Restoring the forest revives our culture: Ecosystem services and values for ecological restoration across the rural-urban nexus in South Africa

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Abstract

The integration of indigenous viewpoints in Ecosystem Service frameworks and planning processes are often lacking, necessitating a need to integrate diverse perspectives for knowledge coproduction. The study adopts a comparative analysis to explore local perceptions of the diversity of forest ecosystem services and values for ecological restoration among urban and rural Vhavenda groups in the Vhembe District of South Africa. We apply the Common International Classification of Ecosystem Services (CICES) framework to structure ecosystem services to explore how well indigenous perspectives are represented. Rural populations identified the provisioning services of forests as more important compared to urban populations to support subsistence lifestyles with a higher dependence on natural resources. Rural values for ecological restoration were dominated by biocultural restoration objectives to revive indigenous knowledge and local practices and inter-generational learning experiences. Trade-offs exist among urban groups where forests are valued for employment and tourism, and rural groups where the intangible values are associated with the spiritual importance of sacred forests among rural groups. However, commonalities between rural and urban residents also persist with collective objectives to restore biodiversity and ecosystem services, enhance collaborations between stakeholders and stimulate education experiences that draw on indigenous and scientific knowledge of forest ecosystems. Our study points to the challenges of ecosystem service valuation and considers the importance of integrating stakeholder values for informing deliberative decision-making.

Keywords: Biocultural; Ecological restoration; Values; Forest; Ecosystem services; CICES

1. Introduction

Forest Landscape Restoration (FLR) is the process of regaining ecological functionality and enhancing human well-being in deforested or degraded forest landscapes by boosting the world's forest cover to sequester carbon for climate change (Lewis et al., 2019). FLR targets environmentally important areas, marginal landscapes, farm forestry and agroforestry systems by creating spaces for natural regeneration or active restoration (Latawiec et al., 2015). FLR planning requires an understanding of the ecological histories and cultural values of the land because misdirected forest restoration agendas can indirectly incentivise agricultural conversion of ecosystems with naturally lower tree cover and threaten historical grassland biomes (Parr et al., 2014; Veldman et al., 2017). This can manifest when large scale monoculture plantations are planted under the guise of FLR (Veldman et al., 2017). Historically, plantations have displaced indigenous and local people creating conflicts over natural resource management, enhanced poverty risks and negative impacts for employment land and livelihoods for affected communities (Andersson et al., 2016; Malkamäki et al., 2018). In this paper, we use the term Ecological Restoration (ER) defined as the "process of assisting recovery of an ecosystem that has been degraded, damaged or destroyed" (Clewell et al, 2004, p.2) to describe a plurality of restoration initiatives that encompass not only FLR, but also other restoration projects with a diversity of objectives and approaches.

Researchers argue for increased engagement of indigenous and local people and their knowledge in the restoration of their ecosystems (Reyes-García et al., 2019). Indigenous and local knowledge (ILK) can inform ER through the construction of reference ecosystems, species and site selection, informing land and invasive species management and post-restoration monitoring (Uprety et al., 2012). The integration of indigenous and local people in ER offers benefits for building partnerships, addressing value conflicts and fostering community support (Davenport et al., 2010; Fox et al., 2017). However, participation is only

likely to yield benefits under particular conditions: when projects involve indigenous and local people in co-designing ER targeting local territories, offer support for the maintenance of restored areas and recognise local traditions and customary institutions (Reyes-García et al., 2019).

The integration of stakeholder perspectives is critical to understand the linkages between humans and their environment to inform environmental decision-making (Bullock et al., 2018; Paudyal et al., 2018; Raymond et al., 2014). Neglecting how humans interact with ecosystems can contribute to detrimental impacts for the recipients of decision outcomes through loss of identity, knowledge systems, social conflicts and diminished trust (Poe et al., 2014; Turner et al., 2008). Ecosystem services (ESs) is a popular concept for understanding how functions of the natural world support human well-being (MEA, 2005). The Millennium Ecosystem Assessment (MEA) outlines a common framework for ES valuation encompassing provisioning services (e.g. timber, food), regulating services (e.g. water filtration), supporting services (e.g. soil formation) and cultural services (CSs) (spiritual enrichment, cognitive development, reflection, recreation and aesthetic experiences) (MEA, 2005). A number of typologies for classifying ESs have built upon these efforts including the Common International Classification of Ecosystem Services (CICES) (Potschin and Haines-Young, 2016) and the system of Nature's Contributions to People used by the Intergovernmental Panel on Biodiversity and Ecosystem Services (IPBES) (Díaz et al., 2015). A distinction between the MEA and CICES is the exclusion of supporting services from the classification which are treated as part of the ecosystem's underlying structures and processes (Haines-Young and Potschin, 2010). The CICES and other ES frameworks are informed by Haines-Young and Potschin's cascade framework that identify linkages between ecosystems and human well-being transcending from the functional characteristics of ecosystems (e.g.

slow passage of water, or biomass) that give rise to services (e.g. flood protection or harvestable products), benefits (e.g. contribution to aspects of human well-being such as health and safety) and values (e.g. willingness to pay for woodland protection or for more woodland or harvestable products) (Haines-Young and Potschin, 2010). In this paper, value is conceptualised not in monetary terms but "as consisting of a relatively small number of core ideas or cognitions present in every society about desirable end states of existence and desirable modes of behaviour instrumental to their attainment" (Rokeach, 1979, p. 49). Value is a process that resides within individuals as an internal structure of their priorities that can be used to explain the motivations behind human behaviours (Tadaki et al., 2017). In this paper, the 'values-as-priorities' concept is applied to identify patterns of values or priorities for ER and the terms are used synonymously throughout the paper to reflect on what this means for deliberative decision-making.

The representation of indigenous perspectives in ES frameworks and planning processes are often lacking, necessitating a need to integrate diverse perspectives for knowledge coproduction (Tengö et al., 2017). The majority of ER and policies are informed by western scientific epistemologies that apply biological and feasibility criteria to inform decisions for ER rather than local priorities (Tobón et al., 2017). Here ES frameworks can provide a common language for ES valuation for environmental decision-making to foster cross cultural understanding (Lyver et al., 2017). However, ES frameworks are often predicated on an economic approach to ES valuation making the quantification and elicitation of ESs difficult particularly, the articulation of CSs (Gould et al., 2014; Laband, 2013). This is problematic because indigenous people identify CSs such as spirituality, culture heritage, sense of place and kinship that are difficult to quantify (Gould et al., 2014; Lyver et al., 2017). Often market based approaches to ES valuation fail to adequately account for CSs

leading to an inability to identify benefits, costs and trade-offs between different ESs (Kant et al., 2016; Laband, 2013). The intangible nature of ESs and benefits are also problematic because certain ESs can give rise to other ESs (e.g. intermediate services (Fisher et al., 2009)) representing overlapping 'bundles of ESs' that pose challenges for ES valuation (Klain et al., 2014). In this paper, we seek to advance these efforts to improve the integration of indigenous perspectives into ES assessments and decision-making processes for ER using a qualitative approach. We do so using the CICES to structure ES categories as it offers a high level of detail and diversity of ESs relative to other frameworks.

