

Aiming at the bigger picture: Citizen science addressing biocultural diversity

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While citizen science is gaining a foothold in more and more disciplines, the exchange of data between citizen science projects is rather rare. Citizen science boasts of its societal relevance, but projects are often only disciplinary. Several citizen science projects in the natural sciences address biodiversity loss. However, diversity loss is not limited to biodiversity alone but also affects the diversity of human cultures and languages. Diversity in all these areas plays a major role in the resilience of systems, whether biological or social. However, the complex interrelationships between biological and cultural diversity can be studied best by involving society in academic projects and by exchange across projects. This contribution therefore presents a general concept for citizen science practitioners on how citizen science projects from the natural sciences, social sciences and humanities can contribute to the analysis and appreciation of biocultural diversity.

*Austrian Citizen Science Conference 2023, ACSC2023
19 - 21 April 2023
Linz, Austria*

1. Introduction

Biocultural diversity is defined as “the total variety exhibited by the world’s natural and cultural systems” [1] according to Maffi (2001). In addition to biodiversity also human linguistic and cultural systems are diverse. Biocultural diversity is considered “the fundamental expression of the variety upon which all life is founded” [1]. Therefore, all forms of diversity are interlinked and deserve to be protected. Biocultural diversity was first addressed in 1988 by the First International Congress of Ethnobiology in Belém, Brazil. The resulting declaration specifies the “inextricable link between cultural and biological diversity” [2]. The definition of biocultural diversity in the Convention on Biological Diversity is in the same line: “biological diversity and cultural diversity and the links between them”.

2. Human-nature dichotomy

The interrelation between nature and human culture can have either a mutually positive effect or a detrimental effect. The latter is especially relevant in today’s cultures in the Global North, where we can see a human-nature dichotomy, i.e. a clear separation between nature and humans. Humans in the Western cultures do no longer consider themselves part of nature and are losing their connection to nature. The increasing trust in technology and (scientific) innovations diminish our relationship with nature. Both biodiversity and diverse human cultural systems are important for being resilient [3], which is crucial in a world shaped by different crises.

This entanglement between nature(s) and culture(s) is also emphasized by the concept of natures-cultures [4], which stresses the inseparable relationships between humans and their (living) environments [5].

3. Preserving biocultural diversity

Therefore, the question arises how biocultural diversity can be preserved in order not to lose resilience. Since biocultural diversity is a complex phenomenon and is affecting each and every individual personally, citizen science might be a way to go.

3.1 Citizen science addressing biocultural diversity

A wide range of citizen science projects is addressing environmental issues and biodiversity loss. These projects are often focusing on one discipline only. Projects may thus cover, e.g. the herpetofauna or butterflies. They may be even restricted to one species alone. As such, many citizen science projects in the natural sciences address biodiversity loss either directly or indirectly. However, diversity loss is not limited to biodiversity alone, but also affects human cultures and languages.

Diversity in all these areas plays a major role in the resilience of systems, whether biological or social. However, the complex interrelationships between biological and cultural diversity can be studied best by involving society in academic projects and by exchange across projects with a focus on interdisciplinarity.

3.2 Interdisciplinarity and transdisciplinarity are key

Studying biocultural diversity is an interdisciplinary endeavour that cannot be completed by one discipline, e.g. biology, or one field of knowledge, e.g. natural sciences alone. In an

interdisciplinary citizen science project about biocultural diversity, disciplines in the natural sciences can focus on analysing the status quo of biodiversity, other fields of knowledge can address the social and human aspects involved. Two main components of biocultural diversity, namely linguistic diversity and cultural diversity are related to human culture, which is the main object of investigation in the humanities. The social sciences, since they study societies and relationships within societies can address the underlying social structures, developments, values, beliefs and attitudes that are shaping our relationship with nature. Thus, biocultural diversity can be studied from different angles and by applying different methods, such as from biology, sociology, cultural studies, linguistics, oral history or sustainability science. If different disciplines are working together, we can achieve an overall picture of biocultural diversity, including its current status and the factors contributing to its loss or preservation.

