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Conservation and indigenous cultures: learning from the Yanadi community in the Eastern Ghats, India

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ABSTRACT. Biodiversity conservation in the Global South is defined and implemented through multiple approaches and frameworks, but in most cases, there is little understanding or value for cultural ecosystem services (CES). CES remain a challenge to incorporate, not only because of their intangibility, but also because of multiple definitions and specificities that emerge from particular human–nature interactions. In India, CES literally and figuratively form a critical part of the social fabric of rural communities. Hence, there is an imperative to acknowledge CES broadly, but also more critically within indigenous communities whose lives continue to revolve around natural resources. Here, we examine CES in part of the Eastern Ghats, southern India through the lifeworld of the Yanadi or Irula people, who shape their lives around the forests, successfully adapting to scarcity and dealing with present-day challenges that threaten their existence. Drawing on a mixed-methods approach that includes semistructured interviews and participant observation, we argue that, as much as the Yanadi lifeworld is shaped by the forests, the forests have been shaped by the community and their interaction with species and spaces. We discuss the CES that are sought out by the Yanadi community and elaborate on how these intangible or nonmaterial benefits are critical. We also examine the consequences of the state’s lack of acknowledgement of CES in its management interventions since the 1970s, alienating the community that depends on the forest for not only resources, but also spiritual, cultural, and social capital.

Key Words: *cultural ecosystem services; Eastern Ghats; forest management; indigenous community; marginality*

INTRODUCTION

Biodiversity conservation in the Global South relies on various frameworks and approaches funded by both the state and non-state actors. In India, conservation discourse and practice largely center on protected areas, biodiversity hotspots, and charismatic and endangered species. The dominant approach has been to exclude, forcibly resettle, and relocate people to “save” wildlife from humans (Rangarajan et al. 2014, Sundar 2014), similar to globally adopted fortress conservation methodologies. However, forest management in India is largely guided by colonial management practices, which focused on the potential for revenue generation. Despite contrary evidence that highlights the social-ecological and cultural value of forests, the state continues its economic valuation of forests. Forest classifications that match international standards drive management goals and tend to seem arbitrary when assessed from social-ecological perspectives.

In India, the state owns and manages almost 95% of forest land. Scholarly works frequently portray the state as distant, revenue oriented, and exclusionary (Rangarajan 1999, Sivaramkrishnan 1999, Menon et al. 2014). Legally, forest classifications based on the 1927 *Indian Forest Act* included Reserve Forests, Open Forests, and Protected Forests. From these categories, various subcategories emerged across states based on varying social-ecological complexities (Lélé 2007). However, driven by revenue generation, there are competing interests between the use and forest management objectives: wood-based industries (plantation forests) vs. use by local communities; ecotourism vs. wildlife conservation; religious tourism vs. wildlife management; sand mining vs. aquaculture in mangroves. The spatiotemporal variations across the country among local communities and their connection to forests are further complicated with state-specific policy imperatives and changing socioeconomic dynamics. Forest management practices in India have evolved at a slow pace, and the preoccupation with trees continues to dominate official

narratives. This arboreal obsession is not limited to Indian forestry, but influences conservation agendas globally (Walker 2004). The problem is further accentuated in semiarid areas where tree cover does not meet standard definitions of canopy cover, a measure used in forest classifications. Semiarid regions across the world support approximately 15% of the human population (Mbow et al. 2013) and harbor critical ecosystems and wildlife. Forest management strategies used in other climatic zones have proved to be fallible, and research shows that “the climatic and ecological functioning of drylands is fundamentally different from that of their more mesic counterparts...” (Herrmann and Hutchinson 2006:21). This difference leads to a problem with standard forest management procedures and helps explain why forests in drylands (which include arid, semiarid, and desert areas) need to be seen for more than the trees. Furthermore, the bias in favor of trees within forest management leads to an expected silence on ecosystem services provided by such environments. This oversight results in a complete disassociation between forest management and cultural ecosystem services (CES) in India.

The Millennium Ecosystem Assessment defines CES as “the non-material benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation and aesthetic experience” (Milcu et al. 2013). Scholars argue that this definition focuses on the intangibility of CES, which has led to an ambiguousness heightened by debates over the term “cultural”. Instead, they suggest a “relational and nonlinear” (Fish et al. 2016) approach that recognizes the ways in which people coproduce their environments (Fagerholm et al. 2012, Small et al. 2017). The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) conceptual framework provides clarity by using the phrase “nature’s contributions to people”. The IPBES recognizes that the partitioning of ecosystem services into “supporting, provisioning, regulating and cultural” is problematic because it is

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difficult to box the benefits derived from ecosystems within each of these categories for many individuals, communities, and nations. Fagerholm et al. (2012) also make the same point about mapping indicators developed to assess landscape services using stakeholder knowledge. CES remains a challenge to incorporate, not only because of its supposed intangibility, but also because of the multiple definitions and specificities that emerge out of human–nature interactions. Hence, there is a clear need for contextual and place-based assessments of CES. A case study from Hawai'i illustrates this complexity and shows how multiple value systems and knowledges can contribute to land-use planning and resource management decisions (Pascua et al. 2017). Pascua et al. (2017) develop a place-based framework to incorporate cultural, indigenous, and genealogical relationships within a CES assessment.

Likewise, our case study shows that only a place-based assessment will enable accurate evaluations and open the potential for assimilation of CES under forest management. It is possible to work toward a more egalitarian system only through such a framework given the often assumed intangible and variable nature of most CES. Through this study, we show that ignoring CES, as the Indian Forest Department does, serves to erase the local indigenous community from the landscape by failing to recognize its contributions and values. Thus, recognizing CES within forest management will provide a type of cultural recognition to the community that has shaped, and continues to shape, the state of forests. We examine CES in the Eastern Ghats of India through the lifeworlds of the Yanadi community. The Yanadis are a forest-dependent indigenous community who shape their lives and everyday practices around forests. An examination of the plurality of knowledge claims with regard to the state of the forests, the everyday practices, and the relationship between the Yanadis and the forest will illustrate how traditional ecological practices comprising both knowledge systems and adaptive skills can contribute to forest management and conservation initiatives. In other words, there is an imperative for forest management in the Global South to incorporate CES into management goals. Rural communities continue to share a relationship with the forest defined through economic, social, and cultural values, which must be acknowledged for more effective and sustainable forest management.

