Chapter 9
Strengthening Traditional Environmental Knowledge for the Integration of Social and Ecological Justice

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Introduction

This chapter considers the conservation aspects of increasing deforestation for charcoal production in Ghana, and the way in which Traditional Environmental Knowledge (TEK) relates to this. The previous chapter (Chap. 8 by Strang in this volume) discussed that implementing indigenous beliefs into constitutions is not enough to reach egalitarianism between humans and non-human beings, but that relationality must reach all domains of society. The focus of this chapter is on the role of existing TEK for the implementation of social and ecological justice in the local context of Dawadawa 2, Ghana.

In the transitional forest/savannah zone in Ghana, between the cities of Kintampo and Buipe, there are eight communities along the N10 highway in the Kintampo north district that produce large amounts of charcoal. One of these communities is Dawadawa 2. From January to March 2017 I conducted field research (Thomasberger 2017) on the charcoal supply chain in Ghana. Undertaking participant observation, Dawadawa 2 was my focal field site. I lived for ten weeks among community members, out of which I spent six actively accompanying charcoal producers as they undertook their charcoal production process. Living among community members gave me insights into the reasons why people seek to engage in charcoal production.

The research was separated into two parts: First, I engaged in qualitative data collection. In the second part the collected data was verified among other households in the immediate community, and where possible with residents of other villages in the area. It is through an analysis of this data, collected among farmers who engage in deforestation for charcoal production, that I discuss the integration of social and ecological justice, and why it is necessary for successful conservation in an area of deforestation.

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The need for the integration of social and ecological justice is at the center of the first two chapters of this volume. It has been noted that the ecocentric worldview, affiliated to ecojustice advocates, coheres with (and is influenced by) TEK in terms of biotic kinship ethics (Washington et al. 2018). However, there has not been a lot of discussion regarding what role TEK actually plays for the integration of social and ecological justice in rural and threatened environments in which TEK is still present around the world. 'Threatened' here refers to any activity, such as deforestation, mining or agriculture that may cause damage to the natural environment.

In the following part of this chapter, TEK in general, and in Dawadawa 2 in particular, will be considered. Thereafter, the background of charcoal production and justice will be considered in Ghana. Then the relevance of charcoal production for deforestation and conservation will be stressed. Thereafter, this chapter discusses the relevance of an implementation of social justice with ecological justice, and the role TEK must play in this process and for conservation. The threats responsible for declining TEK will be clarified.

Traditional Environmental Knowledge

TEK is an 'umbrella-term' that refers to a society's (generally indigenous) 'body of knowledge' with regards to the relationship between natural and human entities. One definition, provided by Berkes (1993: 3), defines it as:

> … a cumulative body of knowledge, belief, and practice, evolving by accumulation of TEK and handed down through generations through traditional songs, stories and beliefs. It is concerned with the relationship of living beings (including human) with their traditional groups and with their environment.

With Berkes' definition in mind, the relevance of TEK for conservation should be considered in regard to the integration of social and ecological justice. Curry (2011: 175) argues that "at the heart of non-modern sustainability… is a mixture of local or bioregional scientifically ecological wisdom" which, along with animism and socio-political ethics, makes up TEK. TEK is often reflected in biotic kinship beliefs and a belief in a 'great spirit' and/or attributes personhood to prey animals (e.g. Ingold 2002), wild animals, or landscapes such as mountains or rivers (see Chap. 8 by Strang in this volume). It evolves over time (Berkes 1993) and is applied differently around the world (Taylor 2010; Sponsel 2013). The ecocentric aspect of TEK, which can assist regarding sustainable living with nature, not only makes TEK relevant to the implementation of social and ecological justice, but also makes it intrinsically important for conservation itself. Boafo et al. (2016) note that in Ghana there has been a growing interest in TEK in regard to assisting sustainable resource use in the past decades. However, although a wide variety of TEK has been reported in rural areas (Abayie-Boateng 1998; Appiah-Opoku and Hyma 1999), it seems to be in decline in Ghana (Millar 2003; Gyampoh et al. 2008).

In Dawadawa 2, TEK was predominantly spiritual. As the tribes in Dawadawa 2 migrated to the area around the time when the British commenced building the N10 highway, their spiritual connection to the land in Dawadawa 2 is arguably weaker in comparison to their spiritual relation to their 'homeland'. For example, burial procedures involving spiritual contestations only took place in an individual's 'place of origin'. Meanwhile, people's local ecological wisdom included knowledge about plants, and this was partly reflected through specific taboos that set specific rules and framed their relation to specific animals and plants. For my informants, some wild animals and trees were seen as being inhabited by spirits; the same spirits are seen as also inhabiting humans. This contributed to a reciprocal relation of humans to some beings in nature.

However, although TEK was relatively weak in Dawadawa 2—as the first tribes only arrived some 100 years ago—my research indicates that the real problem seems to come from globalizing modernity; the exploitative 'nature' of neoliberalism's market forces, and consumerism. Regarding its relation to nature TEK can be considered to oppose 'modernity' because the latter is anthropocentric and therefore values nature as lifeless 'matter in motion' (Oelschlaeger 1991), which is assumed to exist as a servant of human development and economic growth (Crist 2012). TEK, on the other hand, is predominantly ecocentric (Curry 2011) and coheres to the realm of ecological ethics, relationality and care for nature with ecojustice. Faced with this context, TEK would be hard–pressed to evolve to counteract modernity. The possible reasons for a decline of TEK in Dawadawa 2 (and arguably all of Ghana) will be considered later.

