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Politics of Knowledge in Conservation: (De)valued Traditional Ecological Knowledge of Bote in Chitwan National Park, Nepal

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ABSTRACT

Political ecology studies have mostly explored on the conflicts that arise between local communities' and Indigenous peoples' (IPs') vulnerability to sustainable livelihoods based on nature and conservation regimes. Even in the context of the change in conservation tactics towards active community involvement and socioeconomic development, which has reinforced the fortress conservation strategy, traditional ways of life and the lived traditional ecological knowledge (TEK) of IPs are under jeopardy. Nevertheless, the studies give little consideration to the way in which TEK is (de)valued for bolstering fortress conservation at the expense of IPs' livelihoods unsustainability. This study investigates the (de)valuation of TEK of Bote embedded in their traditional livelihoods through conservation management, based on a critical ethnographic investigation carried out in two villages of Bote IPs (in the Buffer Zone area) of Nawalparasi district of Chitwan National Park (CNP) – southern lowlands of Nepal. We argue that TEK is paralyzed by conservation regime without acknowledging the symbiotic relationship between IPs and biodiversity. Therefore, in order to conserve biodiversity and support the mutual sustainability of biodiversity and local livelihoods, there needs to be active guardianship and stewardship of IPs.

Keywords: Customary livelihoods, fishing, Iconic species, National Park, sustainability, Traditional Ecological Knowledge

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SIGNIFICANCE STATEMENT

Scholarships on the political ecology of conservation have explored the tensions that arise between the local/Indigenous peoples (IPs) and the conservation regime, as well as the fragility of sustainable local livelihoods. Nevertheless, there hasn't been enough research done on the (de)valuation of traditional ecological knowledge (TEK) of IPs to strengthen fortress conservation. The study makes the case that the Bote IPs, who live on the edge of Chitwan National Park (CNP) in Nepal's central lowlands, have partial or specialised TEK that the CNP's authorities employ to further their goal through co-management of the Park. The research advances the still-emerging discourse of Indigenous self-management in conservation based on TEK. This is noteworthy in addition because it implies that, in the specific instance of Nepal and in some other contexts, state conservation policies and practices should take the Indigenous perspective into account.

INTRODUCTION

Scholarships on the political ecology of conservation have explored the tensions that arise between the local/Indigenous peoples and the conservation regime, as well as the fragility of sustainable local livelihoods (Adams and Hutton 2007; Robbins and Doolittle 2012; Adams 2015). Indigenous peoples (IPs) and local communities have been evicted from their traditional lands and coercively pushed from independent and self-sustained livelihoods based on Indigenous knowledge adopted for centuries to unsustainable livelihoods (Domínguez and Luoma 2020). The shift from area-oriented approaches (disassociation of local people from protected areas) to process-oriented approaches (conservation through acceptable and adaptive processes reducing conflict between the protected area and local people) around the world has not been implemented in a synchronized manner (Du et al. 2015). The participatory approach to conservation has not recognized the guardianship of IPs for nature-conservation based on traditional ecological knowledge (TEK). IPs coexist with wildlife, accumulating deep TEK about animal and plant species that is characterized as contextual, dynamic, alive in the culture, holistic, agrapha (shared and transmitted through oral traditions), relational, collective, and diachronic (Maurial 1999; Berkes and Berkes 2009; Whyte 2013; Bello-Román 2023), which is widely recognised as instrumental for sustainable resource management (Berkes 1993; Toledo 2013). Nevertheless, the politics of knowledge for applying Indigenous peoples' TEK to advance fortress conservation initiatives has not received enough attention in political ecology research.

The politics of knowledge that have tangible effects on people's lives and means of subsistence as well as what and how the nature is preserved (Adams 2015). There are a few works on the politics of knowledge with the argument of segregation of useful TEK for the progress of scientific projects. Much of the TEK has been archived and stored in databases in the initiation of large formal institutions through the process of *scientisation*, particularly through *particularization*, *validation*, and *generalization* of the knowledge for development and conservation purpose (Agrawal 2002). The scientific project of the documentation of TEK and its use for the purpose of conservation is claimed to have promoted sustainable and participatory resource management but the practices indicate the erosion of the knowledge and of the sustainable use of the resources (Gadgil et al. 2021). Collection and documentation of TEK through scientific research approaches for the purpose of integration with scientific knowledge for conservation forces in compartmentalization and distilling of the knowledge (Nadasdy 1999). The particular part of the holistic TEK (Berkes and Berkes 2009; Nadasdy 1999) constructed in the persisting and emerging system of responsibilities of each other of ecological elements including humans, sustain in collective continuance, has become an instrumental value for science (Whyte 2013). What to use and apply is determined by science and hence the integration of TEK and science is problematic (Bohensky and Maru 2011). However, the literature provides an inadequate explanation of how the particular TEK is valued and used in management of conservation for its progress under the sustainability crisis of biodiversity and IPs' livelihoods.

