This is the preprint of a paper accepted in *SATS: Northern European Journal of Philosophy*.

Concepts of Biodiversity, Pluralism, and Pragmatism: The Case of Walnut Forest Conservation in Central Asia

Elena Popa
FLAME University

Abstract

This paper examines philosophical debates about concepts of biodiversity, making the case for conceptual pluralism. Taking a pragmatist perspective, I argue that normative concepts of biodiversity and eco-centric concepts of biodiversity can serve different purposes. The former would help stress the values of local communities, which have often been neglected by both early scientific approaches to conservation, and by policy makers prioritizing the political or economic interests of specific groups. The latter would help build local research programs independent of pressures from economic or political actors. I employ a case study on environmental research on walnut forests in Kyrgyzstan in support of my argument. Against tendencies to frame different understandings of biodiversity in terms of geographical areas, I propose an interpretation drawing on the philosophy of ecology. Adherence to environmental pragmatism enables a sufficiently complex picture of developing environmental research in the area, capturing issues about scientific framings and local understandings.

Keywords: biodiversity, pluralism, pragmatism, walnut forests, Central Asia

1. Introduction

The concept of biodiversity is linked to concerns about the environment and nature conservation. Environmental questions with regard to species extinction, resources available for human use, and the value of nature have developed in the 19th century, with particular focus on human dependence upon the ecosystems taking shape during the 20th century (Haila 2012). Starting with the 1980s and the emergence of the subdiscipline of conservation biology, environmental problems have been framed in terms of of biodiversity loss (Soulé 1985). Since then, conservation biology has become more interdisciplinary, highlighting the close connection between humans and natural systems (Kareiva & Marvier 2012). Philosophical debates on how to define biodiversity reflect the tensions between different disciplinary perspectives on conservation. While much of the philosophical

discussion has been marked by dichotomies such as natural vs. anthropogenic, intrinsic vs. instrumental value, value-freedom vs. normativity, these distinctions have been challenged by both scientific approaches to conservation that take social aspects seriously, and philosophical views such as environmental pragmatism. Among the views of interest here, there are those that attempt to define biodiversity in a value-neutral way, and the normative ones, defining biodiversity in relation to a set of values. The former can be better described as value-neutral, or eco-centric, as opposed other terms used in the literature, such as 'scientific' to avoid conflation with scientific approaches that take an openly normative stance.[1] In what follows, I will employ the term 'eco-centric' to emphasize its focus on the specific ecosystem to be protected and exclusion of humans. This can be classified as value-neutral insofar as values pursued by humans such as social, economic, political are not deemed to play a role in defining biodiversity.[2] It should also be noted the distinction between different concepts is not a sharp one, with various positions in varying levels of agreement with these tenets. For instance, there are 'weaker' and 'stronger' versions of normativism (see Sarkar and Margules 2002 for the former, and Sarkar 2017 for the latter). This paper will focus on the philosophical discussions around these concepts from the perspective of multiple functions that can be ascribed to biodiversity. I will argue that as long as several functions are at play, corresponding concepts of biodiversity should be employed, rather than being viewed as competitors. This helps explain how multiple concepts of biodiversity operate in distinct contexts, reflecting a focus on distinct aspects, such as measuring the loss in biodiversity, or considering interests of various stakeholders in conservation projects. Incorporating all of these aspects is especially important given questions of cross-cultural knowledge and understanding, and political commitments regarding conservation that go beyond what scientists in North America or Western Europe and environmental philosophers have considered in relation to concepts of biodiversity.

I will illustrate my proposal for pluralism in the context of a single conservation project, employing a case study on walnut forests in Central Asia. The case highlights a tension between conserving multiple species of nut and fruit trees and subsistence activities by the local population, that became dependent on the forests as a result of social and economic changes starting in the 1990s. Older political questions regarding environmental concerns during colonial times as well as the time of Soviet occupation are also relevant. As the history of discourses on the conservation of

1 See Douglas (2004) on value-neutrality: 'taking a position that is balanced or neutral with respect to a spectrum of values' (p. 460).

2 It can still be objected that since biodiversity is deemed worthy of being protected, a value judgment is made. I agree with this, but I would also like to acknowledge the position of advocates of the value-neutrality, who would hold that what constitutes biodiversity can be established objectively. A similar tension can be noted in the philosophy of medicine, where naturalistic views with regard to concepts of health and illness are typically in conflict with normative ones, yet one would count health as something valuable under both views (see Murphy 2021).

the forests shows a quest for control over them by various political agents, a concept of biodiversity in relation to the current state of the forests independent from political agendas would be useful. At the same time, the need to take into account the interests of stakeholders whose livelihoods depend on the forests calls for normative concepts of biodiversity. I will explain how the philosophical apparatus employed in defining biodiversity, and pluralism in particular, can help spell out these problems. This will also be an alternative to tendencies in the environmental studies literature on the region to frame biodiversity as a 'Western' concept. I propose moving beyond a dichotomy based on geographical position and corresponding political interests, illustrating how understandings of biodiversity focused on local values and interests can work alongside more neutral ones in a complementary manner. One important use of such framework is to shape local research agendas, moving beyond the past neglect of local contributions.

Section 2 will review relevant philosophical and scientific literature on concepts of biodiversity and provide an outline of my argument regarding the multiple functions concepts of biodiversity serve. Section 3 will show how a plurality of concepts of biodiversity intertwine in practice by reference to the case study on walnut forests. By analyzing relevant environmental research, I will show how uses of these concepts intertwine.

2. Concepts of biodiversity, values, and pragmatism

Philosophical attempts to define biodiversity include framings in accordance with conversation biology, in accordance with ecosystem services, and socio-ecological framings (Faith 2021). I review the corresponding concepts below.