Historically the welfare of local communities in South Africa has been eclipsed from environmental decision-making for managing natural resources (Koch, 2018). Under colonial and apartheid rule, racial policies and the establishment of game reserves on local territories led to the forcible removal of South Africans from their ancestral land and important natural and cultural resources (Constant and Bell, 2017). Post-apartheid, the need to couple conservation with social justice goals has been tantamount to addressing environmental racism in the country (Holmes-Watts and Watts, 2008), through changes in environmental policies to address human rights, development and public participation in environmental management (Holmes-Watts and Watts, 2008; Koch, 2018). The White Paper for Sustainable Forest Development in South Africa (1997) emphasises the participation of stakeholders in policy development and decision-making for environmental management (Government of South Africa, 1997). The National Forests Act (NFA) (Act No 84 of 1998), advocates for the promotion of economic and social development objectives, enhancing greater access to state forests for South Africans and improving equitability in the distribution of benefits from state forests (Government of South Africa, 1998). The Participatory Forest Management (PFM) Policy and Practice in South Africa also delineates principles to adopt a people centred and holistic approach for forest management (Holmes-Watts and Watts, 2008). The Department

of Environmental Affairs (DEA) under the Expanded Public Works Programme (EPWP) has implemented initiatives that address restoration and conservation of ecosystems to provide social benefits through the employment of disenfranchised communities (Turpie et al., 2008). The DEA's Working for Water (WfW) and EPWP Ministerial Determination, implement a range of ER initiatives such as Working for Water, Land, Ecosystems and Woodlands (Favretto et al., 2018).

We focus our research on two different social groups, rural and urban citizens of the Vhavenda clan in the Vhembe District of South Africa: two rural communities of Tshidzivhe and Vuvha and some urban centres of Thohoyandou. In the Vhembe District ER initiatives on community lands are supported by the non-profit sector. The identified villages have been selected as sites for ER by the non-profit organisation Dzomo La Mupo to address degradation of indigenous and riparian forests through tree planting activities to support ES delivery on community rangelands. Since 2015, the organisation operates in the Vhembe District to revive women's traditional leadership positions for land and agriculture, through environmental education and cultural biodiversity preservation. The non-profit organisation seeks to co-design restoration activities in partnership with tribal leaders, communities, and other stakeholders. The EPWP is also operational in the region under the WfW Programme where local people are employed to clear alien and invasive species along riverine environments (Turpie et al., 2008). Therefore, there is a need to explore local perceptions of ESs and values for ER in these areas to inform planning processes for ER. The paper seeks to (1) identify overlaps and differences between urban and rural people's perceptions of forest ESs, (ii) evaluate how well urban and rural people's perspectives of forest ESs are encapsulated in the CICES framework, and (iii) explore and compare urban and rural people's values for forest ER on community rangelands. The paper introduces the study site,

methods, results, and discussion. We conclude with a discussion of the implications of the findings for ES valuation and decision-making for ER.

2. Study Site

The study was conducted in two rural villages (Tshidzivhe and Vuvha) and Thohoyandou located in the Vhembe District of the Limpopo Province, South Africa. The study sites form part of the eastern Soutpansberg Mountain Range in the Vhembe Biosphere Reserve (Fig. 1). The village of Tshidzivhe and Thohoyandou are in the Thulamela Municipality and Vuvha in the Makhado Municipality (Fig. 1). A total of 845 and 2970 people live in the villages of Tshidzivhe and Vuvha respectively, while a higher number of people (69,453) reside in Thohoyandou (Republic of South Africa, 2019b, 2019d, 2019e). In the Thulamela and Makhado Municipality the local economy is centred around agriculture and ecotourism (Republic of South Africa, 2019a, 2019c), although there are high levels of unemployment with a dependency on pension and social grants (Republic of South Africa, 2019a, 2019c). Tshidzivhe and Vuvha demonstrate a reliance on fuelwood for cooking and heating while in Thohoyandou, electricity is the main energy source to meet household needs (Republic of South Africa, 2019d, 2019e).

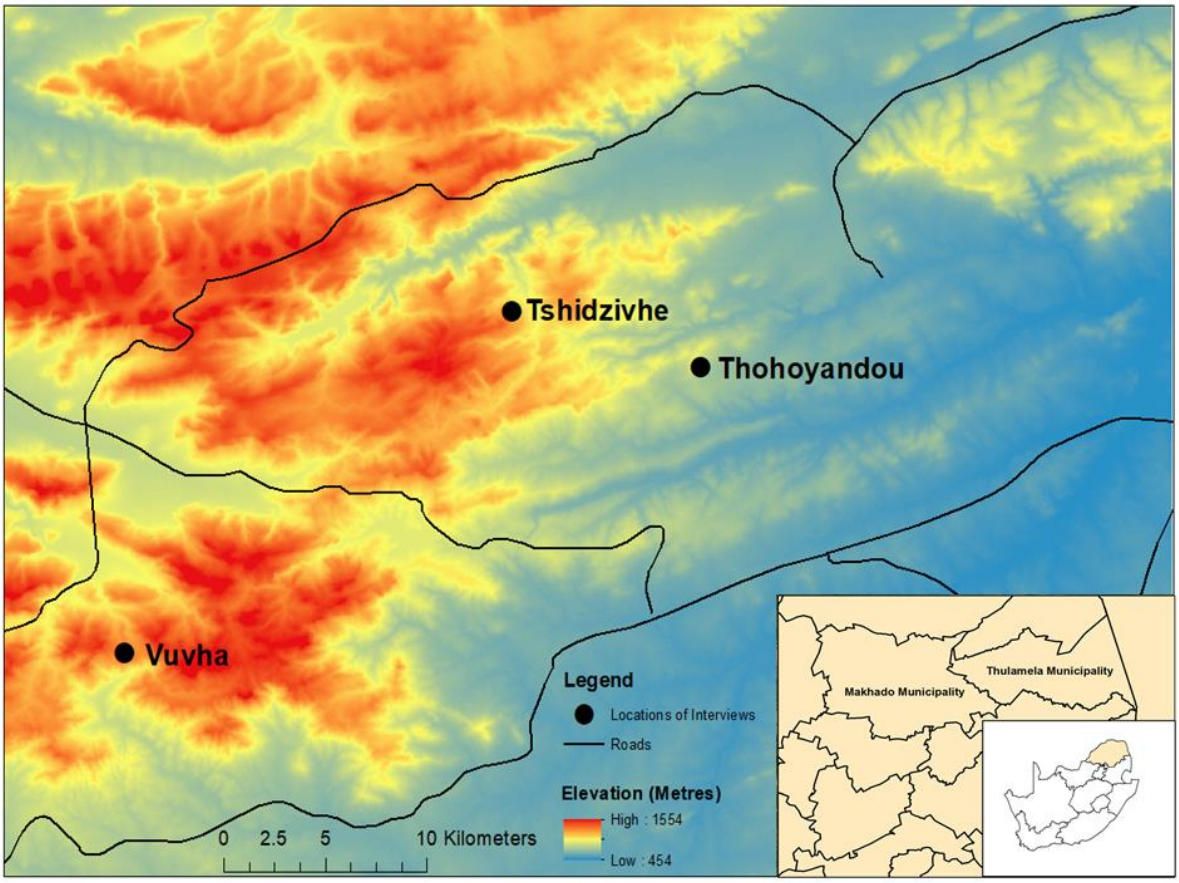

Figure 1: Map of the locations of study site surveys

The region is home to the Vhavenda who are composed of different clans and other smaller nuclear groups (Matshidze, 2013). The first Europeans arrived in the early 1800s, including missionaries, explorers, hunters and land speculation companies. Contestations between the Vhavenda and the first colonisers ensued over conflicts of land and natural resource resulting in ongoing wars between the late 1880s–1900s (Kirklady, 2005). The first missionary church was established in Schoemansdal in 1851 (Tshiguvho, 2008). The missionaries acted as neutral entities during the colonial wars but contributed to the erosion of the traditional cultural practices and belief systems of the Vhavenda (Kirklady, 2005).