In Nepal, conservation policies have evolved from a restrictive model (1950-1980) to a participatory approach (1980-2000), and then a landscape approach (in the 2000s) (Ghimire 2019). This shift aims to promote biodiversity sustainability and support the socio-economic development of IPs and local communities (Bhattarai et al. 2017; Ghimire 2019; Aryal et al. 2020). The latest (fourth) amendment of the *National Parks and Wildlife Conservation Act 1973* in 1993 included the concept of Buffer Zone[1] (BZ) in the Protected Areas[2] (PAs), and *BZ Management Regulation 1996* provisioned the rights of local communities to manage and use forest resources in the BZ areas (Bhattarai et al. 2017). BZ programs in the PAs aim principally to protect and preserve the habitats of endangered wildlife and ecosystems and secondarily to ensure the participation of local people in biodiversity conservation and economic activities (Lamichhane et al. 2019). This has been characterized community-based management, which has supposedly brought significant positive changes in the conservation and enhanced the livelihoods of local people (Heinen and Kattel 1992; Bhattarai et al. 2017; Aryal et al. 2020), albeit not always with positive outcomes (Bhusal 2014).

The BZ programs form part of the national policies, including those linked to Nepali commitments to the Convention on Biological Diversity (CBD), United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), and International Labor Organization Convention 169 (ILO C 169). Even though the national policies are insufficient, as these international standards have a spirit of valuing IPs to participate in the conservation and sustainable use of biological

[1]Since the 1990s, the Government of Nepal demarcated Buffer Zones (BZ) in 13 Protected Areas (PAs) out of 20 PAs (AICSRC 2021) which were shielded mostly in the ancestral lands of diversified IPs from lowland Terai to high mountains.

[2]Almost one-fourth (23.39% or 34419.75 sq. km.) of Nepal's land is covered as protected areas, including 12 National Parks, 1 Wildlife Reserve, 1 Hunting Reserve, and 6 Conservation Areas, beginning with the Chitwan National Park in 1973 (AICSRC 2021).

diversity based on TEK. The national policies accept the responsibility of meeting the subsistence needs of forest resources of locals by initiating BZ Community Forests and promoting ways to increase the efficient use of available resources. Nevertheless, there is the continuous exclusion of IPs in management, governance, and economic activities in BZ areas (Thing and Poudel 2017) with the exclusion of their TEK, and there are several restrictions on community forest management, even on the collection of forest resources such as thatching materials, fodder, firewood, and wild vegetables (Bhusal 2014; Poudel 2019).

Particularly, there is insufficient space in research and existing conservation discourse for the struggles and suffering of Bote IPs in the periphery of Chitwan National Park (Jana 2007a), the oldest protected area in south-central Nepal. Based on critical ethnographic inquiry, the paper explores the de(valuation) of TEK embedded in the customary livelihoods of Bote IPs. We, therefore, argue the part of the body of TEK has been used by the conservation regime for fostering fortress conservation. We locate the argument that participatory conservation has (de)valued and (un)used a lived TEK of conservation, creating a threat to the sustainability of biodiversity and local livelihoods. In this study, we use political ecology (Adams and Hutton 2007) as a frame of analysis.

Political ecology is an appropriate frame to analyze the politics of knowledge use in conservation practices. It emerged from the broader frame of the political economy puts power at the center of analysis. Because of the domination of external power, conservation, and biodiversity often involve livelihood conflicts, thereby creating negative outcomes for the development of IPs (Adams 2015). The political ecology believes that Western ideas about nature, pristine and wilderness, and its conservation techniques are formed, legitimated, transferred, and applied in real-world situations, excluding local communities (Adams and Hutton 2007). It believes on the ideas of conservation are drawn from science backed by the colonial power, where the state divides humans and nature. Patrolling boundaries by rangers and allowing tourism, safari hunting, and scientific research are the common practices of conservation (Robbins and Doolittle 2012).

Recently, attention has shifted toward post-structural thinking of the political ecology of conservation, which concerns Foucauldian power, knowledge, and discourse (Pitsoe and Letseka 2013). The power relations and differences among the social groups for the management of resources are the central concern of political ecology (Gezon and Paulson 2005). A particular form of knowledge is circulated in the form of discourse as a form of power and is legitimated by the state structures (Jessen and von Eggers 2020). Political ecology helps deal with TEK's subjugation by the standard knowledge discourse created by conservation science. In this paper, we explore how the hegemonic power of knowledge of conservation science as discourse has influenced the management of the Park and BZ, thereby (de)valuing Bote TEK.

