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Biocultural Values in Borena Sayint National Park, North-Eastern Ethiopia: Contributions of Ethno botany for Ecotourism Diversification

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ABSTRACT

Humans' cultural perception of certain plants and interaction with the natural environment shape the biocultural traditions of societies living around protected areas. The study was conducted in Borena Sayint National Park, north-eastern Ethiopia between March 2015 and February 2016. Its main objective was to retrieve biocultural values linked with the landscape and biodiversity. Accounts of biocultural values were retrieved from a snowball sample of 100 informants and focus group discussion made with 25 elders. Names of plants mentioned for any biocultural value were recorded and voucher specimens collected. Data management and analysis was conducted using Excel 2007. The coordinate points of each GPS readings were analyzed to make map of the study area using ArcGIS Version 9.3 Software. R software was used to make climate diagram. Potential ecotourism attractions deriving from local plant use culture and reports on antique human-environment relationships were described. Twenty-nine plant species in 27 genera and 20 families were recorded. Twenty plant species are locally perceived for their mythological values, 10 plant species for their social values. The taxa are recognized for 1-14 of 28 alternative local plant uses. Biocultural values add to the ecotourism potential of the national park. The national park management and the Culture and Tourism Bureau can consider the identified biocultural values and others in their on-going efforts to diversify ecotourism attractions in BSNP to advance the fledgling national park to an outstanding ecotourism platform in the region and in Ethiopia.

Keywords: Biocultural diversity, Cultural plants, Ecotourism, Mythological contexts, Social values.

INTRODUCTION

Every traditional culture or human society living close to nature and depending on natural resources for livelihoods, has its own worldview, or a unique way of viewing the universe (Cocks, 2006) and utilizing its components. It includes religion, ethics, and more generally belief systems in the circle of the knowledge-practice-belief complex (Berkes, 1999; Berkes et al., 2000). The unity of humans, nature and deities forms the core of the worldview of many traditional societies (Mathez-Stiefel et al., 2007). Out of the prevailing unity between the human world, the natural world and the spiritual world, both human needs and those of the ancestral spirits residing inside the forest are believed to be simultaneously satisfied. Not only the worldview of societies created a framework for appropriate resource utilization within traditional communities, but also served as a foundation of modern (western) knowledge, formal science and technology. An ideal example is the original plant use knowledge including food, medicinal and other useful plants generated by early humans' acute observation of the behavior of animals and their power of instinct, intuition, trial and error learning and experimentation (Cotton, 1996). Evidence supporting the above assertion comes from the shepherd's legendary insightful discovery of Coffee (*Coffee arabica*), upon observing the strange behavior of his herd of goats browsed on red coffee berries (Heng, 2009; Kucukkomurler & Ozgen, 2009).

The knowledge held by communities leading traditional lifestyles has been accumulated over time, developing through generations of plant use, and will pass down to posterity. Many modern nutraceutical and pharmaceutical productions from novel plant products are legacies of ethnobotanical screening and bioprospecting derived from local knowledge of plants. The lore passing down through generations by words-of-mouth and hands-on practices constitutes the biocultural values of a society.

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The IUCN's World Commission on Protected Areas' task force on Cultural and Spiritual Values of Protected Areas (CSVPA) view biocultural values as those qualities, both positive and negative, ascribed to nature, landscapes and ecosystems by different social groups, traditions, beliefs, or value systems, and connected in meaningful ways to local worldview and fulfillment of humans' needs (CSVPA, 2005). These are manifestations of cultural practices of utilization and manipulation of biological wealth and ecosystems. Emphasis is given to the critical importance of integrating cultural and spiritual values in conservation management because cultural diversity and biological diversity are mutually interdependent (Cocks, 2006).

The Fifth World Parks Congress called for the inclusion of cultural values in the planning of the management and policy guidelines of governments, non-governmental organizations (NGOs), local communities and civil society (Dudley, 2008). The recommendation aims to ensure that protected areas consider cultural and spiritual values in setting management objectives in categories where they are currently excluded. Through the framework of the Millennium Development Goals, indigenous experts agreed that indicators must place greater emphasis on indigenous peoples' values, traditions, languages, and traditional orders/systems, including laws, norms, governance, lands and economies (MEA, 2005).