Background of Charcoal Production in Dawadawa 2

Good environmental conditions for growing rice, maize, beans and yam have attracted migrating farmers to the area. About ten different tribes have settled in the community of Dawadawa 2 to farm on the communal land, under the administrative rule of a chief. From what I learnt during fieldwork, many of its inhabitants retained ties to their 'homeland' in the north.

For the majority of tribes in Dawadawa 2 farming has always been their traditional livelihood, and most of its inhabitants would consider themselves farmers. However, among the last migrating tribes to arrive in the area were the Sissala. In 1978, 46 Sissala tribesmen migrated to Dawadawa 2. They were traditionally blacksmiths, and consequently, experts in the production of charcoal. As a result, the Sissala have progressively introduced their charcoal production knowledge to the larger community. Although it is common in Sub-Saharan Africa for farmers to engage in alternative livelihood activities, such as charcoal production, during the dry season (e.g. Jansen 2010) at the time of my research, the seeds that people were using for the upcoming farming season in Dawadawa 2 were bought using the money they had made from charcoal production. This indicates that charcoal production has gradually

Fig. 9.1 Charcoal is collected after the carbonization process in an artisanal oven. *Photo* Alessio Thomasberger

become the farmers main source of income, and therefore something to rely on (as opposed to a side-activity) (Fig. 9.1).

Approximately 2.2 million Ghanaian households are dependent on charcoal for cooking and heating their homes (UNDP 2014). The cities of Accra and Kumasi alone consume 80% of all charcoal produced (Obiri et al. 2014). Around 98,000 people in Ghana make their livelihood from charcoal (Mafro 2010), making it a significant part of the national economy by providing income and employment. However, in the last 50 years Ghana has lost 90% of its primary rainforest for bushfires, gold mining, agriculture and use for fuel (Mongabay 2006). Deforestation for unsustainable charcoal production on the African continent accounts for a loss of 3 million ha of forest, an area the size of Belgium, annually (Sousa 2017). In Ghana this equates to an average loss of 135,000 ha or 2% of forest per year, which is one of the highest deforestation rates in the world (Gyampoh 2011). Much of the Ghanaian forest loss is due to charcoal production (Obiri et al. 2014). Thus, while charcoal production may secure people's livelihoods, it has disastrous consequences for nature. Dawadawa 2 is a community in the Brong-Ahafo Region, which produces 40% of Ghana's charcoal (UNDP 2014).

Deforestation for charcoal production is supposedly controlled by Ghanaian laws. The 1927 Forest Act was consolidated by the Ghanaian post-colonial government, which declared all forest land, whether private, communal and governmental as forests reserves. Offences towards forests were newly codified with the 1975 Forest Protection Act and the 1998 Timber Resource Management Act condemning and prohibiting all unregistered use of forests reserve land. However, these laws do not seem to be enforced due to the economic significance of charcoal production today.

The Impact of Population

Population growth matters anywhere, as it produces a growing ecological footprint (Engelman 2010). Ghana's population, however, grows at an average of 2.2% per annum, which is one of the fastest growing populations in the world. While in Ghana about 30% of the population are below the age of 14 (Worldometers 2018), in rural Dawadawa 2 it was not uncommon for a married woman to be the mother of 5–10 children. More children result in more intensified subsistence agriculture as the pressure to feed mouths rises. Rising population, therefore, is thus clearly a contributor to deforestation.

The disturbing impact of cattle as well as inconsistent rainfall, which has in the past caused four consecutive years of bad harvests, were reasons for the farmers to engage in charcoal production (Thomasberger 2017). This contextual backdrop of growing economic pressures, combined with population growth, were the central ongoing pressures that drove many of Dawadawa 2's inhabitants to look for alternative land uses, and/or alternative livelihoods.

Farmers were likely to take higher risks under growing pressures. Risks are reflected in their growing dependency on products like fertilizers for intensified agriculture, which has a negative effect on nature. Intensified agriculture does not only refer to the increased clearing and preparing of land, but also a toxification of land, rivers and groundwater, by pesticides and fertilizers and growing CO_2 release (Fianko et al. 2011).

Debt/Creditor Relations in Charcoal Production

Credits from rural banks created long-term debt relations for farmers. Farmers received seeds and fertilizers from their creditor, and some were not able to reimburse their debts. According to my informants, the only possible option to boost their financial income seemed to be part of a local microfinance system based on charcoal production.

The charcoal microfinance system has become the backbone of the Dawdawa 2 community in times of crisis. Central to this were the creditors, or 'Road Side Sellers' who gave credits in form of money to farmers, and received charcoal as payment. They then sold charcoal directly to their business partners, as well as on the market. For the creditors it was crucial that credits were only reimbursed via charcoal production. The relative independence of charcoal production from short-term environmental variabilities, provided farmers the security that they could repay their debts. For farmers, the reasons for entering charcoal debt relations can be succinctly categorized: food, seeds, school fees, donations for funerals, medicine and debts at rural banks. The majority of farmers thus engaged in charcoal production to satisfy their basic needs (Thomasberger 2017).

How Does Charcoal Production Relate to Deforestation and Conservation?

As no meaningful afforestation is taking place in Dawadawa 2, nor for the whole of Ghana, charcoal production is fundamentally unsustainable as it necessitates continued deforestation. Globally, deforestation is estimated to contribute 15% of anthropogenically caused CO_2 emissions (Engelman 2010), threatening life for human and non-human beings alike. Beyond the release of CO_2 emissions, unsustainable charcoal production, in terms of deforestation, contributes to biodiversity loss and thus is a serious problem for conservation.