MATERIAL AND METHODS

Contexts of Study: Chitwan National Park and Bote Indigenous Peoples

Chitwan National Park

Chitwan National Park (CNP) (name was changed following the end of the Nepalese monarchy in 1990), established in 1973 as Royal Chitwan National Park (RCNP), is located in south-central Nepal, covering 952.63 sq. km. in the subtropical lowlands of the inner Terai (McLean 1999). It extends over four administrative districts – Nawalpur (Gandaki Province), Chitwan and Makwanpur (Bagmati Province), and Parsa (Madhesh Province) – providing natural connectivity to the lesser Himalayas on its north, Parsa National Park on its East, and Valmiki Tiger Reserve of India on its South (UNESCO 2021). The Park has declared a BZ in 1996 that covers an area of 750 sq. km., which consists of forests and cultivated private lands (Stapp et al. 2016). UNESCO designated it as a World Heritage Site in 1984 due to its exceptional biological and ecological processes, natural beauty, and importance as homes of endangered species. According to UNESCO (2021), the Park is home to numerous species (541 species of birds, 120 species of fish, and 70 species of mammals, and 49 species of reptiles and amphibians). The Park has 82% forest, 5.36% grasslands, and 3.45% of water bodies (UNESCO 2021). In addition to the conservation of the Gharial Crocodile, the local Rhino population has also been a focus of the CNP (NTNC 2021).

CNP adopted fortress conservation, a dominant model of Yellowstone National Park, the first Park in the United States established in 1872, in preserving wildlife (Adams and Hutton 2007; Mishra 1982; Thing et al. 2017). It was established by authoritarian King Mahendra under the influence of Western conservationists promulgating the *National Parks and Wildlife Conservation Act 1873* (Heinen and Kattel 1992). The Act was implemented forcefully to protect the Park under strict patrolling and surveillance of the Royal Nepal Army (renamed Nepal Army) from 1975 onwards dislocating Indigenous communities such as Tharu, Bote, Chepang, to name a few.

In the 1980s, as an influence of the Bali Action Plan prepared by the World Congress on National Parks (1982), Nepal endorsed the concept of conser-

vation of development by amending the Conservation Area Regulation in 1989 and handed the authority of Park management to the King Mahendra Trust for Nature Conservation which was established in 1982 (Bhattarai et al. 2017). In addition, the concept of a BZ, developed by UNESCO, was endorsed in CNP (Bhusal 2014) to promote biodiversity conservation in partnership with the local people, thereby fulfilling their development needs (Bajracharya 2009). Again, a shift was made at the beginning of the 2000s from site-based conservation to a landscape approach to conservation with the support of international donors such as UNDP, UNEP, WWF, and to name a few (Bhattarai et al. 2017; Ghimire 2019). The ideas and practices of conservation are almost blind in recognizing the TEK, skills, values, and harmonious interaction of IPs with nature that had centuries of contribution to sustainable management of natural resources.

The reproduction of conservation jurisdiction and practices in Nepal have been framed by the influence of expert knowledge of the distribution of species and ecosystems, thereby identifying the CNP as a hotspot. The state as an entity developed conservation strategies as the effect of the discourse and a multiplicity of relations and interactions with international institutions and organizations (Jessen and von Eggers 2020). The state (power) perpetuated the fortress model of conservation in the name of community-based approaches, excluding IPs in the conservation of natural resources (Thing et al. 2017), via state mechanisms and I/NGOs (as discussed above), subjugating TEK of IPs. The alternative discourse that stems from the right to self-determination of IPs (UN 2008; ILO 2013; UN 2011) provoked by United Nations and other large I/NGOs such as IUCN – advocates for the governance of IPs and local communities (Dudley 2008) – is in the weaker position under the strong hegemonic grip of conservation science backed by the state policies and programs (e.g., Buffer Zone).

Bote Indigenous Peoples

Bote is one of the highly marginalized Indigenous groups among the 142 official caste and ethnic groups identified in Nepal (NSO 2021) who mostly live along the East Rapti and Narayani rivers bordering CNP. They developed their settlements and territories along the riverbanks for centuries. Thus, they have riverine livelihoods, culture, history, and ethnic identity. Bote occupies 0.04 percent (11258) of the total population of Nepal of which 0.03 percent (7687) speak their language (NSO 2021). Bote IPs, in proximity to the CNP, are currently in transition from predominantly forest and riverine-oriented livelihoods to multiple livelihood strategies (Acharya 2010). These changes are driven by general modernization pressures, including a government-driven focus on tourism and conservation which has little space for traditional livelihood practices and collective commons rights. Moreover, BZ policies in CNP have led to the devalued customary social system and TEK of Bote and their interaction with the natural system (Jana 2007b) as the Park management and authorities restrict inter alia the ability of local groups to gather resources to reduce 'illegal' encroachments on wildlife (Poudel 2019).

Research Method: Critical Ethnography

For us to be able to contribute to emancipatory knowledge and social justice discourses, critical ethnography was essential to understand the politics of marginalization (Madison 2019) of Bote TEK. Critical ethnography enabled an exploration of the voices of the suffering of Bote on continuous suppression from conservation authorities, thereby creating conflict. We advocate against the invisible power of knowledge and control for Bote's greater freedom and equity (Madison 2019). In so doing, we spent about three months with the Bote communities in the mid of 2021 on three times of field visits of a month each.

Research Fields

The research was conducted in the BZ area of CNP, particularly in Baghkhor village (Agyauli Village Development Committee-5 as an earlier administrative division) of Kawasoti Municipality-15 and Kolhuwa village of Madhyabindu Municipality-2 of Nawalparasi district. The villages are towards the North-South of CNP (see Figure 1).