Several scholars have worked on the conceptual, theoretical, and methodological aspects of CES (Chan et al. 2012, Fish et al. 2016, Rasmussen et al. 2016, Pascua et al. 2017). A framework provided by Fish et al. (2016) incorporates the IPBES reference to “nature’s benefits to people” and forwards the need for a relational approach between spaces, practices, and cultural goods considering the cultural ecosystem benefits and services within the biophysical realm. More specifically, Fish et al. (2016:210) state,

... [CES] are about understanding modalities of living that people participate in, that constitute and reflect the values and histories people share, the material and symbolic practices they engage in, and the places they inhabit. These practices may be creative, ceremonial, celebratory, but also everyday and routine.

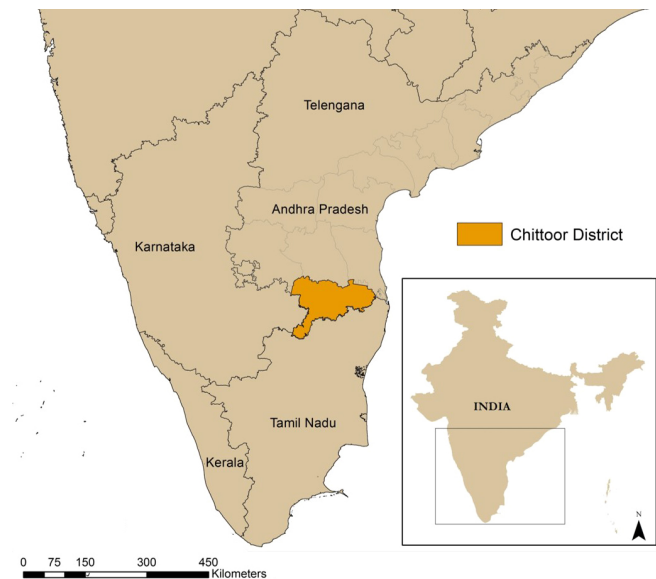
We draw on the broad classification regarding identities, experiences, and capabilities (Fish et al. 2016) to grasp the relation

between the Yanadis and the forest. The data generated show the overlaps and challenges of separating one from the other. In other words, the Yanadi identity, experience, and capabilities are what form their lifeworlds, which are closely tied and inherently derived from the CES generated from the relationship they share with the forest.

Background to the study area and the Yanadis

The Eastern Ghats are a discontinuous range of hills in India between 11° and 20° N and 76° and 86° E. Extending across 75,000 km², these hills range in altitude from 400 to 1500 m and have a tropical monsoon climate (Mundoli 2011). The study area lies in western Chittoor district, Andhra Pradesh, India (Fig. 1). The area receives an average rainfall of 650 mm and is drought prone. Dry deciduous scrub and thorn forests, farms, grazing lands, settlements, irrigation tanks, and rocky outcrops constitute the land cover in this semiarid landscape.

Fig. 1. Map showing the location of Chittoor District, Eastern Ghats, India.



The forests in western Chittoor district are classified as Reserve Forests and are managed by the state Forest Department. Reserve Forests are a classification instituted under the 1927 *Indian Forest Act*. These forests are often used by rural communities to meet their biomass needs. Protection mechanisms vary widely, but timber extraction and hunting are prohibited. These forests are patchy, with vegetation comprising Southern Tropical Mixed Dry Deciduous and Southern Tropical Thorn forests (Champion and Seth 1968), and support high biological diversity. They also act as stepping-stone corridors facilitating seasonal movement of wildlife between two Protected Areas within the district. Apart from offering landscape connectivity between two Protected Areas, they are island gene pools of rare, endemic, and threatened species. The Reserve Forests also form the basis for the local agricultural economy and help maintain the hydrological regime of the landscape. The agropastoralist communities living along

the periphery have a customary right to appropriate nontimber forest products (grazing livestock and fuelwood for consumption) within traditionally demarcated boundaries. However, the Yanadis are additionally permitted to harvest minor forest products such as fruits, tubers, and honey for commercial purposes to meet their livelihood from any Reserve Forest in the state. Most of these forests, before being classified as “Reserves” by the state, were traditionally managed and conserved by local communities as sacred groves. The region is thus rich in biological and ethnic diversity and is inhabited by many tribal communities, including the Yanadis.