Conservation by definition is the "preservation, protection, or restoration of the natural environment and of wildlife" (Oxford Dictionary 2018). The general 'tool' of conservation is the establishment of Protected Areas (PAs), which are established to protect wildlife, biodiversity and 'natural resources' (Adams 2009). In Ghana, twenty-one wildlife protected areas have been established, totaling 1,347,600 ha or 5.6% of the country (IUCN/PAPACO 2010). While PAs have greatly increased in the past decades in Ghana (Abukari and Mwalyosi 2018), Wilson (2016) argues that the expansion of PAs to at least 50% of the total land surface of the globe is necessary to curb biodiversity loss. Adams (2009), however, notes that wildlife is not secured by simply expanding PAs, as wildlife is not limited to these areas. Conservation, therefore, is clearly relevant beyond PAs, and the case of Dawadawa 2 is relevant for understanding the problems that conservation faces outside of these protected areas.

What Justice? The Role of Justice for Conservation in Dawadawa 2

The Conflict Between Social Justice and Conservation in Dawadawa 2

Scholars have argued that social, as well as environmental justice, is not concerned with the environment per se, being instead a fair distribution of resources among humans (see Chaps. 1 and 2) (Kopnina et al. 2018; Washington et al. 2018). This makes them anthropocentric (Ibid.). The case of Dawadawa 2 shows why this is insufficient for conservation, and arguably explains why many conservation strategies fail.

Measures for social protection are not at play in Dawadawa 2 beyond schooling and basic medical care. Rising market pressures create social pressures that conflict with forest protection laws. To protect forests, informal chainsaw milling was prohibited by the Ghanaian government in 1998 (Obiri et al. 2014). In 2017, however, it was clear that the law was not being enforced by the responsible institutions in the area where I was conducting my research. The Forestry Commission, the governmental institution

in charge of protecting forests and enforcing relevant laws, was so underfunded that it was unable to replant a sufficient number of trees, and (unwilling to) enforce the law. The same institution receives 1 Ghana Cedi (~0.20 €) in tax fees per bag of charcoal. The Forestry Commission thus relies on income from charcoal production. This is paradoxical as this is a key cause of forest loss. This conflict of interest is undoubtedly key to comprehending why the institution in charge of protecting forests and wildlife is seemingly inactive; because a primary source of funds comes from the commodification of the very forests that it is in place to protect. As stated on the commission's homepage:

> The Forestry Commission of Ghana is responsible for the regulation and *utilization* of forest and wildlife *resources*, the conservation and management of those resources and the coordination of policies related to them (FCG 2018). (my emphasis)

This is clearly operating from an anthropocentric stance. The head Forestry Commissioner of the Kintampo South District—the district to the south of Dawadawa 2—pointed to the economically challenging situation of the farmers legitimizing the absence of law enforcement. In Dawadawa 2, forests on communal land are recognized protection zones from chainsaw milling. However, when social issues caused by the neoliberal market for charcoal arose, their legal protection status was ignored by the very institution that is in charge of protecting forests and wildlife. This is because the Forestry Commission is not really about 'conservation' but the 'utilization of forest and wildlife resources' for humans. This is a typical failure in society, and has been called the 'greater value assumption', an assumption that prioritizes humans before nature (Curry 2011). People are portrayed as having 'greater value', in this case, than trees, and are therefore legitimized to continue resource extraction. This is a short-sighted and anthropocentric approach to conservation, and in Dawadawa 2 it has disastrous consequences for nature. It will also consequently negatively affect humans in the long-term. Prioritizing human before ecological needs leads to a dead end; firstly, the destruction of nature and secondly, it threatens humans (who depend on nature).

The case of Dawadawa 2 shows this clearly: while charcoal production secured the continuation of the farmers' livelihood in the short term, it threatens to destroy the very natural foundation of their livelihood in the long term. Forests produce humidity, which in the form of clouds brings rain; thus forests themselves work 'as a hydrological pump' to bring greater rainfall (Makarieva and Gorshkov 2007). Cutting down forests is not only disastrous for nature, but rural communities in particular are directly dependent on trees, wildlife as well as ecologically biodiverse areas (Gyampoh et al. 2008). In the case of Dawadawa 2 this is clear through the correlation of inconsistent rainfalls and bad harvests. Thus, in the long term, the destruction of nature through charcoal production rebounds on the inhabitants. This shows that prioritizing humans and the market (neoliberalism) before ecological justice is completely insufficient for conservation. Moreover, such a process will simply lead to greater social injustice in the future.

Stressing the relevance of an 'equalization of justice' or, in other words, the integration of social and ecological justice, I pose the question: "Where would a

'fairer' distribution among humans and more 'effective' use of 'resources' in terms of charcoal and forests lead in the case of Dawadawa 2?".

The UNDP (2014), consider the implementation of more effective artisanal ovens for more 'sustainable' charcoal production. This is not a meaningful change to the situation/threats of farmers and their destructive impact on nature at present. More efficient ovens may lead to a short-term economic gain, as people earn more money. However, any efforts of efficiency are likely to be offset by population growth and a growing demand for energy and resources. What is considered 'sustainable' charcoal production by the UNDP would only help people make a living through a *slower* destruction of the natural areas that both humans and non-human beings depend on. This is similar to what Braungart and McDonough (2002) point out; that 'eco-efficiency' at best only *slows* the process of harming nature. Efficiency in this context, therefore, is not sustainable, but simply prolongs exploitation, and does little to solve the problem at its root cause.