During apartheid, Bantustans were created where South Africans were segregated by ethnicity to create territories and 'autonomous' national states (Tshiguvho, 2008). The study site forms part of the former Venda homeland that was proclaimed under the Bantu Homelands Constitution Act Number 21 of 1971, as a self-governing territory (Wuriga, 2005). The establishment of the Thathe Vondo and Entabeni plantations from 1930s-1970s to supply the country's demand for timber coincided with apartheid leading to the displacement of local residents of the village of Tshidzivhe and Vuvha into the lowlands of clustered villages (Nefale, 2000; Republic of South Africa, 2016). In 1994, the homelands were dissolved and re-incorporated into provinces demarcated by the new South African Government (Wuriga, 2005). During 1994, many African populations migrated from the rural to the urban areas of Sibasa-Thohoyandou for employment, education and health care facilities necessitating a demand for infrastructural services such as water and electricity (Wuriga, 2005). Post 1994, several unresolved land claims have been submitted from a consortium of local communities against the plantations. Today, the villages of Tshidzivhe and Vuvha are held in the form of communal tenure. This means the state nominally owns the land, while local Chiefs control the land in their territory and allocate property to communities (Ntsebeza, 2003).

The Soutpansberg Mountain is a centre for botanical endemism in southern Africa and falls under the mountain bushveld vegetation unit of the savannah biome including deciduous woodlands and evergreen montane forests and open savannah (Mucina and Rutherford, 2006). Montane forests and woodlands are confined to river valleys and higher elevations of the mountain in a multi-use landscape comprised of subsistence agriculture, forestry plantations and croplands of tea and fruit trees (Tshiguvho, 2008). The plantations are

managed by Komatiland Forests, a subsidiary of the South African Forestry Company Ltd (SAFCOL) of the Department of Agriculture, Forestry and Fisheries (DAFF).

3. Materials and Methods

Local perceptions of ESs and their values for ER should be described, analysed and evaluated in context (Iniesta-Arandia et al., 2014). We conducted participant observation and semi-structured interviews to generate narratives about the relationships between local people and indigenous forests. Participant observation involves establishing rapport with the study population to observe and document their lives in place, by getting involved in the rhythms and logics of daily life (Jorgensen, 2015). The first author lived in the villages during the field visits and attended local social events. The strengths of participant observation include the identification of unexpected issues, tensions and perceptions which could not have been foreseen through other research avenues. Longitudinal engagement builds trust with informants and provides information about social-ecological processes (e.g. environmental conditions, social-ecological change, uses and activities of ecosystems) to contextualise the research. The fieldwork uncovered and confirmed a wide range of data to be recorded and coded within an ethnographic diary.

Semi-structured interviews are an important method for ES valuation because participants can articulate in their own words why environments matter to them and reflect upon their values to inform better understandings of intangible CESs (Scholte et al., 2015). When combined with participant observation, interviews can also reveal spheres of ambiguity, contradictions and trade-offs in responses. Respondents have greater power over the direction and content of the data produced allowing greater reflexivity of responses and analysis of the origins and interconnections that shape people's values, attitudes and behaviours (Drury et

al., 2011). There are also numerous constraints associated with using semi-structured interviews which can be time-consuming to complete, vulnerable to interviewer bias, the content and depth of responses are dependent on the expressiveness of respondents and require skill and care to conduct and interpret (Drury et al., 2011).

A total of 30 semi-structured interviews were conducted in Tshidzivhe (n = 7) and Vuvha (n = 8) from September-November 2016 and the urban centre of Thohoyandou (n = 15) from October 2018-January-2019. The interviewees were mainly females (56.7%, n = 17) and men (43.3%, n = 13), ranging in age from 34 years to 85 years. Data were collected by working in collaboration with Dzomo La Mupo who acted as a key gatekeeper to access the communities by arranging meetings with the Chief (Khosi) or headman (Mukoma) to introduce the aims and objectives of the study. Each participant was presented with an information sheet and consent form (approved by the Research Ethics Committee of the University of Venda) and all informants were asked to sign consent forms to secure informed consent to participate. We selected individuals through consultation with the Chief and village headmen using a combination of snowball and purposive sampling to select individuals thought to possess a diversity of relationships with indigenous forests (and an even balance of gender and age groups). Semi-structured interviews were conducted in Tshivenda through the assistance of a translator and later translated into English. Semi-structured interviews were between 60-90 minutes and each was audio recorded and transcribed. Questions were open ended and aimed to understand contextual information about participants relationships with indigenous forests in general rather than focusing on a specific locality. The questions explored the: historical relationships and attachment to the areas in which people live, importance of local forests for local communities, aspirations for indigenous forests, priority areas for ER, contributions of ILK for ER and priorities for achieving restoration (Supplementary Information, Table 1).

4. Qualitative Analysis

The interviews were transcribed verbatim and coded using the qualitative software NVivo Version 11 software and coded. We adopted a modified grounded theory approach to interpret the ethnographic and semi-structured interviews that allowed for priori categories/codes coupled with the identification of emergent themes which allow the researcher to identify and apply relevant theoretical frameworks (Emerson et al., 2011). One of the strengths of grounded theory is that it permits the use of a single or multiple sources of data. Grounded theory approaches have been used to analyse qualitative data to delineate categories of CSs (Gould et al., 2014; Stålhammar and Pedersen, 2017). The strengths of this interpretative analysis allow for the identification of novel themes, categories, and interpretations that participants drew upon when describing ESs and their values for ER. Collecting local narratives allows opportunities for local people to speak in their own words to better describe the articulation of intangible ESs, this allows for comparisons between local descriptions and CICES v5.1 framework definitions. Reflexivity is also ensured by making "frequent comparisons across the dataset, the researcher can develop, modify and extend theoretical predispositions so they fit the data" (Emerson et al. 1995, p. 143). The transcripts were coded in relation to dominant narratives that encompass local people's storylines of forest ESs according to our own definitions which were then compared with the CICES classes of ESs. Secondly, the transcripts were openly coded to identify key values for ER of forests.

5. Results

5.1 ESs and Forests

Interviewees defined a range of provisioning, regulating and CSs associated with indigenous forests between urban and rural residents that were categorised into re-occurring themes defined by the CICES v5.1 and Vhavenda descriptions (Table 1).