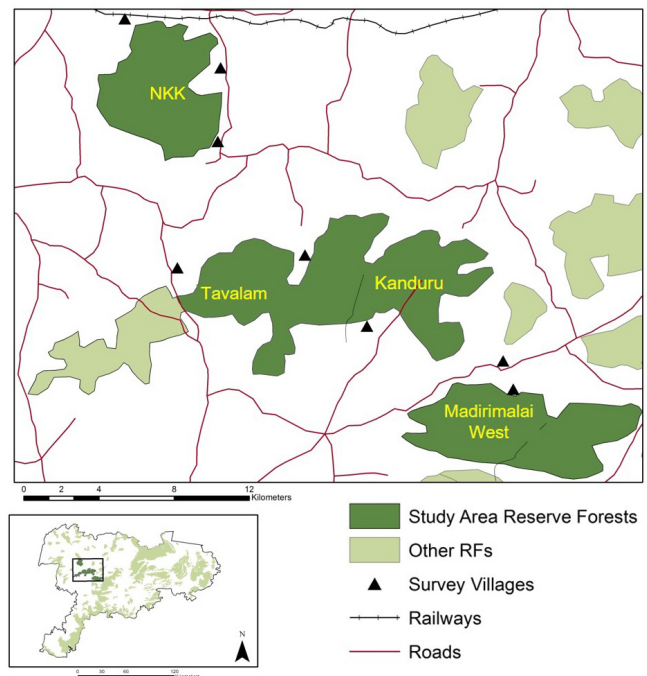
The Yanadis are 1 of 33 different tribes in Andhra Pradesh (in the study area, they are also referred to as Irulas), although there is a lack of consensus on the exact number of tribes that live in the Eastern Ghats (Krishnamurthy et al. 2014). In India, the term “tribe” has a complicated history, and contemporary usage is contentious in several parts of the country. Based on a historical analysis of tribal habitat, language, and religion within the Indian subcontinent, Bêteille (1998) shows that assuming tribes as “Indigenous people” can be misleading. Although India is a signatory to the United Nations Declaration on the Rights of Indigenous Peoples, the government resists using the term “Indigenous” (Bose et al. 2012). We align with using the term “tribe” because both government documents and other scholarly works use it. Studies often characterize the Yanadi community as poor, uneducated, primitive, forest dependent, indigenous, and snake-catchers (Sinu 2013, Krishnamurthy et al. 2014, Alex et al. 2016). These perceptions have materialized and been established historically owing to the cultural differences and traditional practices of tribal communities at large. Populations of Yanadis/Irulas are present in three southern states, Andhra Pradesh, Kerala, and Tamil Nadu. Most research and documentation focus on the community in Tamil Nadu and Kerala (Sinu 2013, Alex et al. 2016). There is a dearth of studies of the community in Andhra Pradesh, and the available literature tends to combine them with other tribes in the state (Krishnamurthy et al. 2014).

Historically disenfranchised, the Yanadis inhabit part of Andhra Pradesh, and in the Eastern Ghats, they are one of many forest-dependent communities (Krishnamurthy et al. 2014). They were nomadic forest dwellers until they were forced to settle by the government in the post-independence period (Krishnamurthy et al. 2014). The Yanadis, along with other agropastoralists, play a critical role in shaping this landscape through their everyday practices and cultural beliefs. They have immense knowledge of flora, fauna, and the seasonal variations in the landscape such as a familiarity with the spatial and temporal availability of species. This knowledge is oftentimes based in conjunction with an understanding of the relationship between flowering times, sighting of different insects, and various other indicators observed in the Reserve Forests. This is not a culturally deterministic view but is based on the primary livelihood of this community that centers around the forests (Sinu 2013, Krishnamurthy et al. 2014, Alex et al. 2016).

We focus on communities living around four forests in the Chittoor (West) Forest Division, namely Noorkuppalakonda, Tavalam, Kanduru, and Madirimalai West Reserve Forests (Fig. 2). These forests are part of a lived landscape where humans have exerted pressure on the ecosystem for centuries, thereby altering

the vegetation structure and composition. The continuous use of fire to manage grazing areas and having access to collect forest produce, graze livestock, and fell trees have maintained conditions favorable for their livelihoods. For the Yanadis and other traditional communities as elsewhere (Millennium Ecosystem Assessment 2003), ecosystem services are essential for their cultural identity and survival.

Fig. 2. Map showing the location of the study area Reserve Forests and villages in Chittoor District, Eastern Ghats, India.



The official narrative

The *State of Forests Report 2014* of Andhra Pradesh demarcates forest cover under categories influenced by the Food and Agriculture Organization definitions (Government of Andhra Pradesh 2014). These categories include Open Forests, Moderately Dense Forests, Very Dense Forests, and Scrub (Government of Andhra Pradesh 2014). The adoption of these categories work toward a uniform language for global indicators that enable reporting and help establish common ground. The Forest Department in India uses these reports to establish working plans, policies, and activities, thus making the nomenclature critical to forest management. Canopy density is the primary indicator used to define each of these categories, which further leads to an understanding that Open Forests, Moderately Dense Forests, and Very Dense Forests are “good forests”, whereas Scrub is described as “degraded” (Government of Andhra Pradesh 2013).

Forests cover 23.64% of the geographic area in Andhra Pradesh (Government of Andhra Pradesh 2014). The state categorizes forest cover in three of the four Reserve Forests in the study area as > 50% of Moderately Dense Forest, whereas the fourth Reserve

Table 1. Forest cover in the four Reserve Forests. Source: Government of Andhra Pradesh (2014).

Reserve Forest	Very dense forest [†]		Moderately dense forest [‡]		Open forest [§]		Scrub forest		Total [¶]
	Area (ha)	Cover (%)	Area (ha)	Cover (%)	Area (ha)	Cover (%)	Area (ha)	Cover (%)	
Noorkupalakonda	0	0	1114.90	32.76	1853.27	54.45	266.38	7.83	3403.64
Tavalam	3.19	0.10	2494.13	75.04	670.91	20.19	115.41	3.47	3323.55
Kanduru	2.57	0.08	2133.96	66.02	946.72	29.29	73.88	2.29	3232.14
Madirimalai West	34.03	1.68	1494.98	73.77	430.97	21.27	44.78	2.21	2026.42

[†]All lands with forest cover having canopy density > 70%.

[‡]All lands with forest cover having canopy density between 40 and 70%.

[§]Lands with forest cover having canopy density between 10 and 40%.

^{||}“Degraded” forest lands having canopy density < 10%, and areas with dwarf and stunted growth.

[¶]Includes water bodies and nonforest.

Forest has 54% Open Forests (Table 1). All forests in the area are secondary forests, whose long history of use and degradation make it extremely challenging to identify and define clear patterns. Research shows that degraded forests largely resist definition owing to the shifting nature of their existence, the lack of a comparative baseline, and oftentimes, the lack of a contextual understanding of what they really are (Goldstein 2014). In our study area, the forest categories are misleading. Based on field transects and extensive time spent in each Reserve Forest, there are few patches of a single land cover. In other words, a Moderately Dense Forest patch also has an undergrowth of Scrub and Thorn vegetation. The official report acknowledges the vegetation composition of the Reserve Forests but does not correlate it with the larger abstracted categories in use. Similar inconsistencies in land-cover categorization have been examined by Robbins (2001), who looks at how forests are classified by state experts as opposed to local communities in Rajasthan. This classification system clearly ignores not only the vegetation, but also the relationality between locals and the forests, along with the ecosystem services provided by forests in semiarid regions.