Regarding conservation biology framings, one important point of contention is whether biodiversity should be defined by reference to human interests or not. The historical background for these debates is the emergence of conservation biology in the 1980s with the explicit aim of conserving biodiversity. The introduction of the concept of biodiversity also brought about further questions about what species to focus on, for instance. Initial tenets by Soulé (1985) held that biodiversity has intrinsic value, regardless of its utility. By contrast, the new conservation science acknowledges the importance of ecosystems for human well being and of equity in conservation projects (Kareiva & Marvier 2012). This shift has given rise to a debate regarding motivations for protecting nature, and what measures should be counted as conservation, with an emerging critique of conservation projects that focus on benefiting humans (Soulé 2014). The philosophical debate on biodiversity reflects these tensions, and this is why the main views appear as competitors. Adapting Sarkar's (2019) discussion, the main approaches can be summarized as follows:

- *Value-neutrality or eco-centrism* – biodiversity is defined as through regularities and natural properties, and not through human interests. Defenders of this view include philosophers (MacLaurin & Sterelny 2008; MacLaurin 2016), but also biologists (Gaston 1996; Takacs 1996). While Sarkar (2017; 2019) refers to this view as 'scientific' or 'scientism', I describe it as eco-centric in order to prevent conflation between these approaches and scientific approaches which include normative commitments and human interests, such as ecosystem services to be discussed below.
- *Eliminativism* – the concept of biodiversity does not serve conservation purposes, and, as such, should be eliminated. This view is motivated by the inconclusive debates between various attempts to define biodiversity in ways described above as eco-centric or value-neutral. Defenders of this view include Santana (2017) and Morar et al. (2015).
- *Normativism* – the concept of biodiversity is defined in relation to human interests. This includes a 'weak' version, also known as deflationism, according to which the practices of conservation biologists alongside the local contexts can shed light on what biodiversity is. Defenders of various versions of deflationism include Sarkar (2002) and Sarkar and Margules (2002). According to 'strong' versions of normativism the definition of biodiversity incorporates human interests, including local values and norms and the perspectives of the stakeholders (Sarkar 2017). One such example is the view by Sarkar and Margules (2002) that components of biodiversity are decided as a matter of consensus between scientists and stakeholders, with the qualification that the focus is on specific components, determined by human interests, and not the entirety of biodiversiy.

A significant difference between the debates sketched out above and the ecosystem services framing is that the latter defines biodiversity by direct connection to human interests. As stated in ecosystem services approaches, the aim of conservation is to benefit people (e.g., Balvanera et al. 2001). Similarly, approaches from the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) refer to 'nature's contributions to people' (Faith 2018). Ecosystem services thus avoid the clash between the two perspectives stressed above by explicitly framing biodiversity conservation in relation to human interests. At the same time, this also leaves it open to criticism regarding its anthropocentric stance that could lead to treating nature as a resource to be monetized (see Silvertown 2015).

The socio-ecological framing is also normative, considering biodiversity not only an issue of conservation, but as incorporating the connection between human society and nature. This framing calls for an expansion of the concept of biodiversity beyond questions of conservation biology, to social issues, such as sustainability and environmental justice (Díaz 2019). One notable difference

from the views above is that socio-ecological approaches take human activity to be an essential part of biodiversity, and not simply something that may or may not be considered when talking about biodiversity. This is important because, unlike the earlier views, this framing does not endorse a split between humans and nature. Of particular interest for my discussion is the commitment to pluralism by proponents of socio-ecological approaches to biodiversity. For instance, Pascual et al. (2021) point out that a narrow concept of biodiversity cannot foster collaboration between conservation professionals and local people, and call for the incorporation of more diverse knowledge and value systems (Pascual et al. 2021, 3). The view I will be defending is in agreement with the above, though the kind of pluralism proposed by the authors is methodological (i.e., biodiversity protection should employ a wider range of knowledge systems, values, and approaches). By contrast, I will make the case for conceptual pluralism: in conservation contexts multiple concepts of biodiversity operate, and they serve various functions. Awareness of this plurality, as well as willingness to employ several concepts as opposed to a single one, can also help address issues such as the disconnect between the scientists' and the local people's perspectives.

My proposal is to integrate eco-centric concepts of biodiversity with normative ones. Concepts belonging to ecosystem services or socio-ecological framings also fit under the broad umbrella of normativism. One question, or potential objection, arising here is whether the value-neutrality inherent to the eco-centric view is necessary, given that all of the framings highlight normative aspects in relation to scientific approaches. Furthermore, given past instances when scientific approaches have neglected local conditions under the guise of value-freedom, wouldn't it be better to simply focus on normative concepts and the human interests involved?

My answer is to acknowledge the criticism of approaches that neglect local contexts or stakeholders, while holding that this does not entail that objectivity or value-neutrality necessarily yield such results. Longino's (2002) argument that scientific objectivity is actually diminished by the exclusion of contributions from members of marginalized or historically oppressed groups is relevant here. On this view, scientific objectivity involves accepting a plurality of perspectives. Understanding value-neutrality in this sense can help move away from past shortcomings while providing key insights into issues relevant to biodiversity. These include enabling scientists to provide an assessment of biodiversity loss prior to making policy recommendations. For instance, a review of findings by Kinchy and Kleinman (2003) holds that 'ecologists tend to maintain a boundary between science and politics because of a perceived necessity to guard the independence of their science' (Haila 2012, 44-45).