Baghkhor is one of the oldest settlements with 75 households of Bote, and Kolhuwa is the newer settlement of Bote in which the CNP displaced 45 families. They were dislocated at this place when the Narayani River, a boundary of the CNP, changed its course, enclosing their traditional settlement. Each household was provided with a small piece of land so that it was enough to make a hut for a single family.

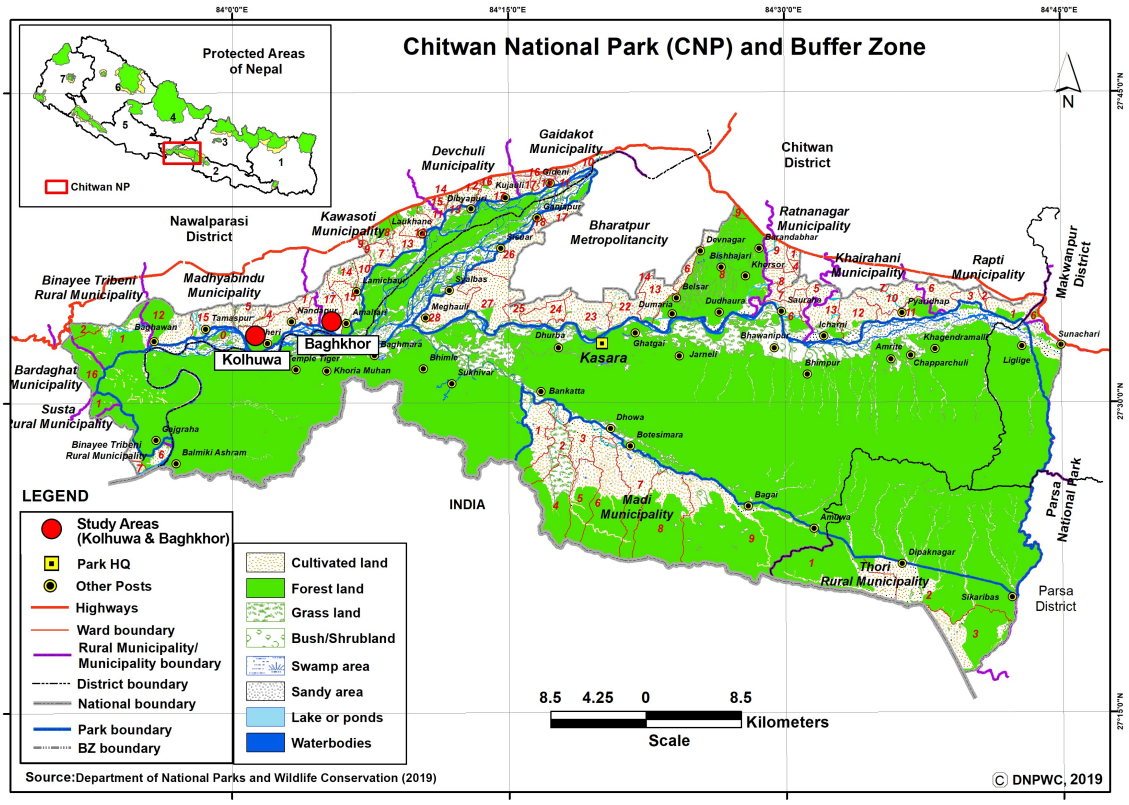

Figure 1. Map of study areas (**Source:** https://dnpwc.gov.np/en/conservation-area-detail/78 Accessed on 5 November 2023)

Unstructured Interviews

We purposefully selected eight Bote community members (fishermen) from two villages (four from each of Baghkhor and Kolhuwa) for unstructured interviews. We chose those participants, aged 40 to 60, based on the recommendation of Gyan Bahadur Bote (pseudonym, an Indigenous activist to whom we knew for a decade) as they had long experiences of fishing in Narayani river, interface with the Park management practices, and alternative livelihoods. Further, we selected two Bote elders (one man and one woman) and two Bote nature guides (one boatman and one Jungle safari guide) from each site to collect information about their TEK embedded with customary riverine livelihoods and nature. A flexible guideline with a few open-ended questions was used to facilitate the interviews. The interviews were also conducted with two Park officers and two representatives of National Trust for Nature Conservation (NTNC), which has key responsibility of managing the Park, to understand their perspectives on the Park management practices.

Focus Group Discussions

We conducted a Focus Group Discussion (FGD) that included six community members at each site. We listened and understood the changes created by CNP on their traditional ways of living. The FGDs were used to collect the community members' collective views (Cohen et al. 2018) on how they have been interacting with CNP activities. These methods helped collect detailed information through probing questions. In addition, the methods were crucial to explore the past and present stories of living based on surrounding natural resources and corroborate the information from unstructured interviews.