Qualifying terms such as “good” and “degraded” are unhelpful because they make tree cover the sole indicator. It is problematic to use a classification system based on canopy cover in an area where tiny proportions of trees grow to heights > 5 m and canopy covers are > 10%. It creates problems such as a lack of attention to ecosystem services, let alone CES, which further lead to a complete lack of knowledge about the functions of the existing vegetation. This lack of knowledge consequently results in the absence of forests’ contributions and roles for people, and finally, afforestation pressures, which may alter (culturally valued) landscapes. For instance, several programs run by the state aim to “tree” (used as a verb) the area. Both scholars and development practitioners working in the Global South critique this fixation on trees (Shiva 2006, Nagendra 2009, Fleischmann 2014). In our study area, the forest department uses an approach that clearly negates the value that scrub vegetation provides to the Yanadi community, including pastoralists and nonhuman species. The simplistic and abstracted categories used by the state do no justice to the ecological complexities and patterns on the ground.

Forest management

The Andhra Pradesh State Forest Department relies on mapping tools and techniques to develop management plans. Presently, forest management is undertaken by the state because

participatory forest management programs (joint forest management and community forest management) are no longer functional. The differences (at the implementation level) between joint and community forest management are reportedly minor, although community forest management was, in theory, supposed to be community led (for specific differences and details see Reddy et al. 2004, 2013). Both of these initiatives were funded by the World Bank, along with centrally sponsored schemes to generate employment (Reddy et al. 2004). In 2013, funding for participatory forest management programs ended, leading to the dissolution of village-level committees in Andhra Pradesh. Both joint and community forest management involved the constitution of a village-level governing body comprising eight women and seven men from either one village or neighboring villages. Based on the spatial location and number of villages in proximity to the Reserve Forest, one or two such committees were formed for each Reserve Forest in the study area.

Under both joint and community forest management, forest protection mechanisms involved community-level decisions about rotational grazing, forest protection from illegal felling, restrictions on sand mining, etc. Plantation activities, soil and water conservation measures, and construction of fire lines or breaks were also taken up at regular intervals. These investments primarily targeted improving vegetation, reducing the spread of fire, and providing communities with wage labor. Presently, the Forest Department funds and oversees both management and plantation interventions in Reserve Forests across the state. In the past, the Village Forest Committee, or the *Vana Samrakshana Samiti*, organized activities such as digging pits for saplings, creating tree rings and contour trenches, desilting water holes, and repairing and maintaining earthen bunds. More recently, the Forest Guard calls upon ex-members to organize labor for these activities. The community views this as standard practice, but a few individuals comment on the futility of plantations based on the abysmal survival rates. However, everyone sees the necessity of desilting old water holes for humans, wildlife, and livestock use. Nevertheless, the community refrains from questioning the Forest Department and its choice of work (or plant species) because it offers several households an additional income for a few days or weeks each year. The species most propagated in the area is *Eucalyptus*, despite the contradictions on its value for a semiarid area. Our field observations correspond with the reportedly low survival rate of plantations in the Reserve Forests, especially due to recurring drought. Soil and water conservation

measures are indeed useful for this kind of semiarid environment, yet when it comes to plantations, the reasons and species choice are both questionable. We next elaborate on the methods used for this research, followed by a discussion about CES as seen through the lifeworlds of the Yanadis.

METHODS

We use multiple sources to determine how forest characteristics in a semiarid ecosystem have led to specific representations by the state, which in turn affect management decisions. By examining the relationship between a forest-dependent community (Yanadis) and the forests (that the state neglects), one can begin to realize the criticality of CES to a people who are shaped by and continue to shape the forests. Marginalizing the Yanadi has alienated the community from forest management practices. This community depends on the forest for not only physical resources, but also spiritual, cultural, and social capital. We build on previous research in the study area, years of interactions with the community, and more formal data generation mechanisms detailed below.

Semistructured interviews and participant observation

We undertook 51 semistructured interviews using snowball sampling. We interviewed 38 Yanadi women and men and 13 shepherds and goat herders in 2015. The number of interviewees was based on a saturation point and the logistics involved in gaining access to individuals from the Yanadi community in the study area. The respondents lived at varying distances around the four Reserve Forests. The questions queried their everyday practices, access and use of the forests, and perceptions toward forests and wildlife. We sampled shepherds and goat herders opportunistically, supplemented with participant observation and informal conversations. The interviews and informal discussions were conducted in Telugu and translated into English. The interview protocol was approved by Rutgers, The State University of New Jersey's Institutional Review Board. Interviews were followed up with informal meetings and conversations in 2019–2020 with individuals from the Yanadi community to gain an in-depth understanding of the relation between them and the Reserve Forests. Extensive field notes were taken during and after these interactions.

Forest department reports

We used annual reports published by the Andhra Pradesh Forest Department (2013, 2014) to understand the state's representations and management of Reserve Forests in the study area. These reports are for Andhra Pradesh state prior to its bifurcation, and the data used here remain unaffected. Informal discussions with rural communities and several Forest Department staff in 2014 and 2015 helped contextualize the official narrative.