My case for pluralism will rely on groundwork set by environmental pragmatism. Broadly, pragmatism supports various kinds of normativism, in this case, including human values and

interests when defining biodiversity. In this sense, Sarkar's views also fall under environmental pragmatism (see Makineni & Sarkar 2021, for instance). Another feature of pragmatism is 'the primacy of practice', holding that concepts are to be analyzed through their consequences (see Putnam 1995). The normative approaches discussed above stress the importance of concepts incorporating human interests in achieving more sustainable and just conservation outcomes. Acknowledging the importance of these aspects, I would like to point out that eco-centric concepts of biodiversity can also have positive consequences for conservation, namely singling out the state of an ecosystem and mapping out potential ways of action. These can then inform conservation decisions, which are framed in relation to human interests. The argument I defend goes as follows:

1. Biodiversity is defined by reference to a framework determined by the research purposes (pragmatism).
2. Different concepts of biodiversity can serve different research purposes.
3. In practice, purposes connected the multiple concepts of biodiversity intertwine (such as when aims to build a local research agenda while incorporating the interests of the stakeholders, to be illustrated through the case study).
4. Therefore, in practice multiple concepts of biodiversity intertwine.

Premise 1 is in line with contributions defending normative concepts of biodiversity such as Sarkar (2017; 2019) and broader pragmatist approaches to ecological concepts such as Norton (2005; 2015). As such, I will rely on arguments from this literature to defend this premise. For example, introducing a hierarchical thinking model of sustainability considering how ecological systems are constituted by smaller scale systems, Norton (2015) holds that 'what is adventuresome in this approach is that, given the type of integrated analysis pursued here, human problems—understood as failures to protect an important human value—can and often do function as the context for choices of models' (2015, 118). This is a pragmatist view insofar as it acknowledges the existence of multiple models (at different scales in this example), and holding that the choice of models is determined by human needs and not by an accurate representation of reality. Applying this to biodiversity, deciding between models also involves choices between what species to protect, which is also determined by human interests, and can give rise to conflicts. To use a well known example from Leopold (1989), an environmental project focusing on the number of deer, and increasing it through allowing for more wolves to be hunted overlooks the effects that an increase in the deer population would have on vegetation, causing subsequent problems such as soil erosion. Keeping a balance between the wolf and the deer population is thus desirable when looking at the problem from a larger scale, including vegetation and soil. Norton's defense of this view is that it can help 'against disciplinary claims that a given discipline can provide a *comprehensive* treatment

of forward-looking environmental problems, and against claims that environmental values can or must be expressed using a single terminology' (2015, 126). The shortcoming of economic approaches to sustainability, in particular, is the neglect of environmental aspects when assessing the welfare of future generations, while a rigid discussion of values excludes the possibility of social or environmental change.

Premise 2 can be defended though commitment to the primacy of practice claim. Norton's (2005) defense of pragmatism in relation to sustainability is one such instance.[3] Scientific models serve definite purposes as opposed to seeking to represent nature: 'pragmatism (...) offers adaptive management a plausible epistemology, capable of justifying attempts to learn by doing, and capable of justifying the construction of many sundry scientific models of nature. What pragmatism would change is that these models would be treated as purpose relative, not as synoptic pictures of reality' (2005, 112). Insofar as different scientific models can serve different purposes, and they are all important, concepts associated with these models can all be used in research. Norton further refers to a distinction by Funtowicz and Ravetz (1993) between curiosity-motivated and mission-oriented science, associating pragmatism with the latter: 'mission-oriented science differs from traditional disciplinary and curiosity-motivated science in that the community that reviews scientific results is expanded to include not just scientists from established disciplines, but also affected parties, stakeholders who have varied interests and viewpoints and express their viewpoints in an open and public process' (Norton 2005, 115). Norton thus defends the use of normative concepts in conservation biology, particularly aiming at taking the interests of the entire community into consideration. On this view, an eco-centric concept of biodiversity fits under curiosity-motivated science. My addition to this is to emphasize that eco-centric concepts of biodiversity aiming for an impartial view can also serve a function alongside normative concepts. In this sense, curiosity can sometimes be part of the mission. A detached perspective can be the starting point for negotiating what should be conserved. In contexts where research has traditionally been subsumed under the interests of the state or the market, such perspective is central for establishing local research programs. The case study in section 3 will be one such example.

Having relied on environmental pragmatism to defend the first two premises, I support premise 3 by reference to a case study illustrating how multiple purposes and related concepts of biodiversity intertwine within the same conservation project. I will discuss current work on biodiversity conservation in Central Asia, highlighting the need to recognize the scientific agenda as

3 The same caveat applies here about Norton discussing sustainability, while I am using his theoretical frame in the context of biodiversity.

well as local people's interests in a way that transcends earlier framings in terms of an opposition between Western and non-Western viewpoints.

3. Concepts of Biodiversity and the Conservation of Walnut Forests in Kyrgyzstan

Central Asia is home to the world's largest areas where walnut trees grow naturally. Over 300 species of plants and wild nut- and fruit-trees grow in an area of about 30 000 hectares in the South of the Fergana Valley, Western Tian Shan. The forests have always co-existed with human activity, as the region is among the most densely populated ones in Central Asia. The area has been under the occupation of the Kokand Khanate between the 18th and the 19th century, the Russian Empire from 1876, and the Soviet Union from 1924. With Kyrgyzstan gaining independence in 1991, and the opening of the former Soviet space, the walnut forests have drawn international attention and conservation projects, while being subject to increasing degradation. The difficult economic conditions in the 1990s, leading up to people losing their employment and livelihoods, have caused an increase in the use of the forests for subsistence activities, such as firewood cutting and grazing.