Observation

We explored many facts through non-discursive ways, i.e., observation (Flick 2018). We made casual observation about how CNP affected the lives of Bote communities. The fishing, ferrying, fishing nets, Narayani riverbank, the traditional settlement areas, cultural and spiritual plants, fish, and the surrounding natural resources of the Bote people were observed in the natural setting. Further, an account of the observation of the field was prepared based on the field notes and the photographs taken in the fields

after getting the informed consent of the participants.

Data Analysis

The data were transcribed based on the field notes and recordings of unstructured interviews, FGDs, and observation accounts. The data were coded, categorized/sorted, and generated the key themes from the information (Cohen et al. 2018). The detailed transcription yielded a great deal of codes, categories, and themes, of which we chose to focus on three for this paper: de(valued) knowledge of fishing, de(valued) knowledge of the Iconic species, and de(valued) customary livelihoods. We aimed to generate a detailed description of Bote's TEK embedded in riverine livelihoods. The description under each theme with bits of narratives as juicy statements of key research participants was presented as evidence. The narratives were further analyzed to draw a conclusion.

Ethics

In seeking the informed consent of the participants, we informed them of the details of the research purpose and procedure. Further, we maintained the confidentiality and privacy of the participants either by using pseudonyms or not disclosing their names. We assured them the non-maleficence ('do no harm'), beneficence, and justice (not to use the study to harm others) (Orb et al. 2001).

RESULTS AND DISCUSSION

(De)valued Fishing and Ferrying Knowledge

After conducting a series of unstructured interviews with Bote fishermen, we understood that they had a custom of fishing on the basis of certain TEK. They were aware of fishing spots and fish species. They fished the Narayani River's sections north of the dam, close to Tribeni-Bhainsalotan, from Deughat (between Kali Gandaki and Trisuli rivers), along the CNP's south-western border, which is adjacent to the border with south India. They held the right and the usage of the river as common property. They usually went fishing at night in boat that was built with Sal trees (*Shorea robusta*). A homemade fishing net would be used by two people travelling long distances on a boat to catch fish. Many others caught fish by using different methods, such as hooks and occasionally they even employed the *Duwali* method (method of fishing by diverting river flow). The big holes of traditional handmade net (*Hatte Jal*) allowed small fish an opportunity to escape being ensnared. They allowed fish stocks to regenerate themselves by only catching specific species during specific seasons of the year. The Park officials would come and exchange knowledge of fishing and fish species (Jana 2007b).

Bote fishermen understood that using traditional hook-and-line methods was sustainable as it caught only the fish they ate. Hooks constructed were designed to catch specific species. Based on their TEK, this fishing method is considered sustainable because it targets one fish at a time. In fact, this strategy aligns with ecological principles by minimizing the impact on fish populations and promoting a balanced and sustainable harvest (Zhou et al. 2019). The method's reliance on TEK suggests a deeper understanding of local ecosystems, contributing to the overall ecological health of the fishing environment. The traditional methods of fishing that used hook results were less bycatch because non-targeted species could be released immediately. With fishing, they used to reside in the forest near rivers and depend on natural resources for a living (Jana 2007b). They engaged in bartering, exchanging fish with food grains in the village as they had no cultivable lands. However, the Park disregarded the TEK, dependence, and relations of Bote with nature, alienating them from their inherent rights and customary resource use practices and creating a serious livelihood crisis.

Bote fishermen shared that the CNP has completely restricted fishing at nighttime for the preservation of Gharial crocodiles. This is because Gharial crocodiles live on fish. However, there are still about 85 Bote who have been engaging with their traditional knowledge of fishing occupations under specific conditions set by the Park. They have been bound to fish in specific areas using only traditional methods, using *Hatte jaal* (cast nets) and *Dhadiya* (bamboo traps) for fishing within a specific time frame of the day. In this sense, the Park has valued their TEK of fishing, which are sustainable. But, the conditions they need to hold and renew their license annually, paying a certain amount of money, pressure them to use other alternatives such as *Tiyari* net (plastic net) which is band. The provision came almost a decade after the establishment of the CNP, an amendment to the *National Park and Wildlife Conservation Act 1973* allowed the provision of forest products or other services against payment of prescribed fees (Section 16a). Some traditional fisher folks were permitted to fish in the river after 26 years in 2000, upon annual payment of a fee (Jana 2007a).

According to Bote fishermen, providing licenses has been stopped for a few years. The youth nowadays do not get licenses. Many of their licenses have been seized and not renewed for several years. Many of their fishing nets and boats have been snatched and destroyed, accusing them of catching the fish untimely or violating the Park criteria/rules. Several times,

many Bote fishers have paid penalties of Rs.1150 to Rs. 2,500; some have even been arrested and detained for several days.

As alternative livelihoods, the Park authorities shared that the Park has managed the fish ponds for Bote in public lands at the core area of the community at Baghkhor. They further informed us that Rs. 25 thousand ($191) of the grant is provided yearly, and no other activities of livelihoods are allowed nearby there. However, the Park authorities understand that Bote are not interested in promoting fish ponds. They shared that no fish has been produced for two years and Bote are not caring it as they are unable to make further investments. In this regard, Bote fishers noted that they were not interested in such artificial fish keeping. This is because Bote groups idealize their past as free and uninhibited by state-imposed restrictions (Jana 2007a), by which they are less interested in artificiality. The freedom of fishing was enjoyed with the use of boats in long stretches of the Narayani River.