RESULTS

The Yanadi lifeworld and the forests

The Yanadis live physically, socially, and metaphorically on the fringes, creating their lifeworld through practices that involve gathering forest products such as honey, tubers, medicinal herbs, and plant parts. They are socially marginalized and are discriminated against based on the class and caste hierarchies embedded in the structural and social norms adopted by a significant proportion of the population in India. During the lean

season, they work as labor on agricultural fields in the villages. Since 2000, recurrent drought and more intensive agriculture in the surrounding areas compel the community to migrate to semiurban areas for wage labor. Both the Yanadis and the wider rural community have a long-held tradition of visiting religious shrines within the forest. Sacred forests represent an important long-held tradition of conserving specific land areas that have cultural and often religious significance. Portions of the Reserve Forests in the study area continue to be held as sacred forests by the local communities, with cultural and religious practices still in place. Sacred forests are not just cultural monuments but areas that provide culturally sensitive models of community-based management (Ormsby and Bhagwat 2010). We elaborate on the lifeworld of the community based on their positionality, identity, experiences, and capabilities to draw out specific CES and the relation the community shares with the forests.

Positionality and identity

Yanadi communities are scattered around the study area, with as few as two households in a village. Their houses are often located at the periphery, away from the rest of the houses in the village. As a community, they are reticent and do not engage with the nontribals unless necessary. This isolation is a consequence of decades of social discrimination as well as their livelihood pattern. Being forest dependent, they lead a semi-nomadic life, moving from one forest to another based on the seasons and availability of resources. This lifestyle results in limited interactions with individuals from the agropastoral community in the area. After being compelled to settle by the state, the community has adapted to a different lifestyle but prefers to stay away for a variety of sociocultural reasons. Such historically situated practices have led to an isolation that continues to harbor stereotypes of what forest dwellers do or do not do. The Yanadis also view their own standing as outsiders to the sociocultural milieu of the larger village. The difference in their livelihood practices, their intimate knowledge and relation with the forest, and different sociocultural practices position them as outsiders. This situation is a result of complex history, systematic discrimination, and now, a choice to insulate themselves from others.

Yanadi identity clearly revolves around the forests and, in turn, is shaped by them. The Yanadis' relationship with forests goes beyond extracting resources to survive. Rather, it is tangled with memory, customary practices, and an intimacy that they explain through terms such as the forest is "a mother", "the womb", or "home". Traditionally, they worship deities who are believed to be forest protectors. Totems of plant or animal origin are worn or kept by people to bring prosperity, protect them from evil, and provide good health. Specific places in the forests are maintained for rituals or ceremonies. Vestiges of Zootheism and Animism can still be seen in their culture and belief systems in the form of worship of animals and plants considered sacred. Birds such as peafowl, koel, and parakeet, and other species such as snakes, frogs, slender loris, and sloth bear are worshipped and not hunted because they are associated with specific gods and deities. Every family is associated with a specific *gothram* of a plant or animal they should never use, which works toward regulating consumption and over-extraction of a species. In conversation, the Yanadis refer to a mythical affinity with certain species and even with inanimate objects and tend to associate them with their ancestral spirits.

The Yanadis have many beliefs and festivals connected to the forest; they worship some plants considered sacred (e.g., *Shorea roxburghii*, *Cassia auriculata*, *Ocimum sanctum*, *Aegle marmelos*, *Ficus religiosa*, *Chomelia asiatica*, and *Boswellia serrata*) and make ceremonial visits to shrines and sacred spots to show respect to nature and their deceased ancestors. An annual festival is organized to worship their god *Katavarajulu*, the forest protector. Every community worships and undertakes prayers to seek blessings for the forests, rather than for themselves. According to the community, “If the forests are blessed, the community will be blessed.” Family names are associated with different landscapes or forests, connecting the people with their place of origin. The community believes that they belong to the area where their ancestors are buried, which is usually in and around the Reserve Forests.

Recurring drought years bring not only problems with finding work on agricultural fields but also a reduction in forest resources. This situation forces the community to migrate seasonally, either to semiurban areas or to better forests in the region. Although the community has historically been nomadic, this kind of seasonal migration has become the norm over the past decade because of the frequency and intensity of drought years, to adapt to the changing environment. The Yanadis rely on stored dried food during the lean months and locate rat burrows near paddy fields. From these burrows, they extract 400–500 kg of rice in one season, which helps them tide over the difficult days. One respondent put it succinctly when he said,

Our food habits are logically linked to the weather and availability of resources. For instance, honey and tubers are collected in summer, along with small wild game when it is relatively easy to find them. While in the rainy season, we consume a variety of leafy greens, fruits, and vegetables. No Irula (Yanadi) is worried about starvation, as they have strong faith in the adavi thalli (the forest deity), who will not let them down.

Conversations with women in the Yanadi community reveal a sense of gender equality when it comes to roles and responsibilities. Unless women are involved with the care of infants or elders in the family, they also accompany the men to the forests. Women are respected, and most deities worshipped by the community are female. Interestingly, however, the community’s religious rituals are performed by designated men and not women (much like the norms followed in other religious communities in India). When the men are home, they also take on domestic responsibilities that involve housekeeping and childcare. Families in a village or those dependent on the same forest usually work under directions from an elder. The elder will assign different groups particular resources to collect from specific areas in the forest. Traditional knowledge about the area and its resources is considered a family asset and is passed down through generations.

Experiences and capabilities

The ethnobotanical, medicinal, and ecological knowledge of the Yanadi community has been documented by a few scholars (Vedavathy et al. 1997, Reddy et al. 2009, Swapna 2015, Emerald et al. 2017). The community has traditionally used resources from these Reserve Forests to construct houses and make tools, game traps, and musical instruments. Their traditional knowledge

equips them to locate and extract certain plant species, seeds, and tubers, which are sold both locally and to traders. Honey has the highest market value. Seeds of *Strychnos potatorum*, *S. nuxvomica*, and *Vitex altissima* and the tubers or roots of *Decalepis hamiltonii*, *Gloria superba*, *Asparagus racemosus*, and *Plumbago zeylanica* also bring in some income for the family. The children are also knowledgeable about these species, which is made possible by the involvement of the entire family in resource collection or extraction. Their immense knowledge of plant-animal interactions, phenology, seasonal availability of resources, and traditional forecast of rains is made possible through experience and intergenerational knowledge. The community has traditionally relied on hunting wildlife for sustenance, primarily small game, using traditional hunting methods such as trapping and snaring. The Yanadis are occasionally used as trackers by others who hunt wild game illegally, and a few interviewees mentioned that they had been recruited in the past to trap species such as the globally threatened Indian pangolin or collect star tortoise hatchlings.