Integrating Ecojustice—A Way Towards Bridging the Conflict Between Social Justice and Conservation—And the Role of TEK

Advocates of ecojustice have been accused by some scholars of being misanthropic and have been held responsible for advocating 'green violence' (e.g. Fletcher 2014). Such arguments, however, have falsely categorized the negative effects of wildlife preservation on local human communities in economic terms as well as land rights (Shoreman-Ouimet and Kopnina 2015). The authors of this volume, as well as Shoreman-Ouimet and Kopnina (2015) and Washington et al. (2018) argue that ecological sustainability is really about the reconciliation of social and ecological justice to achieve what conservation is (and should be) about: conservation of nature, biodiversity and geodiversity. A reconciliation such as this is relevant because it can help curb neoliberal resource extraction. Applying justice to 'resources' equates to a more equal protection of human and non-human beings alike. Ecocentrism and ecojustice respect the intrinsic value of non-human beings and thereby counteracts the dominating 'greater value assumption' (Curry 2011) and opposes the sole application of value to nature based on its human utilitarian value (Crist 2012).

Scholars have been arguing that social justice is caught within the same paradigm that is the main cause of biodiversity loss at present—anthropocentrism (see chapters by DellaSala and Washington). Against the backdrop of the sixth—but first anthropogenically caused—mass extinction in the history of the planet, the integration of social and ecological justice advocates a change from anthropocentrism to ecocentrism in conservation. The main difference of the two poles of eco- and anthropo-centrism manifests itself in the way humans perceive and position themselves within the natural world with regards to an applied (or non-applied) moral value to non-human beings (Washington et al. 2018). Ecocentrism operates through

Fig. 9.2 The eyes of a caiman in a nearby river which is used to fetch water, wash clothes and recreation. *Photo* Alessio Thomasberger

respectful relations between humans and nature (e.g. Curry 2011). Such respectful relations to some wild animals were inherent in the TEK of the people in Dawadawa 2. Caimans, were one species that were valued. During the rainy season they could be spotted in the village and in the dry season caimans retreated to the river basins. The same basins were used by the inhabitants of the human community for washing, water collection and recreation. People did not *like* caimans, as every few years a person was killed by one. However, my informants reported that taboos existed on killing them, as in their spiritual beliefs *personhood* was applied to caimans. The people feared them, but caimans and humans had learned to live side by side. This demonstrated a respectful relation between caimans and humans, and adds to the argument that TEK is relevant for conservation as it aids the protection of wildlife. The baobab tree is also perceived as a spiritual being. The tree, however, is scarce at Dawadawa 2, being more common further north in the people's 'homeland'. There, the tree is diminishing due to its prestigious rosewood (ENA 2018). The people's TEK beliefs however would act as an obstacle to its decline. In this case, the spiritual taboo would aid a sustainable use of the baobab tree. In regard to these examples, TEK coheres with ecojustice in terms of *relationality* and *reciprocal relation* to nature (Fig. 9.2).

Considering this cohesion, and taking into account the fact that human well-being is dependent on a healthy ecosystem, TEK has great relevance for the integration of social and ecological justice in conservation. However, in Dawadawa 2 (as in many parts of the world) TEK is in decline.

Threats to TEK in Dawadawa 2

From my research I argue that the economic pressure of globalizing modernity and neoliberal market forces (as well as population growth and consumption) do not leave

the necessary time and physical resources for people to relate to the land outside a context dominated by extractivism. A number of examples show that societies that historically engaged in deforestation also engaged in reforestation (e.g. Fairhead and Leach 1996; Brightman 2015), and this is also true for the Sissala. The Sissala introduced charcoal production to the community, and they also replanted trees *for* charcoal production. However, although other tribes present in the community may have been taught this relational dimension by the Sissala, only their knowledge of how to produce charcoal was still present during my research period. For short-term economic opportunity, farmers were constrained to act anthropocentrically to make their living. TEK in Dawadawa 2 is not predominantly ecocentric (as TEK in some other places is), but of limited spiritual aspect. Through spiritual beliefs, people would relate to certain beings from the natural world. Encapsulated in a neoliberal context, I argue that any reciprocal relationality to other living beings is in decline for the reason of an increasing engagement in neoliberal economic activities. As people's traditional livelihood does not provide enough money to pay for new economic costs, TEK is discarded in favor of anthropocentric neoliberalism, which becomes increasingly dominant (as commonly happens through globalization).

Charcoal production in the neoliberal context influences the farmer to solely perceive the monetary value of trees once turned into charcoal. When I asked about specific trees' names in the tribal language I was told that the names relate to other elements in the natural world. For instance, the 'water-tree' typically grows in a wet area, which is important for the farmer when seeding rice. Regarding charcoal, however, the farmers were predominantly interested in the density of wood which would secure better and greater amounts of charcoal (which equates to money). They knew that X trees would make X charcoal bags and therefore X amount of money. This change of value, I argue, is characterized by a shift of values due to the commodification of what Western society tends to categorize as 'resources' (Crist 2012). The adoption of such 'modern values' is arguably comparable to the 'colonization of the human mind', identified by Kidner (2014), who claims that industrialized systems are the underlying reason for the spread of anthropocentrism. Kidner's words apply here (2014: 6):

> A system based around money, then, not only backgrounds human subjectivity in judging value; it also reduces the complexity of the entire natural order to something much simpler, so that our values, identity, and understanding of the world are uprooted from the natural order and relocated in the industrial system.

Moreover, when discussing low prices and wages for charcoal workers, farmers generally referred to 'the market'. For the farmers, the market decides, and is responsible for their situation.