Protected areas are sources of an array of sites and values developed through the close interaction of humans with their environment in using natural resources (Pimbert & Pretty, 1995) as well as living in and around them. This intimate human-environment relationship has always been the basis for the development of the ethnoecological/ ethnobotanical lore of societies (Johnson, 1992) that is expressed as unwritten stories of local people. It includes myths, rituals, taboos, beliefs, concepts, stories, sayings, proverbs, poems and dances (Martin, 1995; Cox, 2001). It passes down the generation lines by words-of-mouth as intangible heritage and legacy of ancestral people, transferring everlasting ethnoecological messages (Adal, 2014). It is sometimes depicted in totems, reliefs, artifacts and paintings, and in some societies, reflected in emblems and cult objects for the symbolic expression of the common cultural identity, as well as shared cultural and religious values of the people (Slikkerveer, 1999; Cox, 2001).

Borena Sayint National Park (BSNP) has been legally designated by Proclamation No. 68/2009 at a geographically, historically and culturally important location in Ethiopia to enhance biodiversity conservation and local economic development, while at the same time passing biodiversity to the next generation as a bequest (ANRS, 2009). Comparison of the three national parks in terms of total land area shows that BSNP (43 km^2) is 10-fold smaller than the Simien Mountains National Park (412 km^2) and 50 times smaller than Bale Mountains National Park (2200 km^2) (Bale Mountain National Park General Management Plan (2007-2017) and SMNP (2009-2019). Regarding species diversity, the dry evergreen Afromontane part of BMNP (agroecological equivalent of BSNP) has a record of only 230 species (Yineger et al., 2008) of the overall estimated 1008 species (Personal communication with Prof. Ensermu Kelbessa cited in Adal, 2014); SMNP has 532 species. BSNP has 354 species implying that the difference in species richness between the three national parks is less significant relative to difference in size (Adal, 2014). However, while the proclamation gives premier attention to the conservation of biodiversity, particularly large mammals, endemic birds and vascular plant species inhabiting this vulnerable Afroalpine vegetation zone, it gives no proviso for the preservation of biocultural values associated with the biodiversity and features of the vegetation. The latter are gradually fading away from the indigenous knowledge pool of the local community and this happened perhaps despite the importance of the local plant use knowledge developed about specific plants and folklore linked with the forest, grasslands and other habitat types. Biocultural values are assets that can be used to develop ecotourism products for foreign visitors interested in traditional lifestyles and management practices. These can be a wonderful means to generate local income and improve the welfare of the inhabitants of the destination by increasing the number of attractions (Salafsky & Wollenberg, 2000) if conducted through taking maximum care to prevent the ecological impacts of ecotourism on threatened species survival (Buckley et al., 2015) and prevention of acculturation of traditional culture of local communities. Hence, documenting, preserving and adequately developing these biocultural values not only has pay-offs from ecotourism, but also ensures cultural continuity and strengthens the identity of local people.

Conducting scientific research into the biocultural values associated with the biodiversity and forested landscape in the emerging BSNP is timely, and no such study has ever given so far, such wide scope to this aspect in the study area. The objective of the study is to awaken members of the local community and relevant government institutions to the possibilities of diversification of ecotourism products by reinvigorating weakened or dormant biocultural values. In addition to helping to enhance local economic development through ecotourism diversification, it can address local concerns related to cultural survival and

biodiversity conservation. The research focuses on the following key research questions.

- Are there significant biocultural traditions associated with the plants and forested landscape in BSNP to be evaluated and validated for ecotourism development?
- Which cultural plants and plant products can be promoted as ecotourism attractions?

MATERIALS AND METHODS

The study area:

BSNP is located at one of the watershed catchments of the Blue Nile (or Abbay River) in the north-western highlands of north-eastern Ethiopia in the Wollo Upland Floristic Region (WU) within geographical coordinates of 10° 45'to 11° 00' N and 38° 40' to 38° 55' E (Fig. 1), at an altitudinal range of 2188 to 3732 masl. Initially, BSNP was approximately 4,375 ha, but recently expanded to include 15,262 ha extending to a summit of 4280 masl. The national park circumscribed the natural vegetation between Borena (formerly Debresina) and Sayint Weredas, both parts of the previous Borena Awraja (district in the former classification while 'wereda' is equivalent to a district in the current administrative setups). In July 2006 (EC), Sayint Wereda was divided into Mehal-Sayint and Sayint weredas. Gradually, the national park expansion annexed additional areas from parts of Sayint, Legambo, Modella and Tenta Weredas. Neighboring weredas therefore, demanded the redefinition and renaming of the national park to "Borena Sayint Werhimeno National Park".