Local plants and some animals play a significant role in the rites and rituals of the Yanadi during birth, marriage, and death ceremonies. They prefer traditional medicine and herbal remedies for common ailments but are increasingly encouraged to use modern medicine and disassociate from the older practices. Their affinity with the forests is reflected in their folklore and in places within the forest considered sacred, where megalithic dolmens and prehistoric rock art are present. Forest resources are considered common property and part of their heritage. When asked about conflict within the community with respect to access and sharing limited forest products, more than one respondent explained, “The forest provides for everyone, and it does not matter who finds what first.” There is a clear reciprocity and harmony in sharing resources. The community traditionally uses forest products for food and medicine in a sustainable way, with self-imposed regulations for hunting or harvesting certain species during certain seasons, conservation of economically important plants, and rotational use of areas rich in resources.

During our recent interactions with the community, they spoke about the alarming decline of honeybee populations in the area, particularly when the mango trees flower. They attribute this decline to the insecticides that are sprayed in the mango orchards (owned by rich landowners who often live away from the village) because both the wild plants and cultivated species flower around the same time. According to their knowledge, there are five species of honeybee in the area. The community collects honey primarily from the rock bee (*Apis dorsatus*) for sale, whereas that of the Asiatic honeybee (*Apis cerana*) is kept for consumption. When harvesting honey (sometimes from steep cliffs and rock faces), they prefer to use lianas of *Combretum ovalifolium* over conventional twisted nylon ropes, which, according to them, tend to spin when suspended and snap over sharp rocky edges. They also perform a small prayer before harvesting honey and leave some honey behind for the bees to return and for the sloth bears or honey buzzards. Similar harvesting practices were mentioned when extracting certain roots and tubers. For instance, when harvesting *Decalepis hamiltonii*, the tubers are cut a few inches from the base of the plant, and the shoot is replanted in the same place to ensure the plant survives. Plant seeds are collected during summer and propagated by broadcasting them during the

monsoon. No tubers or fruits are totally harvested, and some are left for the goddess *Vollemma*, indicating sustainable harvest practices.

Conservation-oriented practices are part of Yanadi culture and tradition. In this semiarid landscape, water is most revered and sought after. The Yanadis periodically repair waterholes in the forest by desilting, maintaining water courses, and repairing damaged and earthen bunds. Sometimes, an elder in the community takes up digging of small wells or ponds to provide water for people and animals. In summer, they work on these water bodies because the ponds provide an additional source of food that includes fish, buried tubers, and burrowing animals. The Yanadis say it is not looked at as a separate activity but whoever sees the need first will do it immediately; it is not difficult because they always carry small tools for digging tubers. If the water level seems precarious, some of the fish caught are transferred to another pond or well that has water. At the end of summer, a ceremony called *Kappa Devara*, seeking good rains, is conducted by the community, performing a symbolic marriage between two frogs that are then released in a nearby water body.

The Yanadis use descriptive names for places within the forest based on the topography, soil, and vegetation. These names are remarkably specific and include terms that characterize each location, for instance, waterlogged areas (*jowku bhumi*), sandstone areas (*morali*), plains with scrub (*neladivi*), open grassy areas with hares (*kundellapenta*). Some locations are named after a particular event or incident that occurred there such as a leopard eating a calf or a bear falling into a crevice). Their intimate knowledge of the forests across the Eastern Ghats goes well beyond the boundaries of the study area and forest boundaries imposed by the state. In the event of forest fires, every household sends one person, and they collectively go to douse the fire with damp jute bags or green leaves. The ability to traverse the rocky landscape and know exactly where to go helps them reach the affected areas much faster than others in the village. Often, local pastoralists blame the Yanadis for forest fires, but the latter refute this and say they will not set their home, the forest, on fire because it would affect their own livelihood. Talking about forest fires, one elder said that a major loss from fires is the loss of termites, which affects the health of the forest. According to him, “Termites bring moisture to the surface, even in the driest land, which helps plants grow.”

The Yanadis have connections with not just the forest but also the wildlife present, and they know the value of every species. In fact, even crop raids by wild animals (wild boars, deer, and sometimes migratory elephant herds) are seen as reminders from the god *Katavaraju*, the protector of forests, to provide for other creatures too. He is worshipped every year by the community during the flowering season by praying for bountiful flowering and fruiting of all trees. A crop loss is never regretted because they have faith that the forest will give back in some other form. They gave the example of how, when a branch is broken by an animal, it gives more branches and thus more flowering and fruiting. The Yanadis believe that when the mother earth takes back something, one should not condemn it because they would beget disease or suffering if they do. Crop damage by wild animals is how the goddess takes her share if humans do not provide for her voluntarily; cursing a loss by an animal will further infuriate

her, and you are bound to lose more in the future. Animal raids are reminders to give back to the “mother” and are accepted in reverence. This response is in contrast to that of most farmers in the surrounding villages, who do everything in their power to curtail crop raids through a variety of legal and illegal mechanisms. We next discuss the potential implications of the everyday practices and cultural beliefs reviewed so far on conservation and forest management in light of recognition of the values of CES.