The majority of the inhabitants of Dawadawa 2 settled the region for more promising conditions to farm in wetter areas with a different local environmental condition to their 'homeland'. As they have not been present in the landscape for very long, it is likely that people's TEK—in relation to the Dawadawa 2 region—is not fully developed. The possible 're-working' of TEK in Dawadawa 2 is further hindered by the growing influence of globalization and modern institutions such as Western-oriented

education. For example, the movie 'Schooling the World' (Black 2010) exposes the negative aspect of schooling on the transfer of knowledge in the 'global south'. In many cases, local ecological wisdom is often disrupted by schooling that favors 'modern' thinking over traditional perspectives, such as TEK. Western schooling gives more importance to educating people to become part of a 'developing' and modern Ghana, in which consumerism increasingly means status (Black 2010). Hence modern schooling is one of many modern institutions that is contributing to the loss of TEK. However, this could change, and schooling could actually be a powerful tool to rejuvenate TEK.

It could be argued that TEK is in decline because people are increasingly restricted to short-term livelihood perspectives. Population growth and growing modern consumption demands drive people to engage in charcoal production to raise extra cash. The engagement in charcoal production (as part of the neoliberal market system) fosters the spread of anthropocentrism and the adoption of modern Western values. Unsustainable charcoal production however destroys nature—and therefore the basis of the people's livelihood in the future. Unsustainable charcoal production thus produces ecological *and* social injustices.

Rejuvenating TEK

With regards to the farmers, solutions that are demanded by the integration of social and ecological justice must go beyond law enforcement. As we have seen with regards to the Forestry Commission, mere legislative protection does little to ensure the protection of forests and wildlife in Ghana, as their protective status often falls in direct conflict with funding for that department. This conflict of interest leads to ecological protective rights being ignored in favor of the neoliberal market, implying that the implementation of top-down law enforcement would have little to no effect in the context of Ghana.

Although TEK is in decline in Dawadawa 2, historically it has been an important way to sustainably relate to nature, which is critically relevant for the aims of conservation. Therefore, I would argue that the promotion of TEK via grassroots movements, environmental NGOs, reforestation programs, and schools and universities is essential. The strengthening of mutual understanding and alliances between these social and environmental institutions is important for successfully integrating social and ecological justice in Dawadawa 2.

To realize a strengthening of TEK, the pressures and threats responsible for the decline of TEK must be analyzed, responded to and alleviated. Central to this situation are the increasing economic pressures that fall upon individual households and small communities due to population growth. Secondly, the growing dominance of modernity and neoliberalism in such societies needs to be reduced. What is evident in Dawadawa 2 is that, beyond the satisfaction of basic necessities, consumerism, neoliberalism and growing material inequalities are equally to blame for creating growing economic pressures. This leads to dependencies via debt relations, the

increased use of fertilizers and GMO seeds, and the growing engagement in charcoal production. These threats drive people into a situation where they feel they have 'no choice' but to overexploit nature, and rely on institutions who cultivate dependencies which, in turn, affects their worldview, leading to the decline of TEK (among other things). As a result, Dawadawa 2 is quickly becoming enveloped within the globalized anthropocentric 'monoculture' that Black (2010) describes. However, a campaign to teach TEK alongside the aspects of ecocentrism, ecological ethics and ecojustice could assist in reducing such globalization. Education is a central institution that must embrace change.

A key element of modernity is its repression of other worldviews, wisdoms and systems of knowledge. It finds itself embedded within the dichotomy between the 'modern' and the 'traditional', and the 'developed', 'developing' or 'underdeveloped' (e.g. Escobar 1991), placing 'traditional' knowledge in a position of inferiority. In order for TEK to strengthen, then, modernity needs to be questioned. The modern worldview is not any realer than any other (Escobar 2017). Taking into consideration the damage the 'developed world' wreaks upon the natural world, if we are to seek a sustainable relationship with nature, it is crucial to question who is more 'developed'; the 'modern' or the 'traditional' (Sponsel 2013).

200 years of modernization has led to human alienation from nature (Washington 2015) which is leading the world towards the sixth mass extinction. Vertebrates have diminished by 60% in just the past 40 years (WWF 2018). To strengthen traditional wisdom, we should underline the fact that climate change, biodiversity loss and increasing inequalities between humans are the direct consequence of decisions taken in the name of anthropocentric 'development'. Informing and educating populations about the negative effects of modernity, therefore, is crucial. Modernity has not only disastrous effects on a planetary scale, but neoliberal resource extraction and the adoption of a modern lifestyle has disastrous effects on a local level, as is the case of Dawadawa 2. Putting emphasis on these negative effects strengthens the importance of local traditional wisdom and people's traditional identity.

How Could the Integration of Social and Ecological Justice via the Empowerment of TEK Take Place?

Breaking with the regime of dominating modernity and population growth, while empowering TEK could be achieved via different mechanisms. In many cases, the transmission of local ecological wisdom is disrupted by schooling that prioritizes the production of 'modern' or 'urban' minds. Instead of preventing the discussion of TEK, schooling has the capacity to do the contrary. Elders and spiritual leaders could be included in school teaching, and 'classrooms' could also relocate to outdoor spaces that are meaningful for the transmission of local environmental knowledge. Universities similarly can play a crucial role in re-establishing the discussion of traditional wisdom and knowledge. An example is the indigenous and intercultural

University 'URACCAN' in Nicaragua, which has just recently (2015) graduated their first medicine graduates using a successful focus of the integration of traditional as well as occidental healing practices in their education (URACCAN 2015).