The conservation of the walnut forests can be framed as a project of biodiversity protection as it involves various species (particularly *Juglans regia* and wild fruit trees such as *Malus sieversii, Crataegus pontica, Pistacia vera, Pyrus korshinskyi, Sorbus persica* - see Orozumbekov et al. 2015). The conservation efforts are also framed at the level of the the entire forest ecosystem, looking at interactions between the species and likelihood of their long term survival (Cantarello et al. 2014). The forests are also connected to local economic activity, such as fruit and nut harvest and agroforestry (Rehnus et al. 2013). As pointed out by Schmidt and Doerre (2011), discourses regarding the preservation of biodiversity have only emerged after independence, in the context of increasing degradation of the forests. Currently, important actors include the local people, whose livelihoods depend on the forests, government officials making conservation policies, and international organizations calling for environmental protection. It is also important to stress the historical background of this: the role of the forests in water regulation and preventing soil erosion have been recognized since colonial times, and policies limiting the use of the forests have been in place while the region was part of the Soviet Union. As noted by Schmidt and Doerre (2011), issues about forest conservation have been framed as attempts by various actors to take control over the forests, rather than out of concern for their inherent value. To a certain extent, this persists at present, with government officials trying to limit local people's use of the forests, which was also enforced during the Soviet period. International conservation discourses have also been used to further support this stance: '[government officials] have a tendency to say, "We're not going to let local people have any real authority to cut down trees, even on a selective basis." This overly

conservative approach is partly influenced by international rhetoric about [the importance] of conservation' (Smith, *apud* Ives 2011). Thus, a conflict between conservation agendas and people's livelihoods is visible.

One way of approaching the conflict would be through the establishment of forest participatory management involving the local stakeholders (Shigaeva & Darr 2020). Research on other conservation projects in the area shows that conservation foundations can partner with the local communities to resolve conflicts (e.g., Young et al. 2021). Still, in the case of the walnut forests past research has shown that foreign funded initiatives have not been successful due to a number of factors, including the absence of an analysis of locally appropriate forest regimes (Ulybina 2015). This calls for better knowledge of the local conditions, and a discussion of biodiversity in this context. The conflict between policies promoted by government officials and the interests of local people adds further difficulties.

As my interest here lies in concepts of biodiversity, I will explore how employing multiple concepts of biodiversity to make sense of the case and potentially inform future decisions regarding conservation can help move things forward. Previous environmental research on the walnut forests also exemplifies the tendency to separate concerns about conservation from local needs, assimilating the former with a Western perspective. This can be noted in a study by Jalilova and Vacik (2012) investigating local people's perceptions of biodiversity in villages adjacent to the walnut forests. The motivation of the study is to contribute to bridging the gap between how scientists and policy makers understand biodiversity, with an explicit aim to incorporate the stakeholders in the debate over biodiversity protection.[4] The authors grouped the answers to open ended questions regarding what biodiversity is into three categories:

- 'diversity of living organisms and their interactions with each other' (40%);
- 'a natural wealth providing everything necessary for people's lives' (26%);
- 'surrounding nature and its variety' (19%) (Jalilova & Vacik 2012, 210).

In interpreting these results, the authors note that people show different understandings of biodiversity, and notably 'some of the answers from respondents who work directly with forests were quite clear and incorporated common Western definitions. However, the majority of the respondents based their answers on their historical background and the benefits they had received from the forests, as well as their personal experiences' (Jalilova & Vacik 2012, 210). According to Jalilova and Vacik, the first understanding of biodiversity is the most in line with the one proposed at the Rio Convention, considering both species as well as processes and interactions: 'the

4 Cf. 'Reaching a common understanding of the terms and concepts involved in biodiversity conservation is perhaps the biggest challenge for a successful implementation' (Jalilova and Vacik 2012: 2010).

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' (Convention of Biological Diversity).[5] The authors consider this to be the 'Western concept of biodiversity'.

In the light of the discussion so far, I propose a distinct interpretation of these results, employing a plurality of concepts of biodiversity, as an alternative to a sharp divergence between Western and non-Western perspectives. Before doing so, it should be clarified what exactly is meant by 'Western'. In my reading, this connects to the post-independence situation of Kyrgyzstan, which has enabled international connections beyond the former Soviet space. At the same time, 'Western' also has the connotation of something that is imported rather than emerging locally. In this sense, one may ask whether the opposite of 'Western' here would be indigenous. While this is a question worthy of further investigation, it is beyond my purposes here, in large part because given the history of the region, determining what counts as indigenous is far from straightforward.

It can be noted that the definition that Jalilova and Vacik label as 'Western' does not refer to human needs or interests. Thus, it can also be read as falling in line with eco-centric concepts of biodiversity from conservation biology framings, considering biodiversity as intrinsically valuable. The latter two definitions involve human perspectives, either openly referring to economic valuation, or defining nature by reference to the human viewpoint. As such, they can align with normative concepts: either involving economic value for conservation biology framings, or ecosystem services. Table 1 presents the compatibilities between concepts of biodiversity and the definitions from the Jalilova and Vacik study. I interpret the co-existence of these different perspectives on biodiversity among the local people through the lens of pluralism: people understand biodiversity in different ways according to the uses they see as relevant.

Definition	**Corresponding concepts**			
	Conservation biology framing		Ecosystem services framing	Socio-ecological framing
	Eco-centric	Normative	Normative	Normative
'diversity of living organisms and their interactions with each other'	Yes	No	No	No
'a natural wealth providing everything necessary for people's lives'	No	Yes	Yes	No

5 While in the literature on biodiversity several interpretations of this definition have been proposed, I will only refer to the use of this definition in the Jalilova and Vacik (2012) study.

‘surrounding nature and its variety’	?	?	?	No

Table 1: Concepts of biodiversity corresponding to the answers in the Jalilova and Vacik study.

