significant sites and species in adaptive management", in G. Pungetti and G. Oviedo (eds), *Sacred Species and Sites: advances in biocultural conservation*. Cambridge University Press, pp. 231-246.

Vierikko, K., Elands, B., Niemelä, J., et al (2016), "Considering the ways biocultural diversity helps enforce the urban green infrastructure in times of urban transformation", *Current Opinion in Environmental Sustainability* 22: 7-12.

Walker, B., Holling, C.S., Carpenter, S. and Kinzig, A. (2004), "Resilience, Adaptability and Transformability in Social-Ecological Systems", *Ecology and Society* 9 (2): 2-7.

Walker, B. and Salt, D. (2006), *Resilience Thinking*. Washington, DC: Island Press.

Walker, B. and Salt, D. (2012), *Resilience Practice: building capacity to absorb disturbance and maintain function*. Washington, DC: Island Press

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Wiley, A.S. and Cullin, J.M. (2016), "What Do Anthropologists Mean When They Use the Term Biocultural?", *American Anthropologist* 118 (3): 554-569.

Winter, K.B. and Lucas, M. (2017), "Spatial Modelling of Social-Ecological Management Zones of the Ali'i Era on the Island of Kaua'i with Implications for Large-Scale Biocultural Conservation and Forest Restoration Efforts in Hawai'I", *Pacific Science* 71: 457–477.

WIPO, "Glossary of Key Terms", available at: https://www.wipo.int/tk/en/resources/glossary.html.

WIPO, "Traditional Knowledge", available at: https://www.wipo.int/tk/en/.

Wolverton, S., Nolan, J.M. and Ahmed, W. (2014), "Ethnobiology, Political Ecology, and Conservation", *Journal of Ethnobiology* 34(2): 125–152.

World Intellectual Property Organisation (WIPO), "*Traditional Knowledge*", available at: https://www.wipo.int/tk/en/.

Zent, S. (2009), "Traditional Ecological Knowledge (TEK) and Biocultural Diversity: a close-up look at linkages, delearning trends, and changing patterns of transmission", in P. Bates et al. (eds), *Learning and Knowing in Indigenous Societies Today*, pp. 39–58. Paris: UNESCO.

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