There are various other grassroots movements that could be promoted. 'Food Sovereignty Ghana' organizes demonstrations against Monsanto and fights against GM seeds in the courts (FSG 2018). Meanwhile, the 'Population Media-Center' (PMC 2018) demonstrates an interesting approach. Through entertainment dramas (based upon scientific behavioral change theories) they have found a unique way to foster positive change. They have been able to tackle issues of population growth, environmental degradation, HIV and women's rights. To date this group has operated in nearby countries but not in Ghana. If they were to operate in Ghana they may become a force for positive change. Also, there is 'ecosia.org' (Ecosia 2018), a non-profit web-based search engine that uses the money raised from commercial ads to plant trees around the world. Since its inception in 2009, they state that they have supported the plantation of over 40 million trees and aim to plant 1 billion by 2020. In Ghana, Ecosia's partner is 'Tree-Aid' (TA 2018), an NGO which recognizes the relevance of trees and nature to make an income for people. While this NGO works in the northern part of Ghana, a recently uploaded video (DGM 2018a) from the NGO 'DGM-Global' (DGM 2018b) filmed in Dawadawa 2 shows the positive effect NGOs can have. In this video, a woman explains that she has just learnt about the connection between trees and rain, and stresses the relevance of replanting trees for their livelihood in the future. For all such environmental NGOs it is crucial that they embrace the ecocentric aspect of conservation. Otherwise they are likely to negatively impact indigenous people in terms of how they value nature (Howell 2017). This would be dangerous, as it could lead to a greater decline in ecocentric worldview. Adams (2017) states that conservation must 'reinvent itself' to find a mid-ground between top-down and bottom-up conservation. Within this 'new approach', whether for grassroots movements, NGOs or governmental conservation attempts, the ethical foundation must be ecocentrism. Based on ecological ethics, valuing the intrinsic value of nature, fostering a reciprocal relation between human and non-human beings, such an approach is necessary to attain the conservation of biological and geological diversity (Washington et al. 2018).

From a governmental level, a challenge for this shift in thought, especially in the 'global south', is that of overseas debt. Susan George, President of the Transnational Institute (TNI), 20 years ago made a calculation of interest and debt repayments, stating that: "Sub-Saharan Africa, which is the poorest part of the world, is paying 25,000 dollars every minute to Northern creditors" (George 1999). Structural adjustments implemented by the IMF during the 1980s and 1990s in Ghana, led to greater resource exploitation for export and increasing inequalities for humans in the country (Konadu-Agyemang 2010). As nature, once extracted, is a source of income to repay debts, overseas debts hinder any progress to implement ecological rights on a governmental level. The establishment of nature as a constitutional entity occurred in Bolivia and Ecuador in the 1990s. In New Zealand a river has now been given 'personhood status' (see Chap. 8 by Strang in this volume). However, governmental

overseas debt relations hinder such progress in many countries, as governments in the 'global south' become obliged to destroy their own environment to pay their debts.

The integration of ecocentric values for nature are under pressure in all domains of society in the context of a modern world dominated by anthropocentrism and neoliberalism. Meanwhile, not only the implementation of ecocentric elements in constitutions are signs of positive resistance and recognition of the relevance of TEK for sustainability. An example can be found in various groups joining together in the recent climate march in San Francisco. Not only was it attended by 25,000 people but it was also led by indigenous people (Scheinman 2018). This shows public acceptance of giving indigenous people a lead role for such actions. Indigenous alliances as the 'COICA', which is an umbrella organization of indigenous peoples in the Amazon (COICA 2018), are growing (Scheinman 2018). This is relevant in regard to a hope for overall social change. The 'climate alliance' (CA 2018) shows that alliances can also be built between indigenous and 'modern' societies, with the central aim being to support and learn from indigenous people and their relationship to nature. This shows that the integration of social and ecological justice via strengthening TEK is most relevant for the aims of conservation in all domains of society.

Conclusion

Traditional Knowledge is still widely spread in Ghana, and in Dawadawa 2 in particular the element of reciprocity in TEK has played a key role for the conservation of caimans. The biggest quest for conservation today, I believe, is in the way that humans re-establish reciprocal relations to non-human beings. Strengthening and re-creating TEK for the integration of social and ecological justice via grassroots movements can help conservation to embrace a reciprocal and caring relationship with nature.

If we took seriously the aims of conservation (the protection of biodiversity and geodiversity), then the anthropocentric conservation shown by the Forestry Commission in Ghana does not, and will not, lead to a fulfilment of these goals, as it prioritizes humans over non-human beings. As a response to neoliberal resource extraction, conservation driven by anthropocentric goals remains unsatisfactory for the broader aims of conservation. It prioritizes humans before nature. This is shortsighted because the inhabitants of Dawadawa 2 depend on nature for a living. To achieve conservation's aims, the integration of social and ecological justice is now necessary. It demands strategies that go beyond a distribution of 'resources' and law enforcement. The integration of social and ecological justice demands a care for nature, and an understanding of relationality between humans and our non-human cousins. This ecocentric approach to conservation coheres with aspects of TEK in Dawadawa 2 in regard to the people's spiritual relation to caimans and the baobab tree. TEK is in decline because, despite its crucial value in nature protection, it is

not about generating extra money to spend in the neoliberal market. And why should TEK consider such ideas, when it is mostly about living *sustainably* with nature?

In order for conservation to be successful there must be a way to strengthen and re-create TEK. For this, the adoption of the destructive modern lifestyle and worldview needs to be modified to find a sustainable middle-ground. To re-create TEK, schools, universities, NGOs and grassroot movements should now emphasize the relevance of TEK for the well-being of non-human and human beings alike. It is of key importance that these NGOs are ecocentric, and based on ecological ethics themselves (see chapter by DellaSala). The integration of social and ecological justice is not just relevant for conservation in terms of strengthening TEK. The re-creation of TEK in Dawadawa 2 in a renewed way could also serve as a way of achieving the integration of all forms of justice via grassroots movements.