3.3 Biocultural diversity and citizen science

Due to the magnitude of the endeavour of studying biocultural diversity in a comprehensive form, academics may resort to citizen science, not only for reasons of crowdsourcing, e.g. for data collection but also for aligning the research project with the needs and values of society and for taking different life realities into account.

Citizen science can contribute to the analysis and appreciation of biocultural diversity. Here, the focus should not only be on the description of the mutual development of human culture and nature but on “co-producing knowledge for sustainability solutions, and in so doing, better account for questions of power, gender and transformations” [6]. The urgency of the topic is highlighted by the different sustainability challenges we are facing at the moment, such as the rapid biodiversity loss as well as the loss of languages [7].

The importance of human language diversity should not be underestimated since a language is a means that reflects the way of seeing the world. People may interpret the experience of reality differently in another language. For members of other language communities, this diverging interpretation of reality may be a completely novel way of seeing the world. Therefore, language and culture offer manifold forms of referring to reality, and, thus, varied ways of interpreting it [8]. Language loss is embedded in a broader context of culture loss and loss of intellectual diversity [6]. The notion that life scientists studying biodiversity are increasingly becoming companions for dying species, also applies to linguists, who are increasingly confronted with endangered or even extinct languages. In the coming 100 years, about 50–90% of the world’s languages may be threatened by extinction [9]. The loss of languages thus entails the loss of ways to see the world and the way to react to different situations, which is an important aspect of resilience.

(Human) culture is not an undisputed concept. Generally, it includes customs and behavioural patterns, conventions, norms and beliefs. Culture grew over generations based on (collective) experience. Members of different cultures have different knowledge of the world due the fact that they give different priorities to phenomena in the(ir) surroundings. Although cultures offer some stability, they are no unified givens. They are subject to constant change influenced by “uneven power relations of world society” [10]. Depending on the definition, culture may encompass the entire spectrum of human activities.

A first step for a citizen science project addressing biocultural diversity is to gain an overview of the status quo of biocultural diversity and bringing data from different sources and

disciplines together. To assess the current state, the operationalization of biocultural diversity is necessary. Some authors already suggested indicators for urban biocultural diversity covering materialized and lived conceptual layers as well as stewardship. These can serve as policy-driven instrument [11]. Other authors introduced a global measure, the first of its kind [1], which is based on an index based on countries. For measuring biocultural diversity, different richness measures are used. Based on this global measure, we can find an exceptionally high level of biocultural diversity in Central Africa, the Amazon Basin and Indomalaysia/Melanesia.

These combined data can give an insight into the interactions between humans and nature(s) in different regions of the world and stress the different worldviews [6] that are having an impact on human-nature relations. Here, experience from sustainability sciences investigating biocultural diversity demonstrates that interdisciplinarity and transdisciplinarity play an essential role in addition to questions of social justice and normativity [6].

4. Conclusion

While biodiversity loss is receiving attention both in academic literature and different media, there is much less information about the effects of the loss of human cultures and languages. Studies addressing biodiversity loss or the loss of human languages are often conducted independently. Studies examining their interrelationships are lagging behind.

Citizen science projects are producing a variety of data. However, they usually focus on only one discipline and interdisciplinary collaboration is rare. Nevertheless, despite methodological differences in collecting these data, combining data from different citizen science projects, and thus disciplines spanning the entire range from natural sciences, social sciences, arts and humanities might provide valuable insights into the status of biocultural diversity. Moreover, (interdisciplinary) citizen science projects can distil factors contributing to the preservation or loss of biocultural diversity by analysing human behaviours and attitudes influencing them. In addition, by engaging with the topic of biocultural diversity in a hands-on manner, participants in citizen science projects may feel ownership and responsibility for biocultural diversity.

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