DISCUSSION

Research on conservation and forests in lived landscapes, where human presence defines the patterns and processes, is often challenging because of the contrary epistemological and ontological assumptions used to interrogate the physical and social aspects of the landscape (Newing et al. 2011, Bennet and Roth 2015). However, there is now a wide effort and acknowledgment by several scholars who are working to bridge the disconnect between the social and natural sciences (see Büscher and Wolmer 2007, Newing et al. 2011, Athreya et al. 2013, Sandbrook et al. 2013, Dorresteijn et al. 2014, Bennet et al. 2017, Carter and Linnell 2016, McElwee 2017). An integrated and pluralistic methodological approach is one way to address the problem. In the case of ecosystem services, deliberations continue among ecological, economic, and social perspectives, but there is no universally agreed upon method to account for the use and value of these services across different spatial and temporal locations (Rasmussen et al. 2016, McElwee 2017). One way forward, as McElwee (2017:114) states, is to acknowledge “humanity’s role on interactions with the natural world.” The existing forest management system in India clearly functions in contrast to the literature on social-ecological systems and the potential for conservation in lived landscapes. Here, we further elaborate on how the state’s focus on trees ignores both human needs and the requirements of conservation within a semiarid environment; how a recognition of social-ecological systems within which the Yanadi manage their relationship with nature would argue for more community-based conservation; and that shifting methods of understanding forests to include CES and other factors will support both of the previous points.

Trees as dominant narrative

The knowledge, everyday practices, and cultural beliefs that make up the Yanadi lifeworld surpass the ways in which the state sees and manages these Reserve Forests. One straightforward example is the continued focus on and investment in trees in this semiarid area by the Forest department, whereas the Yanadis have a much more holistic view of the landscape. Several scholars (Shiva 2006, Nagendra 2009) have criticized plantations encouraged by the Forest Department in India. Although forest policy has expanded its focus from revenue generation (as established by the British colonial administration) to include watershed protection, biodiversity conservation, and poverty alleviation, the technical training and rhetoric of “forests equals trees” persists. In an ethnographic study carried out across two state forest departments in India, Fleischman (2014) finds that, contrary to several studies and policy recommendations, bureaucrats are prompted by a combination of scientific bureaucracy, professionalism and forester values, rent seeking, and discursive power to influence the public and institutionalized incentives

when it comes to tree plantations. Trees also become the focus because of the use of satellite imagery and methods used to estimate land cover, despite the reality of heterogeneous land cover. The irony lies in attempts to tree an area that is ecologically fragile, semiarid, and more conducive for small trees, scrub, and thorn bushes.

Informal discussions with Forest Department staff suggest that the fixation with plantations continues; it is a recurring activity that is undertaken despite its success or failure. The complex relationship with *Eucalyptus* trees relies on the species' fast-growing characteristics and contribution to revenue for the state. Although *Eucalyptus* is detrimental to the water table and affects agriculture, it helps "green" the "degraded" forests and increase forest cover. The state thus sees Reserve Forests for the trees, as evident from its management practices and categories used to estimate forest cover. There is little deliberation about native vegetation species or the different fauna for which the Reserve Forests provide habitat. Even though the Andhra Pradesh *State of Forests Report* (Government of Andhra Pradesh 2014) mentions some of the faunal species present in the Reserve Forests and briefly refers to ecosystem services provided, it appears to be a generic acknowledgment, rather than an object or issue of concern or value. The skewed omission is likely a consequence of the semiarid vegetation and relatively low revenue accrued from such spaces. Additionally, the low population densities of the various fauna present in the study area explain the lack of conservation focus. As seen around the world, biodiversity coldspots are ignored in conservation plans, despite the presence of rare and endangered species and critical ecological functions that these spaces provide (Kareiva and Marvier 2003, Bøhn and Amundsen 2004, Carolan 2009, Marchese 2015). Semiarid environments and grasslands are often characterized as coldspots with low species diversity and hence continue to be neglected spaces when it comes to conservation.

Community-based conservation possibilities

The Yanadi community plays a critical role in shaping the forests in this area of the Eastern Ghats through its knowledge systems and cultural practices. The natural, social, and cultural capital derived from the forests also shapes the community in terms of its identity, experiences, and capabilities. Involving the Yanadis as stakeholders in the management process, rather than as sources of information, is key to the future of these Reserve Forests. The Yanadi lifeworld is clearly defined by the CES enabled by the forests, and their identity, positionality, survival, sociocultural practices, and belief systems all revolve around the forest. This historic association has come down through generations, and, even though cultural memory takes time to erode, the Yanadi community is at risk of losing this enduring relationship. Although it is not possible to attribute this relationship to a single factor, the constant struggle to survive, the need to migrate for seasonal labor, changing practices at the household level, and exposure to the urban lifestyle bring with them quick money and a host of other experiences that may eventually lead to a breakdown of the community's association with the forests. Based on our observations and interactions with the community, this breakdown is already occurring among young adults, who are keen to disassociate from the forest and embrace the modern. We do not suggest that the community should remain isolated and not "modernize". Rather, it is a call to acknowledge and

appreciate the ways in which the community has shaped the forests for generations and continues to do so in both intended and unintended ways, which a co-management regime would help recognize and valorize. Apart from the lure that nonforest activities and wage labor offer, it is also a way out of the structural discrimination and marginalization that the Yanadis have faced for decades. Identified by other rural communities as forest dependent, nomadic, and with ways of their own, the cultural ramifications have done more damage and reinforced the stereotype of the community's backwardness.

The Yanadis almost unanimously express a desire that the forest protection and management should be entrusted to them. They believe their knowledge, and more so, presence in the Reserve Forests, will ensure stronger protection mechanisms, unlike the state, which governs from a distance. Furthermore, the community also realizes that its knowledge is being misappropriated by traders, who offer to buy forest products from them for pharmaceutical companies. Traders offer better prices than the forest department cooperative and even come to collect the products from the village. This process saves individuals time and energy that otherwise would have been spent in going to the designated place to sell their products. The entry of these traders has increased the demand for forest products, resulting in scarcities. Until recently, the same products were harvested sustainably. Recurring drought years also add to the problem. Presently, the community collects gum, seeds, tubers, and leaves from species such as *Anogeissus latifolia*, *Vitex altissima*, *Decalepis hamiltonii* and *Phoenix sylvestris*. The Yanadis acknowledge that it is getting more challenging to find certain species such as *Decalepis hamiltonii*, which is a rare and endangered plant. However, the community is at a loss with respect to finding alternatives. One individual mentioned that a couple of men from the community were hired by a pharmaceutical company as seasonal labor to help propagate certain species in greenhouses located in another state. Yanadi traditional knowledge, in this case, is likely being used to promote biopiracy and to further commercial interests without sufficient benefit to the community. In the long run, this situation can turn into a tragic consequence of not recognizing the role of the stakeholders in these forests.