As can be seen in the table, the first definition, at least in the interpretation proposed in the article, has a narrow focus on biodiversity as independent from human interests. The second one, by contrast, focuses on the benefits biodiversity brings to humans, being in line with both conservation biology and ecosystem services framings, which take human interests into account. It should be noted, though, that the assumption that humans are viewed as benefiting from nature, as opposed to being part of it runs against the socio-ecological framing. The third definition is not sufficiently precise to explicitly confirm or rule out whether human interests are part of what biodiversity is taken to be, but it still endorses the assumption that biodiversity is defined from a perspective where humans are outside nature.

As already mentioned, while it is not entirely clear what ‘Western’ stands for, in the light of this discussion and the historical background one may single out a concept of biodiversity according to which nature has intrinsic value is a new addition. The observation by Schmidt and Doerre (2011) about conservation discourses on the walnut forests never having referred to the inherent value of the forest ecosystem, but rather to various economic interests and actors is relevant in this sense: ‘concepts for forest protection from the colonial period up to the post-Soviet era did not arise from the understanding of an intrinsic value of nature, but were formed through pragmatic arguments to create control systems over these forests’ (2011, 290). While eco-centric concepts of biodiversity may be new in this sense, it should, however, be pointed out that they bring similar drawbacks as the focus on the interests of dominant political actors against local people. The broader problem regarding conservation projects and biodiversity is summed up by Plutynski and Fujita-Lagerquist as follows: ‘this erasure of people from the picture is a symptom of a larger historical tendency by Western environmentalists to ignore the significant role that people play in these diverse places. Biodiversity is at the intersection of a host of political and economic conflicts over land, resources, and power’ (2017, 282). Thus, exclusive focus on biodiversity connected to nature’s intrinsic value or on biodiversity as a resource to be controlled by dominant political actors are both deficient in the sense that they do not incorporate the interests of the local population. Remedying that would require normative concepts that bring the local interests and values into discussion. Thus, my proposal is to drop the Western-non-Western distinction, and instead refer to concepts of biodiversity ranging from eco-centrism to focus on specific sets of values to the incorporation of human activities as essential for biodiversity conservation. As also illustrated in the table above, this last conceptualization is notably missing from the empirical work discussed. While

the definitions compatible with certain normative concepts of diversity leave space for the incorporation of a human perspective, that can be viewed as a part of biodiversity that may or may not be considered, and not as essential to it. Nevertheless, in contrast with the separation between nature and humans presupposed by the definitions above, various indigenous approaches emphasize the inextricable connection between humans and nature (see Pascual et al 2021).[6] Thus, another role of pluralism is to open the way for understandings of biodiversity which incorporate human activity as essential.

Normative considerations in relation to the stakeholders' needs and interests fit in with the tenets of environmental pragmatism. These perspectives are especially important given the social and economic changes following the collapse of the Soviet Union and independence that have rendered the use of the forests one of the means of subsistence for the local population (Fisher et al. 2004, Schmidt 2007, Rehnus 2013). In this context, the economic values are expected to play a central role in how local people understand biodiversity and relate to conservation efforts. This is reflected in studies on the walnut forests, which investigate both matters of fact, such as 'do current levels of grazing and fuelwood cutting cause negative impacts on forest biodiversity?' (Cantarello et al. 2014, 457), but also consider prescriptions to be implemented: 'can analyses of disturbance regimes (…) usefully inform the development of conservation management plans?' (ibidem).

At the same time, eco-centric concepts of biodiversity can also help, particularly in assessing the biodiversity loss and sketching out potential conservation pathways. Given the history of the region, and the recent dominance of market forces in post-independence Kyrgyzstan, building a research agenda independently of these pressures can be part of the process of democratic transition.[7] Eco-centric concepts of biodiversity can help build a broader local research agenda on environmental issues. Past misuses of such concepts need not rule out the possibility of a structure where research aims at the truth rather than at one political agenda or another, which would bring epistemic advantages that Western societies have experienced, while also considering locally relevant aspects. The adoption of eco-centric concepts of biodiversity could help consolidate an autonomous scientific community: while environmental research can serve political or economic interests, scientists should be able to pursue their research regardless of them. Rather than viewing such concepts as Western imports, they could play key roles in enabling the independent development of environmental research specific to Central Asia. This can further contribute to a picture where opting for eco-centric concepts would fall under what Elliott (2017) deems 'clean-

6 I am grateful to an anonymous referee for this point.

7 See Reeves (2005) and Merrill (2011) for a discussion of the involvement of market forces in the post-independence state of higher education institutions – this point can be extended to research.

hands-science': scientists maintaining a detached perspective in conveying the results of their research, without taking sides. While Elliott's discussion focuses on working under uncertainty, this can be expanded to cases of politically contested issues.

Finally, envisioning concepts of biodiversity that take human activity to be essential to biodiversity as opposed to simply viewing humans as benefiting from biodiversity can help open new ways of thinking of conservation. The historical co-existence of human activity and the forests highlights that the two cannot be separated, and this point has been missed by both conservation efforts excluding humans and attempts to control the local population's access to the forest. Expanding biodiversity to this broader scope can also provide space for criticism of past and current conservation policies and open the way for models that explicitly factor in human activity.