References

Abayie-Boateng, A. (1998). Traditional conservation practices: Ghana's example. *Research Review of the Institute of African Studies, 14,* 42–51.

Abukari, H., & Mwalyosi, R. (2018). Comparing pressures on national parks in Ghana and Tanzania: The case of Mole and Tarangire National Parks. *Global Ecology and Conservation, 15,* e00405.

Adams, W. (2009). *Green development: Environment and sustainability in a developing world.* London, New York: Routledge.

Adams, W. (2017). Conservation from above: Globalizing care for nature. In M. Brightman & J. Lewis (Eds.), *The anthropology of sustainability: Beyond development and progress*. New York: Palgrave.

Appiah-Opoku, S., & Hyma, B. (1999). Indigenous institutions and resource management in Ghana. *Indigenous Knowledge and Development Monitoring, 1,* 15–17.

Berkes, F. (1993). Traditional ecological knowledge in perspective. In J. Inglis (Ed.), *Traditional ecological knowledge: Concept and cases*. Ottawa: International Program of Traditional Ecological Knowledge.

Black, C. (2010). '*Schooling the world*' *video*. See: https://www.filmsforaction.org/watch/schooling-the-world-2010/. Accessed: October 20, 2018.

Boafo, Y., Saito, O., Kato, S., Kamiyama, C., Takeuchi, K., & Nakahara, M. (2016). The role of traditional ecological knowledge in ecosystem services management: The case of four rural communities in Northern Ghana. *International Journal of Biodiversity Science, Ecosystem Services & Management, 12*(1–2), 24–38.

Braungart, M., & McDonough, W. (2002). *Cradle to cradle: Remaking the way we make things*. London: Vintage Books.

Brightman, M. (2015). Savage values. Conservation and personhood in Southern Suriname. In C. Hill, A. Webber, & N. Priston (Eds.), *Understanding conflicts about wildlife: A biosocial approach*. Oxford: Berghan.

CA. (2018). *Climate Alliances.* The Climate Alliance. See: https://www.climatealliance.org/home.html. Accessed: November 14, 2018.

COICA. (2018). *Coordinadora de las Organizaciones Indígenas de la Cuenca Amazónica*. See: https://www.sourcewatch.org/index.php?title=Coordinating_Body_for_the_Indigenous_Peoples%27_Organisations_of_the_Amazon_Basin. Accessed November 25, 2018.

Crist, E. (2012). Abundant earth and the population question. In P. Cafaro & E. Crist (Eds.), *Life on the brink: Environmentalists confront overpopulation* (pp. 141–151). Georgia: University of Georgia Press.

Curry, P. (2011). *Ecological ethics: An introduction*. Cambridge: Polity Press.
DGM. (2018a). *Njisam patience on climate change, Dawadawa no. 2. Dedicated grant mechanism*. See: https://www.youtube.com/watch?v=kAoEH0eRzsg. Accessed November 10, 2018.
DGM. (2018b). *Dedicated grant mechanism*. See: https://www.dgmglobal.org. Accessed November 10, 2018.
Ecosia. (2018). *How it works*. See: https://info.ecosia.org/what. Accessed November 12, 2018.
ENA. (2018). *CSOs commit to fighting against illegal rosewood logging*. Environment News Agency. See: https://enaghana.com/2018/10/21/csos-commit-to-fighting-against-illegal-rosewood-logging/. Accessed November 11, 2018.
Engelman, R. (2010). *Population, climate change, and women's lives*. Worldwatch report 183. Washington, DC: Worldwatch Institute. See: http://www.worldwatch.org/system/files/183%20Population%20and%20climate.pdf. Accessed November 25, 2018.
Escobar, A. (1991). *Anthropology and the development encounter: The making and marketing of development anthropology*. Princeton: Princeton University Press.
Escobar, A. (2017). Sustaining the pluriverse: The political ontology of territorial struggles in Latin America. In M. Brightman & J. Lewis (Eds.), *The anthropology of sustainability: Beyond development and progress*. New York: Palgrave.
Fianko, J., Donkor, A., Lowor, S., & Yeboah, P. (2011). Agrochemicals and the Ghanaian environment review. *Journal of Environmental Protection, 2,* 221–230.
Fairhead, J., & Leach, M. (1996). *Misreading the African landscape: Society and ecology in a Forest-Savanna Mosaic*. New York: Cambridge University Press.
FCG. (2018). *About the Forestry Commission Ghana*. Forestry Commission Ghana. See: http://fcghana.org/page.php?page=46&section=22&typ=1. Accessed November 08, 2018.
Fletcher, R. (2014). *Romancing the wild: Cultural dimensions of ecotourism*. Durham: Duke University Press.
FSG. (2018). *Food Sovereignty Ghana*. See: http://foodsovereigntyghana.org/. Accessed November 12, 2018.
George, S. (1999). *A short history of neoliberalism*. Presented at the Conference on Economic Sovereignty in a Globalising World, Bangkok, March 24–26, 1999. See: https://www.tni.org/en/article/short-history-neoliberalism. Accessed November 12, 2018.
Gyampoh, B. A. (2011). *Deforestation in Ghana: Government's incentives and policies*. See: https://benjigyampoh.blogspot.com/2011/10/deforestation-in-ghana-governments.html. Accessed December 14, 2018.
Gyampoh, B. A., Idinoba, M., & Amisah, S. (2008). Water scarcity under a changing climate in Ghana: Options for livelihoods adaptation. *Development, 51,* 415–417.
Howell, S. (2017). Different knowledge regimes and some consequences for 'Sustainability'. In M. Brightman & J. Lewis (Eds.), *The anthropology of sustainability: Beyond development and progress*. New York: Palgrave.
Ingold, T. (2002). Jagen und Sammeln als Wahrnehmungsformen der Umwelt. In E. Mader & A. Gingrich (Eds.), *Metamorphosen der Natur*. Vienna: Böhlau Verlag.
IUCN/PAPACO. (2010). *Parks and reserves of Ghana: Management effectiveness assessment of protected areas*. Ouagadougou: IUCN/PAPACO. See https://portals.iucn.org/library/sites/library/files/documents/2010-073.pdf. Accessed November 25, 2018.
Jansen, J. (2010). What gold mining means for the Malinke, and how it was misunderstood by the French colonial administration. In C. Panella (Ed.), *A world of debts* (pp. 95–110). Amsterdam: Rozenberg Publishers.
Kidner, D. W. (2014). Why "anthropocentrism" is not anthropocentric. *Dialectical Anthropology, 38*(4), 465–480.
Kopnina, H., Washington, H., Taylor, B., & Gray, J. (2018). The 'future of conservation' debate: Defending ecocentrism and the Nature Needs Half movement. *Biological Conservation, 217,* 14–18.