Ferrying for Bote was another means of livelihood accompanied by fishing. Several *Ghats* (ferry points)- *Bhausar Ghat, Leda Ghat, Sigrauli Ghat, and Madwya Ghat* - were managed and used collectively under the leadership of *Mukhiya,* a traditional village chieftain (Jana 2007b). As informed by a Bote elder, they provided service to the villagers in exchange for food grains and other livelihood needs. Additionally, the Rhino Patrol employees of CNP were heavily dependent on Bote's ferrying services (Jana 2007b). The Park authorities shared that they still use ferrying in emergency cases for rescuing animals. Bote in FGD in Baghkhor shared, *"Sometimes, Park officials call us when they need to cross the river to rescue animals when flooded by the river, and we (fishermen) use our boats to go to the risky areas where people cannot go".* However, modern road and bridge construction has gradually replaced ferrying as traditional means of living among Bote.

Following the setting up of the CNP in 1973, fishing was outlawed while Bote were, subject to the license being granted, allowed to fish in the rivers. The Park criminalizes the customary livelihood practices of Bote. The Park authorities seize fishing nets and boats. Bote fishers or community members are frequently accused of illegal activities, arrested, intimidated, and detained for several days. Above analysis shows the Park has (de)valued TEK of Bote with partial permission for fishing and ferrying. However, this has been serving the interest of the park to strengthen the protectionist conservation. (De)valuation of TEK is also visible in management of iconic species.

(De)valued Bote Ecological Knowledge on Iconic Species

The Park has emphasized conserving endangered iconic species. Among several iconic species such as Rhinoceros (*Rhinocerotidae*), Tiger (*Panthera tigris*), Elephant (*Elephas maximus*), Red Panda (*Ailurus fulgens*), and Black Buck (*Antilope cervicapra*), the Gharial Crocodile (*Gavialis gangeticus*) is an endangered species and a central attraction to tourism in the CNP (Aryal et al. 2020). From the series of unstructured interviews with Bote elders (both men and women), we understood that they experienced their customary riverine livelihoods still have a huge body of TEK. Due to their extensive fishing history, the Bote people have also amassed a wealth of knowledge regarding the Gharial crocodile's manner of existence. The Bote elders (men) shared that sometimes the Gharial crocodiles, which eat fish, become trapped in fishing nets. The availability of the crocodiles informed them of the fish habitats, thus they reasoned that the crocodiles needed to be untangled. The presence of Gharial crocodiles and their habitats provides information on the locations where fish are present in the river.

Because of their long history of interacting with the river environment, Bote can recognise sections of rivers and types of sand that are suitable for Gharial Crocodiles. Protected breeding centers have been established by the Park to increase the Gharial population with some success, and Bote have been employed by the Park in these projects to collect eggs and hatchlings of Gharial crocodiles on the riverbanks. Bote know when, where, and how the crocodiles lay eggs and hatch hatchlings. Bote elders informed that the last week of March to the mid of April is the duration of laying eggs. Densely foggy weather that irritates the eyes is the time of egg laying of crocodiles. Silky sand mixed little with mud is the most appropriate for hatching eggs. Crocodiles lay eggs at least two feet down in the sand as it absorbs the heat of the sun for a longer period.

Bote elders shared that they have specific knowledge of finding the eggs laid by the crocodiles. They see the sand scratched and the direction thrown around the buried hole. They dig out the sand at the place at least around six or seven feet of the distance the sand is thrown. That means they find the direction of the sand thrown and measure the approximate distance. They dig out the sand and collect the eggs. They are also allowed to collect hatchlings of crocodiles. Generally, the hatchlings come out of the sand after a month, from the last week of April to mid-May. They know how the mother crocodile behaves with the hatchlings. During this period, mother crocodiles come and listen to the sound of hatchlings

time and again. After the sound of hatchlings is exposed, she digs out the babies. Bote can also identify the sound of hatchlings produced inside the sand. So they catch the hatchlings by digging out the sand or when coming out of it. In the FGD of Kolhuwa, one of the participants noted; *Officials from the Park give us a call. They write us a letter asking us to pick up the crocodile eggs. The eggs are gathered by a group of Bote and sent to Kasara (artificial breeding center), where crocodile eggs are gathered in preparation for hatching. Eight or nine couples go out and gather crocodiles' eggs. The Park officials find it challenging to locate the egg laying spots. Yes, we have a strong team there.* (Excerpt from transcription)

CNP has used the TEK of Bote in collecting eggs and hatchlings. As informed in the FGDs, Narayan Bote (pseudonym) and a few others have been invited yearly for this work. They go every year with their wives as wives have to cook food as they live for one and half months at the banks of the Narayani river. They collect and take eggs and hatchlings to Kasara, an artificial hatching center. At Kasara also, they need to make an artificial hatching spot under the sand and take care of it till the hatchlings are produced. For their efforts and knowledge, Bote received Rs. 15000 ($ 114) for each for a month last year, and this year (in 2021), they got Rs. 20000 ($152) for each with no provision for their wives included. They have been economically exploited, and their TEK on the life-cycle of Gharial crocodiles is used to promote the artificial scientific approach of increasing the population of the crocodiles.