Having looked at how the complexity of the case is better captured by pluralism about concepts of biodiversity, I will now illustrate how different concepts can work together by using examples of current research on environmental problems in the area. Relevant contributions include the conceptualization of the forests as 'cultural landscapes', considering the local benefits of environmental projects, and assessing the sustainability of certain economic activities in the context of forest degradation.

a) Forests as 'cultural landscapes'

Work on conserving forest biodiversity in Kyrgyzstan includes conceptualizations of forests as cultural landscapes (Schmidt 2005, Schmidt and Doerre 2011, Fürst and Blank 2014, Fleming 2014). Fürst and Blank (2014), in particular, stress the importance of the walnut forests as cultural landscapes in the light of two sets of considerations: preventing conservation efforts from limiting the local inhabitants' power and resources, and avoiding the classification of what may be anthropogenic (or 'non-natural') as natural (2014, 72-73). The former point stresses that one need not sacrifice either forest biodiversity or human development, and that ways of reconciling the two should be sought. The latter point raises the question of the value of walnut forests from an ecological perspective. While often described as a unique case of walnut trees growing in a natural habitat, research shows them to be anthropogenic (Beer et al. 2008, Cantarello et al. 2014). Viewing walnut forests as cultural landscapes within a system inclusive of the inhabitants and local culture would help avoid further issues regarding what counts as natural, and whether only what is natural should be conserved. The pluralist view about concepts of biodiversity defended here can provide philosophical background for this: normative concepts including the values of the inhabitants would help stress their voice in deciding what should be conserved. Concepts in line with the socio-ecological framing are particularly well suited for stressing that culture is central to the forest

biodiversity. Thus, conservation efforts should go beyond negotiations between stakeholders, to calling for the inclusion of human activity when putting together models. Nevertheless, research into the origin of the walnut forests, and the likelihood of various species becoming extinct under various background conditions would also rely on concepts of biodiversity measured independently from choices about conservation. This is also where my view digresses from the philosophical background assumed by the views above. I take eco-centric concepts of biodiversity, at least ideally, to do more than promote economic or political interests of certain actors, and also enable impartial research.

An interesting consequence of the anthropocentric character of the forests in connection to the debate over concepts of biodiversity is that it would render conservation discourses based on 'wild nature at-risk' inaccurate or inadequate. This would provide support for cases against eliminating biodiversity such as the following: 'Morar et al. (2015) also claim that the use of "biodiversity" is politically inappropriately misleading because it is perceived to be a factual/scientific term rather than a normative one. This may be true, and would be normatively problematic if it were true, but they present no evidence (e.g. survey-based empirical data) to defend this value beyond more traditional ones such as wild nature and at-risk or charismatic species' (Sarkar 2016, 49). While not presenting empirical evidence as such, the case of the walnut forests is a better fit for conservation strategies based on biodiversity than strategies such as 'wild nature at-risk', due to their strong link with human activity.

b) Environmental projects and local problems

From a broader perspective, discussions of environmental projects in Central Asian context require sensitivity to the socio-economic problems in the area. For instance, a review article by Jalling discusses tensions between environmental projects and the social realities of Central Asia, with the following conclusion:

> Environmental awareness is not necessarily a phenomenon confined to rich and developed societies, either on the political or populist fronts. The parlous economic situation prevalent in Central Asia requires, however, that such humanitarian policies as feeding people should take precedence over environmental projects, such as preserving the biodiversity of the region. Nonetheless, environmental projects can both produce money and be of political significance (Jalling 2003, 176).

This approach illustrates the clash between calls to protect biodiversity for its intrinsic value against calls for attending to the local people's needs, while stressing that a focus on the former is not necessarily a 'Western' view. Also, as illustrated by approaches such as ecosystem services,

economic aspects of environmental protection are also present in Western approaches to biodiversity. More importantly, the author suggests that pursuing environmental projects does not automatically lead to a neglect of economic or social aspects. The ability to do so shows that one need not choose one over the other, and that there are ways of approaching environmental issues that can also contribute to development. Once again, this can be viewed as different concepts of biodiversity coming together: biodiversity can be preserved through projects that also assist the local community, with ecological and economic concerns intersecting.

c) Economic activity and sustainability

Attention to local needs can also provide avenues for environmental research or hypotheses to be tested. For example, Cantarello et al. (2014) explore the impact of economic activities on the walnut forests and show that while firewood cutting and grazing together significantly damage the biodiversity of the walnut forests, keeping grazing alongside conservation efforts would be sustainable. This is another example of how conservation efforts can coexists with local people's subsistence activities, and one of the roles of environmental research is to highlight such possibilities. Furthermore, the Cantarello et al. (2014) study also provides a model where features of the ecosystem are modeled together with human activity, illustrating socio-ecological views where human activity is an essential part of biodiversity.

These examples show that conservation efforts can be tied to the interests of the local community, and that conservation and maintaining the livelihood of local communities are not mutually exclusive. This is important especially since the conservation status of the walnut forests in Kyrgyzstan still remains uncertain, with people depending on the forests for subsistence while the forests deteriorate despite legislation such as bans on logging. Discussing concepts of biodiversity in this context has the potential of shaping how conservation projects in the area should be thought of, particularly taking the human perspective into consideration. While the importance of walnut forest conservation has been stressed in several ecological studies (Frohardt 2010, Venglovskiy et al. 2010), the management of the forests is still inefficient due to institutional shortcomings following Kyrgyzstan's independence from the Soviet Union. This brings about worrisome consequences from both environmental and economic perspectives: the loss of biodiversity, soil erosion, and depletion of resources on which people in the region rely for making a livelihood (Hardy et al. 2018). While the forests have suffered damage because of past and present mismanagement, little information is available regarding, for instance, threatened species, and this renders conservation efforts more difficult (Orozumbekov et al. 2015). Thus, both scientific research into the extent and causes of degradation and relevant human activities, and political effort

in fostering deliberation among the local communities and government officials are required to achieve a broader perspective, or a new model.