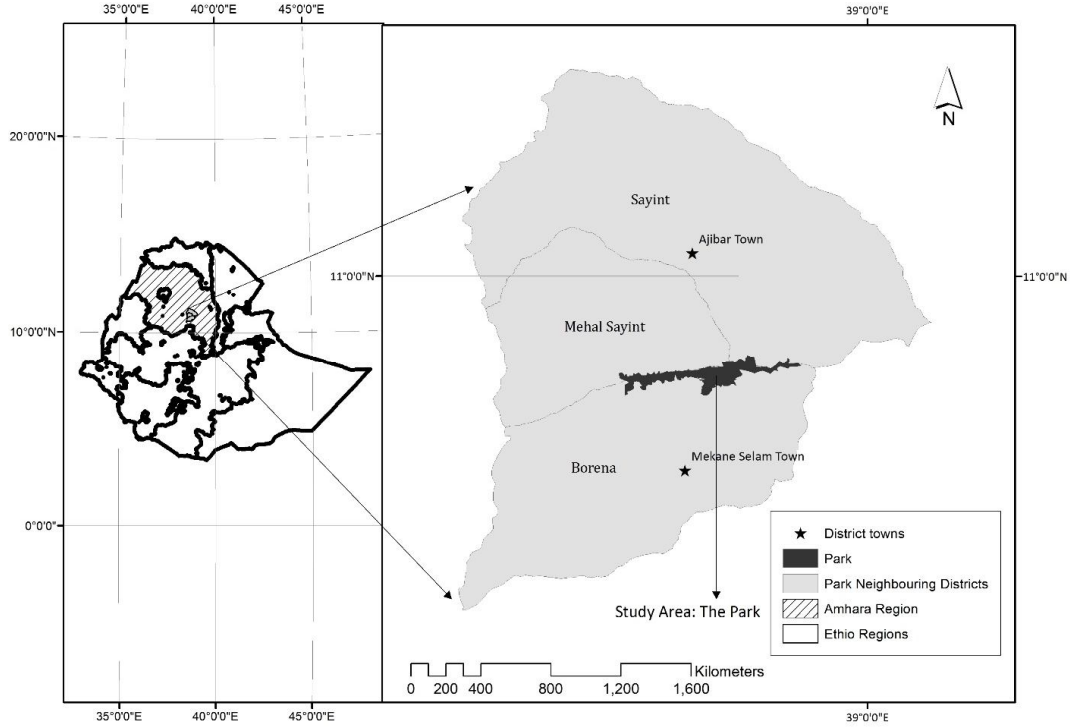

Fig. 1: Map of the study area

The general topography of BSNP is unique in that its dry Afromontane forest (DAF) (hereafter referred to as TIKUR DEN) occurring below 3000 m is entrenched inside a deep canyon, while its sub-Afroalpine grasslands (hereafter referred to as GUASSA) rises above 3000 m. Both landscapes look-like an accordion due to the presence of recurrent quasi-pleated sheets of land mass formed by repeated faults and folds occurring at short distances from each other. The GUASSA is the origin and upper watershed of eight intermittent rivers flowing down into the Abbay River, excluding those of the expansion area. The TIKUR DEN is sandwiched between ridges of land masses along the border of Borena and Sayint Weredas within the national park, except where it is sharply demarcated by the Mognoch Afaf, a sharp cliff separating the national park from the low-lying settlement zone at its southern end. The TIKUR DEN portion of the national park is difficult to access except at the entrances where there are permanent footpaths leading through the forest.

The study area is characterized by bimodal rainfall, short rains in March, long rains in July through September, with a mean annual rainfall of 931 mm and annual temperature of 16° C (Fig. 2) (NMSA,