Due to their long-standing engagement with nature wandering around the thick forests, fishing, ferrying, panning gold motes, grazing cattle, and collecting forest products, Bote knew the habitats of each type of fauna. They believe that there are capitals of wild animals, such as Rhinos roaming around a Dhok (a rock as an image of the home of the god of Rhinos), Crocodiles moving around Bhim Dam, and Tigers wandering in and around Bhaisalotan, south of the Narayani river (Jana 2007b). This is further supported by a study conducted in southern Mexico, which found a proactive and positive correlation between the self-identification of indigenous groups and the appropriateness of their habitat for large carnivore conservation (Guerrero-Montes de Oca et al. 2021). Recognizing the TEK of Bote, they are frequently used for accompanying the Park officials on patrol duty, ferrying them for unimpeded access to the river when they engage in conserving endangered animals such as one-horned Rhinoceros (Jana 2007b). As informed by Bote in FGDs, they are, time and again, called informally to rescue animals flooded or injured. According to them, despite their contribution, Bote people have been labeled thieves and contributors to the extinction of Gharial crocodiles and fish in the Narayani River.

In addition, a member of NTNC shared that they have mobilized IPs and local communities for the preservation and protection of wildlife. He further said, *'Chor Ko Hat Ma Chaabi'* (Key at the hand of thief). He thought that the IPs and local communities as poachers. There are 20 Community-Based Antipoaching Units (CBAPUs), sub-units of 22 Buffer Zone User Committees (BZUCs) is another initiative of community-based conservation that contributes to patrolling, surveillance, rescuing wildlife, gathering information on illegal activities, and raising awareness. Three CBAPUs (Barandabhar, Patihani, and Mirgakunja) in Beeshazari Lake have a significant contribution to wildlife conservation (Lamichhane et al. 2020). NTNC member further noted; *We employ locals to locate and capture animals like tiger, elephants, rhinos, and others since they are familiar with their habitats and behaviors. We also use them for rescuing animals which are under risk of floods and diseases. They are used as guides.* (Excerpt from transcription)

There were few Indigenous youths who participated in CBAPUs (Lamichhane et al 2020). In an FGD at Kolhuwa village, Bote said that they were often called by CBAPUs to rescue wild animals flooded by the Narayani River. The Park authorities have been using TEK of Bote to serve their interest in the scientific conservation of biodiversity. Most Bote youths have little such knowledge as they have been restricted from engaging in their traditional livelihoods. Generating TEK and its intactness through direct contact with nature and transmitting TEK in the kinship system is likely to disappear in the Bote community. The TEK, recognized as instrumental for biodiversity conservation and natural resource management by CBD and Agenda 21 (Higgins 1998), is under serious threat of extinction. Restriction of CNP for Bote has not only created a threat to their TEK but also has made a shift from sustainability to the unsustainability of their livelihoods. Bote youths have been diverted towards alternative livelihood strategies.

Alternative Livelihoods and (De)valued Ecological Knowledge

Bote in Baghkhor have been limited in the area, and most have vulnerable livelihoods. They had no cultivable lands. After restriction of the Park to engage in riverine livelihoods, they have been residing in the areas outside of Narayani river. However, they have been converted into small landholders, though the lands have not yet been officially registered. Wild animals frequently damage crops and vegetables in

small patches of cultivable lands. As informed by the participants, many of them do not receive any compensation as they do not claim due to clumsy and messy bureaucratic processes. Bote in Kolhuwa are more vulnerable as they were displaced when the Narayani River changed course, enclosing their traditional lands (now inside the Park). Each of the households has been provided a small patch of land, just enough to make a small hut with no registration certificate. They have no option for livelihoods. Thus, many Bote youths go abroad (in Gulf countries) for wage laboring, and some engage in labor works in the vicinity.