4. Conclusions

This paper has argued for a pluralist stance regarding concepts of biodiversity, showing how they work in environmental research, as well as in local people's understanding in Central Asian context. According to the view defended here, eco-centric and normative concepts complement one another, the former shaping a research agenda that is not necessarily driven by political or economic influences, and the latter helping to include the local people's interests in conservation efforts. I argued that this approach is preferable to a sharp distinction between Western and non-Western viewpoints when defining biodiversity, because it looks for uses of eco-centric concepts of biodiversity that are not necessarily imposed from outside, and considers local needs and interests. Several directions of environmental research in Central Asia show how multiple concepts can work jointly in environmental research: by considering how both conservation and economic development can be achieved together, and by designing models inclusive of people's economic activities.

More broadly, this approach has the potential of bridging research in conservation biology from different geographical and cultural settings. The emphasis on different concepts of biodiversity at work in environmental research in Central Asia and elsewhere enables a perspective different from simply drawing a line between Western and non-Western perspectives. Likewise, the case for an eco-centric concept of biodiversity is of particular importance in comparable contexts, and this perspective highlights its practical aspects, as well as sketch out future goals in terms of pursuing independent research.

Acknowledgments

I would like to thank the anonymous referees of this journal, as well as one previous referee from *History and Philosophy of the Life Sciences* for feedback that has helped improve the paper. I am also grateful to James Plumtree for exchanging ideas and literature suggestions on the case study.

References

Balvanera, P., Daily, G. C., Ehrlich, P. R., Ricketts, T. H., Bailey, S. A., Kark, S., ... & Pereira, H. (2001). Conserving biodiversity and ecosystem services. *Science*, 291.5511: 2047-2047.

Beer R., Kaiser F., Schmidt K., Arnmann B., Carraro G., Grisa E., Tinner W., (2008). Vegetation history of the walnut forests in Kyrgyzstan (Central Asia): natural or anthropogenic origin? *Quaternary Sci Rev* 27: 621–632.

Cantarello, E., Lovegrove, A., Orozumbekov, A., Birch, J., Brouwers N. & Newton, A.C. (2014). Human Impacts on Forest Biodiversity in Protected Walnut-Fruit Forests in Kyrgyzstan, *Journal of Sustainable Forestry*, 33.5: 454-481.

Convention of Biological Diversity, URL= <https://www.cbd.int/>

Díaz, S. (2019). Why Care About Nature? a Pluralistic Agenda for Biodiversity, in Wyborn, Kalas, and Rust, *Seeds of Change: Provocations for a New Research Agenda* (pp. 62–65).

Douglas, H. (2004). The irreducible complexity of objectivity. *Synthese*, *138*.3: 453-473.

Elliott, K. C. (2017). *A tapestry of values: An introduction to values in science*. Oxford University Press.

Faith, D. (2018). Avoiding paradigm drifts in IPBES: reconciling “nature’s contributions to people,” biodiversity, and ecosystem services. *Ecology and Society*, 23.2.

Faith, D.P. (2021). Biodiversity, *The Stanford Encyclopedia of Philosophy* (Spring 2021 Edition), Edward N. Zalta (ed.), URL = <https://plato.stanford.edu/archives/spr2021/entries/biodiversity/>.

Fisher R J, Schmidt K, Steenhof B and Akenshaev N (2004). Poverty and forestry: a case study of Kyrgyzstan with reference to other countries in West and Central Asia, *LSP Working Paper (FAO)*, Rome.

Fleming, J., (2014). Political Ecology and the Geography of Science: Lesosady, Lysenkoism, and Soviet Science in Kyrgyzstan's Walnut–Fruit Forest. *Annals of the Association of American Geographers*, *104*.6: 1183-1198.

Frohardt K. 2010. *Fruit and Nut Forests of Kyrgyzstan and Tajikistan*. Washington, DC: Flora and Fauna International.

Funtowicz, S. O., & Ravetz, J. R. (1993). Science for the post-normal age. *Futures*, 25.7: 739-755.

Fürst, S. and Blank, S.S., (2014). Natural Landscape or Anthropogenic Environment? A Case Study on the ‘Wild’ Fruit and Walnut Forests in Southern Kyrgyzstan. *Berlin Geographical Papers*, 71.

Gaston, K. J. (1996). What is biodiversity? In K. J. Gaston (Ed.), *Biodiversity: A biology of numbers and difference* (pp. 1–9). Oxford: Blackwell.

Haila, Y. (2012). Genealogy of nature conservation: a political perspective. *Nature conservation*, *1:* 27.

Hardy, K. A., Thevs, N., Aliev, K., & Welp, M. (2018). Afforestation and Reforestation of Walnut Forests in Southern Kyrgyzstan: An Economic Perspective. *Mountain Research and Development*, *38*.4: 332-341.

Ives, M. (2011). Saving Ancient Walnut Forests In the Valleys of Central Asia, Yale Enivornment 360, URL= <https://e360.yale.edu/features/saving_ancient_walnut_forests_in_the_valleys_of_central_asia>.

Jalilova, G. & Vacik, H., (2012). Local people's perceptions of forest biodiversity in the walnut fruit forests of Kyrgyzstan, *International Journal of Biodiversity Science, Ecosystem Services & Management*, 8.3: 204-216.

Jalling, L., (2003). Environmental Issues in Central Asia, in T. Everett-Heath (Ed.), *Central Asia. Aspects of transition*, Psychology Press.

Kareiva, P., & Marvier, M. (2012). What is conservation science?. *BioScience*, 62.11: 962-969.

Kinchy, A. J., & Kleinman, D. L. (2003). Organizing credibility: Discursive and organizational orthodoxy on the borders of ecology and politics. *Social Studies of Science*, 33.6: 869-896.