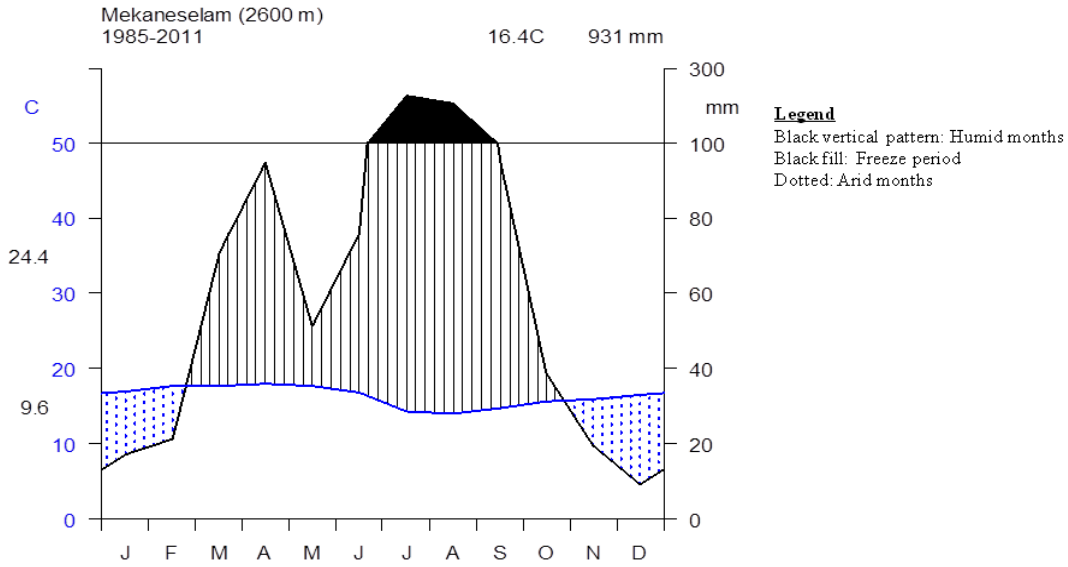

Fig. 2: Climate diagram of Mekaneselam (Data source: NMSA, 2012)

2012). It is comprised of volcanic rocks of pre-Cambrian and Jurassic origin, which provide the substrate for major soil types, including Cambisols, Andosols, Lithosols and Vertisols (Friis et al., 2011). Prolonged exposure of the soil to excessive erosion has reduced the productivity of the land so that smallholder farmers living off crop cultivation on the degraded rugged hillsides of the area often harvest little crops.

Two major vegetation types occur in BSNP sandwiched between degraded hillsides at the interface of neighboring weredas. The TIKUR DEN covers the DAF on both sides of the Denkoro River Valley below the Alebachew Washer while the GUASSA part covers the sub Afroalpine and Afroalpine belts of the Limesk plateau and adjacent areas surrounded by the ericaceous belt. The DAF is characterized by physiognomic diversity comprised of a mosaic of vegetation types described in Friis et al. (2011), including the undifferentiated Afromontane forest; dry single-dominants Afromontane forest; Afomontane woodland, wooded grassland and grassland. In addition, wet spots and small ponds fill with water during the rainy seasons and contain aquatic vegetation.

In addition to physiognomic diversity, the national park is characterized by species diversity. Adal (2014) documented 39 wild edible plants, 82 medicinal, 67 bee forages and 77 in other use categories among the 354 vascular plant species recorded in the study area alluding the Afromontane vegetation to a rich diversity of non-timber plant products (NTPPs). Also, several indigenous mammals and birds including endemics are present. Previously Chane (2010) listed 30 wild mammalian species including the Ethiopian wolf (*Canis simensis*), leopard (*Panthera pardus)*, Gelada Baboon *(Theropithecus gelada)*, and Menelik's Bush-buck (*Tragelaphus scriptus meneliki)*. Several common and endemic birds are reportedly present (Ayalew et al., 2006). However, this biodiversity-rich national park has long been subjected to heavy anthropogenic pressure and recurrent drought.

According to Abate (1973), the study area forms the western edge of the historical BETEAMHARA (Amhara dominion), where the Oromos moved into during the end of the 16th and first half of the 17th centuries. The incoming Oromos pushed the Amharas west to the area beyond Denkoro River; that side is still considered Amhara's territory. The people of Borena Wereda trace their line of descent from a mixed Amhara-Oromo ancestor, while communities in Sayint Wereda assert to be predominately Amhara. Today, both groups are completely integrated into a single linguistic and cultural group through marriage and all forms of cultural exchange. These smallholder farming communities with mixed culture live on both sides of the people-park interface struggling to satisfy their economic needs.