Table 1: Ecosystem services associated with forests identified in the semi-structured interviews by urban and rural respondents.

Ecosystem Services	**CICES v5.1**	**Vhavenda Descriptions**	**Urban**	**Rural**
Provisioning	Fibres and other materials from wild plants for direct use or processing (excluding genetic materials)	**Medicinal Plants**: Foraging of medicinal plants in forests for treating human ailments		X
	Wild plants (terrestrial and aquatic, including fungi, algae) used for energy	**Fuelwood**: Access to fuelwood for making fires for cooking and heating water	X	X
	Wild plants (terrestrial and aquatic, including fungi, algae) used for nutrition	**Wild Food**: Harvesting of wild fruits from trees, food for domestic and wild animals and the importance of wild foods during times of		X

		environmental hardship such as drought		
	Fibres and other materials from wild plants for direct use or processing (excluding genetic materials)	**Fibres**: Building material for constructing houses, kraals, furniture and domestic utensils		X
Regulating	Regulation of chemical composition of atmosphere and oceans	**Climate Regulation**: Presence of forests regulates the climate and mitigates against the impacts of climate change and periodic droughts	X	X
	Regulation of temperature and humidity, including ventilation and transpiration	**Climate Moderation**: Respite from the sun and trees providing shade in gardens and protection from rain	X	X
	Maintaining nursery populations and habitats (including gene pool protection)	**Habitat Protection**: Support habitats for wildlife	X	X

	Maintaining nursery populations and habitats (including gene pool protection)	**Biodiversity Protection**: The presence of forests for protecting biodiversity	X	X
	Control of erosion rates	**Soil Erosion**: The presence of forests and trees in the landscape prevents soil erosion		X
	Hydrological cycle and water flow regulation (including flood control and coastal protection)	**Water Regulation**: Forests attract the rain, maintain water in rivers and the water cycle	X	X
	Wind protection	**Wind Breaks**: Windbreaks to protect households		X
	Filtration/sequestration/storage /accumulation by micro-organisms, algae, plants and animals	**Water Filtration**: Filter and clean water in low-lying areas	X	X
	Filtration/sequestration/storage /accumulation by micro-organisms, algae, plants and animals	**Air Quality**: Forests filter and clean the atmosphere		X

Cultural	Characteristics of living systems that are resonant in terms of culture or heritage	**Cultural Heritage**: Descriptions of traditional practices related to historical processes and history	X	X
	Characteristics of living systems that enable aesthetic experiences	**Aesthetics**: Beauty of forested landscapes associated with evoking a sense of peace and harmony	X	X
	Characteristics of living systems that enable activities promoting health, recuperation, or enjoyment through active or immersive interactions	**Recreation**: Opportunities for tourists to visit forests for hiking, exploring Vhavenda culture and relaxing in nature, local people enjoy visiting the forests for picnics, swimming and relaxation	X	X
	Elements of living systems that have sacred or religious meaning	**Spirituality**: Forests spoken of in terms of their sacredness and connections (and communications) with ancestral spirits and God; sacred forests represent the	X	X

	abodes of ancestors; specific mention of ceremony (*Thevhula*), including prayers to the ancestors, as places for the performance of rituals; and connecting with plants as sacred objects in homesteads

5.1.1 Provisioning Services

Rural residents identified a wide range of provisioning services of forests for subsistence where wild fruits, vegetables, medicines and wood for fuel and crafts are harvested. Most households supplement their nutritional needs with shop brought items from social grants; however, the monthly income (< ZAR 1500) is often not enough to support large families:

> "The forests provide us with everything we need, we get firewood, foods from the wild fruits, things to build our houses, we don't need to pay for these things, they are free and available to use on our lands. Even those medicines from the trees are keeping us healthy" (R7)

Urban residents discussed the provisioning services of forests in terms of fuelwood use for those with vehicle access. In contrast, the high cost of electricity in rural areas drives the utilisation of fuelwood for cooking and heating water. Urban residents described how

deforestation and the transition of communities toward western lifestyles has reduced local dependence on forests:

> "Today we no longer have those forest, I grow up seeing those birds, I enjoyed, but today we no longer see those animals, children of today don't even see them, they must go to another place to go and see those animals, but when we grew up there they were there in the forest, we are losing a lot of life. Forest give us a lot of things, when we want construction, wood we go to the forest, fire comes from the forests but today our life is no longer connected to what we get in the forest, we do need it anymore, we have our shops and jobs." (U3)

In 2016 the Vhembe District, experienced a drought sparking discussions of the role of forests for supporting rural households during environmental hardships. Women collected Black Jack (*Bidens Pilosa*), Bitter Melon (*Momordica boivinii*) and Forest Inkberry (*Phytolacca octandra*) from forests during times of famine and drought which also forged important social connections between community members. Several people described how the replacement of forests by plantations and herbicides applied by forestry staff has reduced access to wild herbs. Local women have adapted their behaviour to cultivate herbs in home gardens or travel further distances to harvest herbs from forests that continue to supplement diets during drought or other hardships.

5.1.2 Regulating Services

Climate change featured in discussions among urban residents highlighting the regulating services of forests. Urban interviewees observed a connection between the presence of

periodic droughts during 2019 and deforestation driving the decline of water in natural springs and rivers:

> "You see, we use to have many indigenous forests here in Venda that covered all of the mountains. Those forests attract the rain for us, you would see the mist there often, it's a place where rain gathers. But as times change, the pine plantations, came here long ago, which led to the removal of those forests. Today, people are cutting them down to make way for their houses, for human settlement, to make orchards. Our town depends on the rain from the mountains to give us rain. Today it is too hot, we don't have enough rain, or water, it's because of the degradation of those forests." (U6)

Rural and urban residents acknowledged the regulating role of forests for maintaining the water cycle and the filtering abilities of forests to provide clean water for households. In rural areas due to poor infrastructure development and the leaching of herbicides from the plantations; access to clean water is problematic. Most rural households collect water from rivers, streams, and stagnant pools. Urban residents acknowledged the regulating role of forests in rural areas for attracting rain to supply and filter water in lower lying dams for residential towns.

5.1.3 Cultural Services

Rural and urban counterparts demonstrated overlapping CSs in terms of spirituality, cultural heritage, aesthetics and recreation. Rural residents described forests as places to connect with the creator, describing the interrelations between God, life and human well-being:

> "When we were created by God, we were created together with the trees. We live with them; they give us life and it connects us back to where we came from." (R4)

In Vhavenda culture, the spirits of the deceased are said to reside in natural areas such as trees and forests. Ancestral spirits are thought to affect happenings in the real world and are consulted to resolve and provide guidance on individual, family and clan matters. Urban residents frequently associated forests as places to commune with God and their ancestors to seek counsel, resolve conflicts and to strengthen social connections with their families.