There is an increasing realization of conservation providing alternative livelihoods for IPs and local communities through expanding education and ensuring participation in protected area management (Bhattarai et al. 2017; Heinen and Kattel 1992). But, the evidence of implementation for some IPs, such as Bote, is not convincing, as reported later by Poudel (2019). The park has provided 30-50 percent of the park revenue for community development and natural resource management in the BZ. New ideas of Buffer Zone Community Forest, community development, and the formation of user committees came into practice in addressing the problems of IPs and local communities. One of the representatives of NTNC asserted; *"In order to preserve and safeguard wildlife, we closely work with the communities. We have improved the local communities' standard of living. I give you the statistics of our programs. There are 72 households engaging in animal husbandry, 401 weaving wool, 76 making carpets, many of them are growing mushrooms, and many are growing bananas. Individuals have received training and been hired to serve as tourist guides for nature or conservation. We have encouraged cooperative credit and savings groups to engage in microfinance."* (Excerpt from transcription)

In particular, in series of interviews with Bote nature guides (boatman and Jungle Safari guide), we explored that most of the Bote have less access to the alternative livelihoods offered by the Park. Few households in Baghkhor engage in homestay business, and few are nature guides (trained by the Park) and earn only for subsistence in the season of tourists. The purpose of the community-based approach to conservation is again to detach Bote from their customary lifeways and their TEK. The form of economic modernization has been coupled with the purpose of conservation. Ecotourism, widely recognized as one of the key strategies for social, economic, cultural, and environmental sustainability, promoted in the major entry points/villages in the BZ areas has both positive (economic benefits mostly for migrants and the Park) and negative (cultural erosion, violence, pollution) impacts on IPs and local communities (Bhusal 2007; Acharya et al. 2020). However, Bote are less benefitted from ecotourism except for a few nature guides, boatmen, and Jungle safari guides (Biswakarma and Gurung 2018). As informed by a nature guide, they are focused on training the guides as they already know the topography of forest, river, species, and the whole nature of the vicinity. A Bote guided us as we explored the many areas of the Park to observe and understand TEK. He gave us an explanation of all the species, their habitats, the locations of forests and rivers, and their importance. This shows that Bote TEK has been used for promoting conservation practices while promoting ecotourism. The present conservation practices have forced Bote to change their socio-economic and cultural practices (de)valuing their TEK systems.

Resistance of Bote

Bote IPs spontaneously come out when someone/s in their community is/are accused and arrested in so-called illegal activities inside the Park. This is because the IPs and local communities are not satisfied with the current practices of CNP (Lamichhane et al. 2019). As informed by a Bote fisherman, at one time, two years ago, a group of Bote youths entered their past home areas inside the Park, and they were arrested and detained for a week. They, collectively with the support of political cadres, went to Kasera (Head Office of CNP), and the youths were released by paying a fine. However, Bote, including other fisher groups (Majhi and Musahar), started advocacy movements[3] in the 1980s and later expanded networks in different villages of Nawalparasi, engaging in mass demonstrations, protesting, dialogue with Park authorities, and exerting pressure on the authorities (Jana 2007a). The issues they continuously raise are the basic human rights of providing fishing, collecting wild vegetables, fodder, and firewood, and a complete stop to militarization. In the later years, they have been claiming their rightful space in resource management, such as in Community Forest User's Group, Buffer Zone Users Group, and so on. However, they have not felt any positive changes for them except limited excess to fishing, and natural resources in Bz areas.

[3]The organization was registered under the name of Majhi Musahar Bote Kalyan Sewa Samiti (MMBKSS) in 1994 for the sustained advocacy program (Jana, 2007a).

CONCLUSION

In this paper, we argue that the body of TEK of the Bote community, deeply rooted in their traditional riverine livelihoods, is (de)valued in fortress conservation practices. The community-based conservation approach has provided this limited space of incorporating particular TEK. Particular TEK of Bote is valued and used for strengthening the protectionist conservation model. The physical displacement of the Bote community by the Park has not only severed their connection to the land but also disrupted their lived experiences and relational knowledge of the natural world. The use of distilled TEK by the Park for conservation has paralyzed its nature of wholeness (intrinsically connected with the culture and livelihoods). Thus, TEK's integrity (in the sense of undivided) and intactness are misrecognized by the Park for the mutual sustainability of biodiversity and Bote.

A paradigm shift towards the co-management of protected areas with a general understanding of making participation of local communities in governance and sustainable resource management practices (Ward et al. 2018) are less meaningful from the Indigenous perspective. The state policies and management practices of protected areas could not sufficiently recognize IPs' inseparable relationships (economic, cultural, and spiritual) with nature. The current co-management practices are insufficient to integrate the TEK and practices of sustainable natural resource management. The argument for hybridizing TEK with expert knowledge to achieve the transformative change of conservation (Domínguez and Luoma 2020; Reyes-García et al. 2022) may not be the solution as it may again paralyze TEK. Dominantly, it needs to have Indigenous guardianship and stewardship of nature to mitigate the conservation challenges (Gadgil et al. 2021) and to promote mutual sustainability of biodiversity and livelihoods of the IPs. Thus, it is crucial to recognize, respect, and translate the ethnoecological imagination (concept of IPs on nature) of IPs in biodiversity conservation.

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DATA AVAILABILITY

The data used to support the findings of this study are available from the corresponding author upon reasonable request.

CONFLICT OF INTEREST

There is no conflict of interest.

CONTRIBUTION STATEMENT

Conceived of the presented idea: IMR
Carried out the experiment: IMR and RKD
Carried out the data analysis: IMR and RKD
Wrote the first draft of the manuscript: IMR
Review and final write of the manuscript: IMR
Supervision: IMR

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