The study area is part of the drought-prone region in Ethiopia where the 1974 (EC) historic Wollo Famine driven by drought ravaged the lives of thousands of people and subsequently triggered a massive civil unrest that led to the overthrow of the Monarch. Because of chronic poverty, the local people have been forced to put pressure on the natural vegetation looking as a primary biological resource. Thus, besides impacts of recurrent droughts, anthropogenic pressure has been a threat to the biodiversity of the national park. This long human-environment interaction has consistently modified the natural vegetation and led to its current state.

Sampling design:

The total population of the 13 peasant associations (PAs) surrounding the national park in both weredas is estimated at 62,084 (31,008 males and 31,076 females), including 13,969 households (CSA, 2008). Of these, 8,290 individuals in 1,190 households living in 35 village clusters (hamlets) at the edges of the national park were taken as the study population (Fig. 3). Snowball sampling beginning with 25 elders and leading to interviews with 100 knowledgeable elders were employed to get adequate samples from the park fringe communities, including inhabitants of the DAF and GUASSA zones in the two weredas.

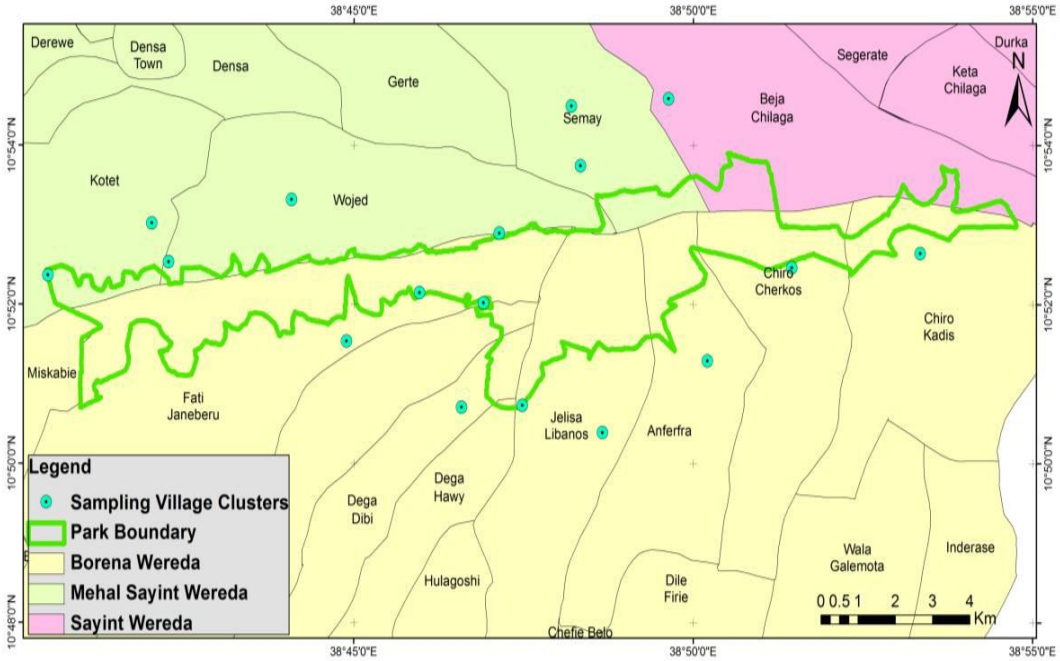

Fig. 3: Ethno botanical data sampling village clusters (Map of the study area obtained from the Ethiopian Mapping Agency, EMA (1998) and modified for the study). ● denote the positions of village clusters for ethno botanical sampling

Methods of data collection:

Ethical clearance was obtained from concerned government authorities before obtaining the verbal consent of each informant. This was done to comply with the requirements of Proclamation No. 482/2006, articles 11:4 and 22:2 (GOE, 2006) providing for access to genetic resources, community knowledge, and community right. A free-listing activity was exercised on the cultural use of plants in two cultural contexts; mythological and social, using a semi-structured interview schedule employed for 100 informants. Next, with a view to compare the cultural importance of the plants, data were generated on the overall use-value of all recorded plants in a focus group discussion made with 25 elders. This was done following Martin (1995) where subjective allocation of use-value scores was made for each plant based on three arbitrary index levels: a value of "1" for major use; value of "0.5" for minor use and value of "0" for no use. The rank order of popularity of each species (ROP) was computed from the number of informants citing a plant for any cultural context.