Sacred natural sites commonly featured in rural narratives as sacred forests (*Zwifho*) that represent different meanings to different people. Sacred forests are protected by custodians from specific clans of the Vhavenda that represent the abodes of ancestral spirits, are places of rituals, harbour biodiversity and serve multiple ecosystem functions such as attracting rain to support nature and human populations:

> "Sacred forests are for prayer to ancestral spirits by ceremonies and celebrations to ask and celebrate and thank Mupo [Nature] for giving the community the land, the territory, the nature. Communities respected the clan's customs and laws and that is how the ecosystems in these sites were never interfered with or threatened. Sacred forests are very sensitive ecosystems that from the beginning of life were boundaries which were set since creation that no human interference should happen, but only custodians who go there only for rituals and in only a specific required time or period. Even the custodians cannot interfere in this ecosystem, it was a nature law that people do not harvest, fetch, or remove any single thing inside the sacred forests. The Zwifho

> [sacred natural sites] were protected and became a safe habitat for all of biodiversity as trees, soils, stones, animals, insects in these sites, became signs of wellbeing when the custodians were doing their Thevhula [rituals]." (R9)

An especially important feature of sacred forests mentioned by rural residents as the social component of rituals and communal celebrations that strengthen community interactions. The performance of ritual ceremonies was frequently described by urban and rural residents in terms of their reverence for their culture, heritage and finding peace and harmony through consultation with their ancestors:

> "I've heard people talking about the sacred forests, they are all over here in Venda, in fact they are not just forests but natural places. Many Venda's go there for praying and the rituals. You find people here in Venda, are still practicing their culture, their heritage in those places." (U13)

Several urban respondents described how the places of exchange where local people connect with ancestral spirits has transitioned from the forest to the homestead because of limited access to these sites particularly, for urban communities.

Traditional beliefs and practices associated with ancestor veneration have changed due to the imposition of other religious systems such as Christianity. Rural communities expressed deep concern regarding the protection of their sacred forests from outside forces and changing belief systems. Local chiefs in some villages clash with the custodians of sacred forests who desire to use these sites as graveyards for Christian believers. In contrast, the custodians wish to preserve the integrity of these places for traditional ceremonies and biodiversity.

Urban and rural residents valued forests for recreation which were tied to appreciations of the beauty of the forest landscapes and finding a sense of peace and harmony. Rural residents reflected upon their own recreational experiences of visiting the forest during the weekends for picnics, to swim in the rivers and to recharge from their daily lives in the beauty of the landscape. Urban residents' narratives of forests featured aesthetical appreciations of the forest and recreational opportunities for developing tourism facilities close to sacred forests giving examples, of the Phiphidi Falls; an important waterfall used for rain-making rituals by the Ramunangi clan:

> "The forests attract tourists from all over the world, they hear about the Thathe Sacred Forest and Lake Fundudzi and the Phiphidi Falls, they want to visit those beautiful areas in Venda. It's also important for bringing money here, creating jobs, where people can become employed as guides." (U8)

Several rural residents referred to the incompatibilities between tourism and the cultural value of sacred forests which are prohibited from being accessed by outsiders and exploited for commercial gain. Urban residents referred to the importance of plantations compared to rural groups for offering employment in the timber industry and the tensions between the presence of the plantations and the negative impacts these areas have on water availability and biodiversity.

5.2 Values for Restoration

Discourses delineating values and priorities for ER were coded into three central themes: 'Ecological Integrity,' 'Education,' and 'Building Partnerships' these themes were further sub-divided into other themes highlighting emergent topics raised by urban and rural groups (Table 2).

Table 2: Themes and descriptions identified in semi-structured interviews as key values for the restoration of indigenous forests among rural and urban respondents.

Values	**Themes**	**Vhavenda Descriptions**	**Urban**	**Rural**
Ecological Integrity	Preservation of nature	Restoration of forests motivated by a need to protect nature and biodiversity	X	X
	Continuation of life	Restoration associated with the revival of life and human well-being		X
	Ecosystem services	Restoration associated with the maintenance of ecosystem services to support human well-being.	X	X
	Alien plants	Restoration targeted to remove alien plants from disturbing water	X	

		levels in rivers and biodiversity	
Education	Cultural practices	Restoration motivated by the revival of customary laws and practices associated with regulating the use and protection of indigenous and sacred forests	X
	Intergenerational learning and revival of traditional platforms for knowledge sharing	Restoration activities to engage elders and youth in the community to revive knowledge about forests and culture and traditional modes of knowledge sharing (e.g. initiation schools). Restoration activities designed to facilitate gatherings with community leaders and	X

		community members to revive ILK and practices associated with the protection and management of forests		
	Colonial history	Education initiatives designed to raise awareness of the history of land displacement during colonialism and apartheid		X
	Importance of forests and key threats	Restoration activities designed to raising awareness of the importance and threats to forests (e.g. littering, cutting down trees, destroying the environment)	X	X
	Science	Integration of biological subjects into activities	X	

	Integrating scientific and cultural knowledge	Integrating planting activities with traditional clan gatherings where biologists discuss the science of trees and elders share ILK of the forest		X
Building Partnerships	Building alliances	Restoration motivated by a need to build relationships with stakeholders to provide new expertise, funding and tourism opportunities	X	
	Collective action	Restoration activities to emphasise notions of working together rather than alone	X	X
	Autonomy/Independence	Restoration activities designed to build partnerships with outside agencies to help empower communities to build	X	X

		autonomy and independence in their restoration activities		
	Employment	Potential for ecological restoration to create jobs for local people	X	
	Tourism	Restoring forests to create recreational opportunities and accommodation facilities to attract tourists	X	
	Respect	Integration of restoration activities with sensitives surrounding local cultures and the need for mutual respect in developing partnerships with stakeholders		X

5.2.1 Ecological Integrity

Rural groups prioritise the need to restore the biodiversity of forests and the provisioning, regulating and CSs to support community well-being. Rural residents likened the restoration of forests with the symbolic continuation of life, biodiversity conservation and promoting happiness in the community. Urban residents also spoke of the importance of maintaining forests for biodiversity but placed greater emphasis on restoring ESs for supporting water regulation and filtration and mitigating the impacts of climate change. Overlapping narratives of ER of urban and rural residents referred to the success of WfW as part of restoration action by employing impoverished communities. However, some rural communities expressed dissatisfaction with government approaches to removing invasive species of biocultural importance due to different notions of ecological integrity:

> "Those people [Government] remove the trees we need; they say they're invasive like Muluwa [*Senegalia ataxacatha*] that has always kept the cattle from entering the rivers … we were doing conservation ourselves. Now they say it is a harmful thing. Also, the guava, we eat those trees, they also provide habitats and fruits for the birds, we can't remove them." (U6)

5.2.2 Education

Rural residents prioritised the revival of cultural practices and customary laws regulating the use and protection of forests for ER for example, culturally important trees are tabooed from being cut down and used as firewood or in homesteads. Rural residents described how women collect and propagate the seeds of important edible and medicinal plants in home gardens to access declining wild populations. Traditionally laws were also in place to promote the sustainable harvesting of selected plant and trees to prevent overexploitation:

> "In the past when we grew up we had rules we follow, we need to build the logs from the tree, we were guided when you go to fetch the pole trees, if you see five poles you don't cut all of them you take one or two and go to another tree. The tree should survive and continue life. There were rules to guide about getting medicine from the trees, if you need a root you don't kill the tree, you extract it from the side and put the soil back. If you need bark, you go from a certain side of the tree and take the bark and leave to allow the tree to continue to live…The foundations or springs where rivers are started, you must not build a cultivating field. We learn this through practice, not without laws or customs." (R7)

Rural community members described prohibitions against the collection of natural resources inside sacred forests such as fuelwood and cutting down trees. Taboos prevent the entry of non-clan members inside sacred forests and certain protocols must be adhered to cultivate notions of respect. As a deterrent against unwarranted use of sacred forests rural residents recite stories of punishments inflicted by unknown spiritual phenomena that prevent improper use of these areas. Rural residents expressed concerns that indigenous ways of protecting forests are eroding due to changing values among youth and reduced opportunities for knowledge exchange across generations. Traditionally, knowledge of the forest was shared through storytelling, initiation ceremonies, clan gatherings and lived experienced working on the land:

> "Like, people were respecting forest because they learnt from indigenous ways. Like indigenous school, or initiation school. They happen at the chief's palace and mostly in the forest, where the peoples spend more time in the forest and after that training,

> they respect the forest and they don't chop the trees, because they know this is their forest. Also it is their home for their trainings and when they come back they respect the local trees." (R10)

Justifications for the revival of cultural knowledge practices sought to address the histories of colonialism and apartheid. Land displacement and fragmentation of clan members is associated with a lack of social cohesion within communities, the erosion of sacred and indigenous forests and changing cultural beliefs:

> "Scattering of our clan in different places where we no longer stay together as one clan. It has brought a huge impact while we no longer stay together because the impact is, we no longer sit together with our children, as the children of the clan and the leaders, in unity' (R3)

Rural residents identify a need to strengthen inter-generational learning opportunities where elders and youth exchange ILK of forests and integrate teachings of the colonial and apartheid history to engage youth in understanding the root cause of environmental and social problems. Urban and rural residents shared the perspective that advancing knowledge of the importance and threats to forests were equally important. Urban residents described the importance of using ER projects to teach biological subjects to inform communities and youth about the drivers of deforestation. Rural residents also offered solutions for integrating scientific and cultural knowledge by interlinking tree planting with traditional clan gatherings where biologists could be invited to talk about the "science of trees" and elders share knowledge of the cultural importance of forests.

5.2.3 Building Partnerships

Urban residents identified the importance of forging partnerships with other stakeholders through ER to provide new expertise, funding and tourism opportunities. Generating alliances was seen as a strategy by both groups to take collective action. Urban residents more greatly recognised the power of working with government and scientists as a strategy to help communities regain independence and autonomy:

> "This helps people to become independent, it gives them confidence to start something good for their communities, maybe even bringing new opportunities here like tourism, I see restoration of the forest as bringing new opportunities here. We need to develop these forests to attract foreigners here, building accommodation, making new things happen."

Only urban residents identified employment and tourism as important priorities for ER to create economic opportunities for local communities. Urban residents identified the plantations as a neglected source of employment and the importance of the WfW programme as a 'win-win' approach to meet ER goals and to secure jobs for local people. ER was linked to bolstering the values of forests as tourist attractions for recreation by building accommodation, picnic sites and hiking trails to encourage economic investment in rural areas. However, rural residents viewed engagement with outside agencies with suspicion detailing accounts of the histories of land displacement by government and current interactions with forestry staff. The history of land displacement permeates discourses surrounding the plantations as an example of the 'white man's lies' and contributes to ongoing distrust of outsiders and government actors:

> "We have had trouble with outside people when it comes to matters of our land. We have been pushed back onto poor land because of the white government in the 1970s. And, when we speak with the plantation people about the damage caused by the pesticides they leach into our water, they don't respond in a good way. So, we are always suspicious, people have their own agendas, they look down on our ideas and it is our land, we are the decision-makers here." (R4)

6. Discussion

6.1 ESs across the Urban-Rural Nexus

The variety of ESs of forests expressed by Vhavenda people is dependent upon access to forests and resource use patterns (Paudyal et al., 2018; Zoderer et al., 2016). Changing social-ecological conditions have shaped the importance and loss of different ESs over time, negatively impacting human well-being. Rural residents living close to forests demonstrated extensive knowledge of provisioning services compared to urban groups (Republic of South Africa, 2019e). Where wild or semi-wild lands are converted to intensive land uses, the resources previously used by local communities are lost, therefore, some communities adapt their behaviour to acquire other resources as alternatives (Shackleton and Pandey, 2014). Rural residents discussed the historical role of forests for gathering foods and medicinal plants which serve as 'famine foods' during drought, or financial and social hardships (Constant and Tshisikhawe, 2018). Climate change-induced drought and conversion of community lands to plantations negatively impact food security, forcing women to adapt by traveling further afield to source the seeds of rare herbs and plants that are propagated in home gardens (Constant and Tshisikhawe, 2018). Urban interviewees depended less on forest resources for subsistence, relying on store-purchased food and electricity instead of fuelwood

for cooking and heating water, a trend that is suggested to increase with growing urbanisation (Cocks et al., 2012; Uhunamure et al., 2017). Across the urban-rural nexus, anthropogenic impacts on forests (e.g. deforestation, plantations, subsistence agriculture) are perceived as a contributor of drought and declining water flow in rivers. The Vhembe District is characterised by variable rainfall patterns, contributing to flooding and droughts that are exacerbated by land cover changes, increasing local temperatures, evaporation rates and water losses for local communities who depend upon streams and stagnant pools for water and to feed dams in lower-lying towns (Kundu et al., 2015).

Our findings allowed for the identification of different opportunities, conflicts and trade-offs associated with forest activities. In Vhavenda culture, sacred forests are valued for their cultural and spiritual practices for example, as places for ritual ceremonies to connect with ancestral spirits and God, such as the good harvest celebrations and first-fruit ceremonies (Matshidze, 2013). During these ceremonies, *Nwali* (God) and ancestral spirits are thanked for the sharing of the year's harvests and newly ripened fruits (*Thevhula*) through the pouring of beer into clay pots, as a libation and offering to the ancestors (*U Phasa*) (Matshidze, 2013). Traditionally, these ceremonies were used to maintain harmony within the community by placating ancestors after a period of disease, bad harvests and a lack of rain (Mabogo, 1990; Matshidze, 2013). Ritual ceremonies are also conducted to facilitate important social interactions with clan members and to cultivate traditional forms of respect (Constant and Tshisikhawe, 2018).

In contrast, urban populations favoured the utilisation of sacred forests for tourism. However tensions exist between modern traditional leaders and sacred site custodians who seek to derive economic benefits from sacred natural sites. In 2007, Jerry Tshivhase a Vhavenda headman, sanctioned the development of chalets above the Phiphidi Waterfalls, a sacred site of the Ramunangi clan leading to prohibitions against the performance of their rain-making

rituals (Ross, 2017). Similarly, the promotion of tourism activities inside the Thathe Vondo Plantation resulted in the development of a hiking trail for tourists through the sacred forest of the Tshidzivhe clan that has generated conflicts with sacred site custodians (Holmes-Watts and Watts, 2008). The creation of a road through the centre of the sacred forest has also allowed tourists to enter the site unsupervised; however, sacred natural sites are deemed invaluable to Vhavenda culture to which access to outsiders is prohibited (Ross, 2017).