Konadu-Agyemang, K. (2010). The best of times and the worst of times: Structural adjustment programs and uneven development in Africa: The case of Ghana. *The Professional Geographer, 52*(3), 469–483.

Mafro, E. (2010). *Chainsaw milling in Ghana: An overview of the issue*. Wageningen: Topenbos International. See: http://www.tropenbos.org/file.php/213/chainsaw%20milling%20in%20ghana_final%20version%20may%202009_low%20res.pdf. Accessed October 12, 2018.

Makarieva, A. M., & Gorshkov, V. G. (2007). Biotic pump of atmospheric moisture as driver of the hydrological cycle on land. *Hydrology and Earth System Sciences, 11*(2), 1013–1033.

Mongabay. (2006). *Tropical forests Ghana*. See https://rainforests.mongabay.com/20ghana.htm. Accessed November 23, 2018.

Millar, D. (2003). *Forest in northern Ghana: Local knowledge and local use of forest*. Copenhagen: Sahel-Sudan Environmental Research Initiative.

Obiri, B., Isaac, N., Obeng, E., Owusu, F., & Mafro, E. (2014). *Charcoal industry in Ghana: An alternative livelihood option for displaced illegal chainsaw lumber producers*. Wageningen: Tropenbos International.

OED. (n.d.). *Definition of conservation in english by Oxford dictionaries*. Oxford Dictionaries. English, Oxford Dictionaries. See: https://en.oxforddictionaries.com/definition/conservation. Accessed August 12, 2018.

Oelschlaeger, M. (1991). *The idea of wilderness: From prehistory to the age of ecology*. Newhaven, London: Yale University Press.

PMC. (2018). *About population media center*. Population Media Center. See: https://www.populationmedia.org/. Accessed October 20, 2018.

Scheinman, T. (2018). *They won't be able to eat their money*. Amazon Watch. See: https://amazonwatch.org/news/2018/0910-they-wont-be-able-to-eat-their-money. Accessed October 22, 2018.

Shoreman-Ouimet, E., & Kopnina, H. (2015). Reconciling ecological and social justice to promote biodiversity conservation. *Biological Conservation, 184,* 320–326.

Sousa, G. (2017). *Deforestation triggered by charcoal production around the world*. See: http://www.worldatlas.com/articles/world-regions-with-the-highestdeforestation-triggered-by-unsustainable-charcoal-production.html. Accessed: October 12, 2018.

Sponsel, L. E. (2013). Human impact on biodiversity: Overview. In S. Asher & W. Levin (Eds.), *Encyclopedia of biodiversity* (pp. 137–152). Minnesota: Academic Press.

TA. (2018). *Tree aid*. See: https://www.treeaid.org.uk. Accessed November 12, 2018.

Taylor, B. (2010). *Dark green religion: Nature spirituality and the planetary future.* Berkeley & Los Angeles: University of California Press.

Thomasberger, A. S. (2017). "*Today-job*"*—Temporalities, futures and social ties along the charcoal value chain in Ghana*. Masters thesis. Leiden: Leiden University. See: https://openaccess.leidenuniv.nl/handle/1887/56857. Accessed October 12, 2018.

UNDP. (2014). *Nama study for a sustainable charcoal value chain in Ghana*. New York: UNDP. See: http://www.undp.org/content/dam/LECB/docs/pubs-namas/undp-lecb-mdgc-Ghana-Sust-Charcoal-NAMA-Study-2016.pdf. Accessed December 07, 2018.

URACCAN. (2015). *Medicina intercultural*. Universidad de las Regiones Autónomas de la Costa Caribe Nicaragüense. See: http://www.uraccan.edu.ni/medicina-intercultural. Accessed November 15, 2018.

Washington, H. (2015). *Demystifying sustainability: Towards real solutions*. London: Routledge.

Washington, H., Chapron, G., Kopnina, H., Curry, P., Gray, J., & Piccolo, J. (2018). Foregrounding ecojustice in conservation. *Biological Conservation, 228,* 367–374.

Wilson, E. O. (2016). *Half-earth: Our planet's fight for life*. New York: Liveright/Norton.

Worldometers. (2018). *Ghana population* (*Live*). See: www.worldometers.info/world-population/ghana-population/. Accessed August 07, 2018.

WWF. (2018). Living planet report—2018: Aiming higher. In M. Grooten & R. E. A. Almond (Eds.), *World wide fund for nature*. Gland: WWF.