The state is also losing opportunities for revenue generation, which they claim is the focus of forest management, simply because of the refusal to see these Reserve Forests for more than the trees. The lack of protection mechanisms, conservation interest, and scientific research in the area contributes to illegal wildlife trade and possibly biopiracy. Yanadi people's traditional knowledge and skills are being misappropriated, rather than directed toward conservation and sustainable forest management.

Implications for forest assessment

The juxtaposition of the Yanadi lifeworld and forest relationship with the official assessments of land cover point at an urgent need to reassess the current forest management practices in India. There is a clear effect of using economic benchmarks and canopy cover on forests that do not meet these criteria, which has led and continues to lead to unintended consequences on the lifeworld and lifestyle of an indigenous culture and community. Measurements of land cover are not able to quantify CES or factors such as recurring drought years, amount of precipitation,

and presence of vegetation that is not defined by canopy cover. However, objective classification methods are important and provide assessments that qualitative data sets lack. Only a combination of both methods can provide accurate assessments. The state's way of knowing must be put in the context of a history that involves a specific discourse (where forests equals revenue), a global focus on increasing tree cover (which percolates scales), and the marginal status of secondary forests in areas that are not identified as ecologically important (unlike biodiversity hotspots). Likewise, the community's way of knowing the forests is part of its history, culture, tradition, and beliefs. None of these factors can or should be discounted by forest management.

Sparse representations of the Eastern Ghats as a unique biogeographic region in conservation discourse and praxis in India result from the fragmented habitats, the vegetation type, isolated wildlife populations, and an assemblage of other ill-constructed variables that determine the norms of conservation value. Particularly, anthropogenic presence and the inability to fit lived landscapes into a protected area mold is a major cause for limited scientific research and conservation in the region. Despite the documentation of high floral endemism in this biogeographic region, particularly outside protected areas, the Eastern Ghats remains at the margins of conservation discourse and practice. Ramachandran et al. (2018) assess land use and land cover changes in this region from 1920–2015, with focuses on endemic plants and rare, endangered, and threatened plants. They report the presence of unique floral associations, wild rice varieties, and immense floral diversity of > 2600 angiosperms across the Eastern Ghats. However, the state overlooks these findings and ignores the ecosystem services, wildlife presence, and relationships local communities share with the forests.

One way to overcome these contradictory ways of knowing is by integrating CES into forest management. In doing so, the possibilities for determining value will increase and can include different data sets, histories, and practices. For instance, if forest managers account for floral species important to the people and wildlife, it will change how value is determined. Forest management would likely move away from plantations that do not belong or survive, toward native species that are more adapted to the area's climatic and topographic conditions. Although this vision may seem like a challenge to implement, given the spatial and temporal diversity of biodiversity and ecosystems in India, it may be the only way forward. Previous versions of involving communities in forest management had limited success because the communities were rarely considered equal stakeholders in the process. A lack of understanding of who forest-dependent individuals are, and a gross misinterpretation of what is at stake, led to the collapse of community forest management. CES provide an opening to make amends based on both ecological and social grounds.

The complexities of assessing land use and cover are well researched, but limited work has been done on integrating CES within the framework. Participatory mapping provides one way to take a more grounded approach to the issue and one that is within the discourse of development, forest management, and land-cover assessment (Pascua et al. 2017, Wangai et al. 2017, Ridging et al. 2018). However, there is a need for more research on the issue to be able to address discrepancies across scales and

create standard measurement tools and a broader language for CES. Within the gamut of forest management in India, CES are important, and thus, Reserve Forests in India should be managed in coordination with the community, who is the custodian and rightful manager of the resource, as our data show. In doing so, forest management will gain a new perspective on the flora and fauna and will be able to engage in a deliberate management strategy rather than using canopy cover as a blueprint for all forests in the country. Only if CES are truly acknowledged through the knowledge, traditions, and cultural values held by the Yanadis, will the future of these Reserve Forests be secure.

CONCLUSION

Through our research, we have shown how “the silences and incompatibilities... become evident when data sets produced by diverse methodologies are brought together” (Nightingale 2003:80). While one data set using qualitative methods (interviews and participant observation) characterizes the Yanadi lifeworld in connection with the forest, the analysis of forest management practices shows the limitations of universal classifications and typologies in characterizing a forest. Putting together these ways of knowing in the context of CES and forest management leads us to two critical points. First, the contradictions in how forests are valued are ontological in nature, resulting in the methodological limitations evident in both the qualitative data generated through our study and quantitative data used by the state to classify and measure Reserve Forests. Second, the state's refusal to see beyond trees has led to collateral damage in the form of disregard for a community's traditional practices and ecological knowledge. Both of these issues result in neglect of the community that has a deep understanding and relationship with the ecosystem, and neglect of the biodiversity that is shaped by and shapes the CES.

There is an urgent need to reconsider forest management in semiarid areas for the sake of both humans and nonhumans. Place-based solutions for incorporating nature's benefits or CES require nuanced analysis of both the ecosystem and the peoples living in these areas. In this location and others, forest management will consider more than monetary value or revenue earned only when it incorporates the community as an equal stakeholder. Unless cultural ecosystem services are valued on par with revenue generation, the future of the flora and fauna in semiarid forests is at risk. If forest management recognizes the value of marginal spaces and forests, and the value of marginalized people, from whom we can learn how to conserve and sustainably manage resources, more sustainable outcomes become much more likely for the future.

Responses to this article can be read online at:

<https://www.ecologyandsociety.org/issues/responses.php/12779>

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Data Availability:

The data that support the findings of this study are available on request from the corresponding authors DP and SJ. The data code are not publicly available because the interviews contain information that could compromise the privacy of research participants.

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