Plantations, sawmills and timber processing facilities are a low provider of local employment and income generation (Ofoegbu et al., 2017), possibly due to the outsourcing of operations to contractors who employ people from other areas of South Africa. Plantations feature in local narratives as a cause of land displacement, forest degradation and ES loss (water quality, availability and food security) and they contribute to the erosion and distribution of sacred forests and loss of access and control of these sites (Tshiguvho, 2008). Alien species are targeted using herbicides which rural and urban community members fear is contributing to water and soil contamination in downstream rivers echoing other studies in the area (Munyati and Kabanda, 2009). Plantations have the potential to damage the cultural integrity of communities, but also the knowledge, practices and social connections linked to these sites. It also likely that the potential benefits of income and employment are unlikely to outweigh the costs of plantations in terms of environmental damage and the loss of ESs.

6.2 Indigenous Perspectives and CICES Framework

Our findings demonstrate that forest ESs could not always be defined into discrete categories framed by the CICES particularly for CSs. Rural and urban communities' spiritual relationships with forests into CICES categories risks oversimplifying the interconnectivity

and depth of human-forest relationships. Some aspects of local people's spiritual relationships with forests could be categorised under the CICES category 'characteristics of living systems that enable scientific investigation or the creation of traditional ecological knowledge' (Haines-Young and Potschin, 2018). Cultural practices protect and maintain sacred forests for biodiversity protection, but also allow mechanisms for local people to connect spiritually with the land, ancestral spirits, and God. These activities constitute a significant component of ILK systems, through the transfer of knowledge, cultural heritage, finding peace, harmony and strengthening social connections. However, the majority of respondent narratives highlighted the interconnected and interdependent qualities of ESs. We found that the provisioning of foods and medicines from forests benefit human well-being, quality of life, food security and social cohesion. Similar findings show the interconnections between the collection of food and the establishment of social relations by spending time with friends (Pröpper and Haupts, 2014). In both rural and urban residents, recreation was linked in multiple ways to aesthetics and cultivating harmony and peace (Hauru et al., 2015). Local people's spiritual relationships with forests also represent interconnecting CSs. Similar research on the cultural meaning of forests demonstrates the linkages between spirituality, heritage and cultural identity (Gould et al., 2014). A focus on the single categories of ESs defined by the CICES can overlook the inter-dependence of multiple ESs and benefits. This poses a challenge for ES valuation and risks of double counting of ESs and benefits; necessitating a need for clear definitions between intermediate and final services (La Notte et al., 2017).

In the cascade model, ESs are indicated as final services, while biophysical structure and function are indicated as supporting or intermediate services (Haines-Young and Potschin, 2010; Potschin and Haines-Young, 2016). The latest version of the CICES v 5.1 does not

classify the underpinning intermediate or supporting services of ecosystems. Rather, the CICES addresses the final services (the contribution that ecosystems make to human well-being as flows) that link to the goods and benefits that are valued by people (goods and benefits are created or derived by people from the final ESs) (Haines-Young and Potschin, 2018). Double counting of ES can be overcome where only the benefits from final services are aggregated for the purposes of economic valuation but this could also be criticised as overtly reductionist; particularly for CSs (La Notte et al., 2017; Lyver et al., 2016). On the other hand, consideration of the complex interconnected bundles of services can promote awareness of the benefits of restoring multiple ESs to garner public support and incentives for ER (Deal et al., 2012; Townsend et al., 2012)

6.3 Values and Priorities for Restoration

Across the urban-rural nexus, priorities for ER were motivated by objectives to preserve biodiversity and restore ESs following other studies (Lyver et al., 2016). However, priorities assigned to ESs depended on community needs, perceived benefits and spatial relationships. Rural residents placed greater emphasis on the restoration of provisioning services while urban communities assigned higher priority to regulating services. Natural resources located in rural areas provide important provisioning services for rural communities for their basic needs and survival are often more vulnerable to degradation than in urban populations (Alexander et al., 2016). The supply of provisioning services (e.g. timber, or food generated from forests or agriculture) and regulatory services (e.g. mitigation of stormwater runoff due to the presence of rural forests) directly provide for urban populations (Alexander et al., 2016), but these services are often unappreciated and spatially disconnected from their immediate environment (De Lacy and Shackleton, 2017).

Rural residents advocate for enhanced awareness of the importance of cultural practices that could support ER and the revival traditional platforms for intergenerational knowledge sharing, aligned with 'biocultural restoration' initiatives (Walsh et al., 2013; Wehi and Lord, 2017). In African societies, cultural practices, taboos, myths and restriction of access to sacred natural sites have protected forests as refugia for biodiversity, providing important lessons for natural resource management (Tshiguvho, 2008). We show that ILK can be integrated into ER projects by (1) promotion of selective harvesting practices of trees to promote the recovery and protection of ecologically and culturally important species, (2) propagation of seedlings of threatened species by women to support tree planting initiatives, (3) the revival of customary rules and regulations to protect riparian forests and prevent the cultivation of agricultural fields close to these areas, (4) revival of normative and moral codes of conduct that contribute to the maintenance of sacred forests, and (5) enhancing understanding of local commercial use of key alien or invasive species.

Education was also identified as a mutually important priority for ER across urban and rural groups. The complex issues of ER require a diversity of intellectual approaches that can benefit from a thoughtful integration of ILK to inform contemporary relationships with the natural world and the science of restoration ecology (Kimmerer, 2012). Rural residents' assertions to integrate colonial teachings into education programmes for ER was not surprising considering the historical grief of colonisation, apartheid, acculturation and erosion of indigenous knowledge systems. Education initiatives designed to synthesise contributions from ILK and science for ER should be designed according to the sensitivities of colonial history, which in turn requires trust building (Rathwell et al., 2015), a significant barrier identified in this study.

Participatory natural resource management was also an important priority identified in both urban and rural communities to foster local autonomy, challenge institutional power relationships and build individual and collective agency (Constantino et al., 2012). Local participation in ER planning can benefit both practice and policy by informing more effective decision-making, enhancing legitimacy of policy and reducing the risk of conflicts (Baker et al., 2014). However, participation cannot be viewed as a panacea for ER particularly in circumstances where there have been unsuccessful engagement attempts, insufficient resources, or a poor culture of participation (Reed et al., 2018).

Legislative support for participatory nature resource management in South Africa, is not matched by practice on the ground. Indeed, Holmes-Watts and Watts (2008) identified several critiques that have limited the integration of social justice and sustainability goals for Participatory Forest Management in South Africa. A Participatory Forestry Framework developed under the Department of Water, Agriculture and Forestry in state forests embraces a participatory approach to the rights of those with forest management concerns. Since forestry officials may lack the understanding and skills of participatory processes, collaborative forums between forestry and other stakeholders often lead to poor representation of community groups and the accruement of benefits to politically connected and wealthier individuals before local people. Participation is often equated with offering employment benefits in the forestry sector, but this means that local people work as labourers rather than developing capacity to establish their own enterprises.