Leopold, A. (1989). *A Sand County almanac, and sketches here and there*. Oxford University Press, USA.

Longino, H.E. (2002). *The Fate of Knowledge*, Princeton: Princeton University Press.

Maclaurin, J. (2016). Is biodiversity a natural quality?. In *The Routledge Handbook of Philosophy of Biodiversity* (pp. 70-82). Routledge.

Makineni, V., & Sarkar, S. (2021). 'Biodiversity'as a Primarily Normative and Inseparable Thick Concept, URL = <http://philsci-archive.pitt.edu/19562/>.

Maclaurin, J., & Sterelny, K. (2008). *What is biodiversity?*. University of Chicago Press.

Morar, N., Toadvine, T., & Bohannan, B. J. (2015). Biodiversity at twenty-five years: Revolution or red herring?. *Ethics, Policy & Environment*, 18.1: 16-29.

Merrill, M.C., (2011). *Kasha* and quality in Kyrgyzstan: Donors, diversity, and dis-integration in higher education. *European Education*, 43.4: 5-25.

Murphy, D. (2021) Concepts of Disease and Health, *The Stanford Encyclopedia of Philosophy* (Spring 2021 Edition), Edward N. Zalta (ed.), URL = <https://plato.stanford.edu/archives/spr2021/entries/health-disease/>.

Norton, B. G. (2005). *Sustainability: A philosophy of adaptive ecosystem management*. University of Chicago Press.

Norton, B. G. (2015). *Sustainable values, sustainable change*. University of Chicago Press.

Orozumbekov, A., Cantarello, E., & Newton, A. C. (2015). Status, distribution and use of threatened tree species in the walnut-fruit forests of Kyrgyzstan. *Forests, Trees and Livelihoods*, 24.1: 1-17.

Pascual, U., Adams, W. M., Díaz, S., Lele, S., Mace, G. M., & Turnhout, E. (2021). Biodiversity and the challenge of pluralism. *Nature Sustainability*, *4*.7: 567-572.

Plutynski, A., Fujita-Lagerqvist, Y., (2017). Putting Biodiversity Conservation into Practice: the Importance of Local Culture, Economy, Governance and Community Values. In *The Routledge Handbook of Philosophy of Biodiversity* (pp. 281-293). Routledge.

Putnam, H., (1995). *Words and life*. Harvard University Press.

Reeves, M., (2005). Of Credits, *Kontrakty* and Critical Thinking: Encountering 'market reforms' in Kyrgyzstani higher education. *European Educational Research Journal*, 4.1: 5-21.

Rehnus, M., Mamadzhanov, D., Venglovsky, B.I. and Sorg, J.P., (2013). The importance of agroforestry hay and walnut production in the walnut-fruit forests of southern Kyrgyzstan. *Agroforestry systems*, 87.1: 1-12.

Santana, C. (2017). Biodiversity eliminativism. In J. Garson, A. Plutynski, & S. Sarkar (Eds.), *Routledge handbook of philosophy of biodiversity* (pp. 86–95). New York: Routledge.

Sarkar, S. (2002). Defining "biodiversity"; assessing biodiversity. *Monist*, 85: 131–155.

Sarkar, S. (2017). Approaches to biodiversity. In *The Routledge Handbook of Philosophy of Biodiversity* (pp. 57-69). Routledge.

Sarkar, S. (2019). What Should "Biodiversity" Be?. In *From Assessing to Conserving Biodiversity* (pp. 375-399). Springer, Cham.

Sarkar, S., & Margules, C. (2002). Operationalizing biodiversity for conservation planning. *Journal of biosciences*, 27.4: 299-308.

Schmidt, K., (2007). Livelihoods and forest management in transition: knowledge and strategies of local people in the walnut-fruit forests of Kyrgyzstan. University of Reading, Reading, 1–406.

Schmidt, M. and Doerre, A., (2011). Changing meanings of Kyrgyzstan's nut forests from colonial to post Soviet times. *Area*, 43.3: 288-296.

Shigaeva, J., & Darr, D. (2020). On the socio-economic importance of natural and planted walnut (Juglans regia L.) forests in the Silk Road countries: A systematic review. *Forest Policy and Economics*, 118: 102233.

Silvertown, J. (2015). Have ecosystem services been oversold?. *Trends in ecology & evolution*, 30.11: 641-648.

Soulé, M. E. (1985). What is conservation biology?. *BioScience*, 35.11: 727-734.

Soulé, M. (2014). The "new conservation". In *Keeping the wild* (pp. 66-80). Island Press, Washington, DC.

Takacs, D. (1996). *The Idea of Biodiversity: Philosophies of Paradise*. Baltimore: Johns Hopkins University Press.

Ulybina, O. (2015). Participatory Forest Management: The experience of foreign-funded programmes in the Kyrgyz Republic. *Environmental Policy and Governance*, 25.1: 70-82.

Venglovskiy B, Mamadjanov D, Sorg J, Rehnus M, Sarymsakov Z, Abdykakharov B. (2010). *Bioecological Bases for Forestry Management in Walnut Forests of Kyrgyzstan and Their Multifunctional Use*. Bishkek, Kyrgyz Republic: National Academy of Sciences, Institute of Walnut and Fruit Cultures.

Young, J.C., Alexander, J.S., Bijoor, A., Sharma, D., Dutta, A., Agvaantseren, B., Mijiddorj, T.N., Jumabay, K., Amankul, V., Kabaeva, B. and Nawaz, A. (2021). Community-based conservation for the sustainable management of conservation conflicts: learning from practitioners. *Sustainability* 13.14: 7557.