Similar findings can also be encountered across ER projects in South Africa (Favretto et al., 2018). In our study site, local support for the WfW programme is likely to be higher among a growing urban population due to better alignment of biodiversity and economic goals. In this South African programme, environmental policies for restoration primarily address human

development goals by raising employment through labour intensive alien species removal as the main tool for achieving job creation (Favretto et al., 2018). However, ER projects that engage local communities only for labour are often economically unsustainable because of insufficient resources, high costs of land, employment and alien-clearance operations (McConnachie et al., 2016; Reyes-García et al., 2019). Several restoration programmes across South Africa have been criticised focusing on short-term labour benefits at the expense of wider ecological and social outcomes such as raising awareness, knowledge generation training and capacity building (Favretto et al., 2018). This follows from the absence of an institutional culture of public participation culminating in a top-down approach to natural resource management where communities play passive roles (Holmes-Watts and Watts, 2008).

Successful implementation of ER also requires a level of co-operation between different actors in both the public and private spheres that may hold different and not always compatible views (Baker et al., 2014). In our case study, traditional leaders are key gatekeepers to access communal rangelands as they retain political agency and land ownership rights to their land (Ntsebeza, 2003). Restoration projects involve government, municipal authorities, state forestry and the NGO sector. However, distrust toward government actors across all levels was commonly highlighted by rural residents. Our study emphasises the need to understand power asymmetries between different actors and to consider this history and its residue of ongoing distrust and cultural erasure. Distrust prevents effective participation due to prejudice and negative stereotyping, minimising willingness to cooperate, obstructing dialogue and inciting conflicts between different parties (Davenport et al., 2007). To broker trust and legitimacy among diverse actors, bridging organisations can mediate between formal government and communities (Yeboah-Assiamah et al., 2016). In our case study, NGOs serve as bridging organisations to neutralise or reduce ‘legitimacy

deficits' to foster collaborations with other partners such as government or the forestry sector (Yeboah-Assiamah et al., 2016).

Yeboah-Assiamah et al (2016) identify several factors that can build common ground for collaboration such as fostering a sense of place or community and developing a common vision where collaborative projects begin with a strong identification of a geographic location, biophysical feature, or community. Such collaboration with target communities may encourage different partners to adopt a collective identity associated with an important resource, such as participation in community events like clean-up campaigns, sports and cultural festivals linked to the local environment (Yeboah-Assiamah et al., 2016). Collaborations can also be positively enhanced by the physical proximity of stakeholders through the shared benefits of geography, language, common values and social norms (Yeboah-Assiamah et al., 2016). In our study, the NGO Dzomo La Mupo is implemented by local people who have a history of operations in the region and share local visions for ER that align with rural populations, allowing the integration of biocultural objectives into ER programmes. Here, when resource degradation is interlinked with the erosion of cultural values, linking cultural revitalisation with ER may serve as a motivator for garnering community support (Lopez-Maldonado and Berkes, 2017).

6.4 Limitations and Future Research

Our small and purposive sampling design allowed more in-depth contextual exploration study of the ESs and values for ER but precluded drawing conclusions about a larger population. Through an exploration of meaning, heterogeneity and contradiction our approach promises a better understanding of the social-ecological complexities behind human behaviour. Due to spatial and temporal differences between the timing of interviews for urban and rural

populations, our study offers only a snapshot in time of local perceptions across the urban-rural nexus.

Our research methods focused on individual valuation of ESs and values for restoration however, recent developments across the behavioural psychology, neuroscience and social anthropology sciences have also shown that human decision-making is not only an individual, but also a social process (Parks and Gowdy, 2013). Embracing group level decision-making to elicit social valuation of ESs through deliberative valuation can guide social decision-making; offering promising avenues for future research to assess multiple stakeholder perspectives (Wilson and Howarth, 2002).

Some aspects of ESs lend themselves better to quantitative modelling whilst others are better articulated through qualitative means and discourses. Our study did not quantify the importance of different ESs using contingent valuation methods (Soto et al., 2018). However, our findings caution against the use of economic approaches for ES elicitation particularly regarding CSs. Such questioning styles be met with resistance or indifference among some indigenous communities because responses are based on a cash metric or agreement with survey questions about ESs that conflict with indigenous worldviews (Lyver et al., 2016). The CICES definition of value considers that ES values represent different preferences for decision-making (Haines-Young and Potschin, 2010). However, not all ESs can be interpreted as such (Gould et al., 2014). Similarly, interconnected provisioning, regulating and CSs as observed in this study cannot easily be separated making it difficult to weigh intangible CSs against the more tangible provisioning and regulating services that can be more easily quantified. This highlights the difficulties associated with the valuation of people's more intangible relationships with the natural environment and the fundamental differences between interpretivist and positivist approaches to ES valuation.

We conclude that the strengths of our qualitative approach offer several advantages: (1) respondents have power over their own responses which captures the depth and interconnections of different ESs and values, (2) an analysis of the characterisation and the context dependent nature of ESs and values, (3) narratives allow for the identification of synergies, contradictions and trade-offs between what people say and do, connecting information about respondent perceptions and behaviours and (4) allows for the identification of unanticipated issues and greater reflexivity to capture a diversity of responses.

6. Conclusions

In this paper, we adopted a comparative approach to understand local perceptions of the diversity of ESs, values and priorities for the ER of indigenous forests among Vhavenda urban and rural groups. Rural populations identified the provisioning services of forests as more important compared to urban populations due to subsistence lifestyles and the transition of urban populations toward a lower dependence on forest resources. Across the urban-rural nexus, local populations demonstrated overlapping forest CSs with spirituality, cultural heritage, aesthetical and recreational services of forests. Urban residents also demonstrated the expression of more commodity aspects of forests associated with employment of the plantations, through tourism and building recreational opportunities for tourists.

Our study reveals that the CICES framework does not adequately represent diverse perspectives or account for the interconnected dependence of different ESs and values. Current research on sociocultural values (Iniesta-Arandia et al., 2014) and new social value frameworks (Paudyal et al., 2018), coupled with deliberative approaches (Bullock et al., 2018) can help to capture the plurality of stakeholder perspectives. An exploration of the opportunities and barriers for participation and trust building under different forms of ER

governance will contribute further to identifying factors that contribute to participatory management.

ER planning is a process of balancing and contrasting competing values and interests; therefore, our study contributes to identifying the distinctions that emerge between different recipients of ER to provide input for deliberative and informed decision-making. The process of ESs and value identification can help to address issues of social justice in social-ecological management (Lauer et al., 2018) by elucidating the impacts and trade-offs of different decisions.

The opportunities that arise from integrating sacred sites, indigenous values and traditional forms of natural resource management into ER projects may serve as novel ways to engage and incentivise local people in this setting. Trade-offs exist between the expression of more commodity driven concepts of nature where values for ER focus on enhancing employment and tourism among some urban residents, that contrast, with the competing cultural values and uses of sacred forests among rural groups. On the other hand, joint values to restore biodiversity and ESs, prioritise education goals and forge new partnerships may build common ground among implementing agencies and urban and rural communities for ER.

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