Narratives related to the forested landscape were captured from the words-of-mouth of the informants by oral history methods and through a focus group discussion held with selected elders. Sites mentioned during interviews were observed while taking readings of coordinate pairs of each spot using a GPS (Garmin 60). Pictures of cultural plants and relevant landscapes were taken using an Olympus Master 2 camera. All plant voucher specimens were collected, pressed, dried, identified and authenticated at the National Herbarium, ETH, and Addis Ababa University using the relevant volumes of the Flora of Ethiopia and Eritrea and checking against identified specimens at the herbarium. Voucher specimens were deposited in the herbarium for future reference.

Methods of data analysis:

The map of the study area was drawn using ArcGIS Version 9.3 Software from the GPS readings taken using GPS Garmin 60 and sampling village clusters were drawn on the modified map obtained from the Ethiopian Mapping Agency (EMA, 1998) from the numeric values of the coordinate pairs taken for each village. R software

was used to make the climate diagram. The data obtained from informant consensus for each cultural plant use was summed up (∑**Uv**) to determine the cultural significance of the species. The proportion of informants who cited a species for a context was used to determine its rank order of popularity (ROP). The biocultural data collected from the informants representing the local people was analyzed using text analyses.

RESULTS

Biocultural values developed from humans-habitat interaction:

Biocultural values associated with the natural habitat and vegetation were retrieved from the cognitive domain of the participants of the study (Table 1). These values are expressed in the lyrics of folksongs chanted referring to the natural vegetation as a topic. Contents of verses of the lyrics cited for chanting reflect the sentiment or intension of the individual with the probable practical action he may take to compensate for the cause of his intension articulated via the chants. Someone reflecting the elegance of the vegetation chants lyric 1, someone else wishing to hide in the forest to satisfy his bloodlust and someone else comparing the merit of forest life to that of civic life chant lyric 2 and 3 respectively. Adults are still chanting these folksongs at times of eventful days such as on wedding ceremonies and festivity days. In addition, young men normally sing out the lyrics to use them as motivational factors when they are spending time in the field, working the land, or herding domestic animals.

Biocultural values developed through local plant use:

Biocultural values associated with the mythological and social use of plants were retrieved from free-listing activity. In total, 29 cultural plant species in 27 genera and 20 families were recorded forming the basis of the biocultural traditions of the local people (Table 2&3, Appendix 1). Twenty plant species have mythological values and 10 plant species used for social contexts. Twenty-eight miscellaneous uses of the plants were recorded from focus group discussion (Fig. 4).

The mythological contexts include myths and rituals expressed in practices of witch craft, warding off JINI (bad sprit), attracting the wizard and conducting WUKABI (spirit) rituals. In the social context, cultural plants are used as markers of annual festivities, especially during the New Year (INKUTATASH) and Easter (FASIKA), during courtship fairs of village youths enjoyed on carnival days and in a traditional game known as GITIE. Appendix 1 presents a short list of cultural plants and their use documented in the study.

The mythological context:

Plants used to ward off a SELABI or MUARTEGNA (Witchcraft):

In the cosmology of the local people, some cultural plants are believed to prevent a SELABI (witch) from doing evil things such as stealing others' property. A small piece of the root of *Verbascum sinaiticum* is plugged into the vent of a WOSSO

Table 1: Three most chanted lyrics of folksongs in reference to the forest

Line	The lyric in Amharic	Transliteration	Translation	Ethno-ecological message
1.1	ደንቆሮ አረጀ አለ ሸበት ቀነቀነ	*'Denkoro' areje alu shibet kenekene,*	Denkoro grew old, has grey hair,	Deforestation is a threat to the grace of a natural habitat and traditional life style
1.2	አንድ ሰው ብቻውን ይጓዘው ጀመረ	*Andi sew Buchan yiguazew jeer.*	A solitary individual could now cross it without fear.	
2.1	ጥራኝ ደኑ ጥራኝ ደኑ	*Tiragn denu, tiragn duru,*	Call me out the wilderness, call me out the forest,	The harmonious coexistence of natural forests and humans
2.2	ለአንተም ይሻልሃል ብቻ ከማደሩ	*Lantem yishalihal bicha kemadaru.*	Better enjoy my company than the lonely night.	
3.1	መነጠሩት አለ ደንቆሮ ደኑን	*Meneterut, akatelut alu 'Denkoro' demonic,*	They slashed and burnt 'Denkoro' Forest, there is a rumor,	Compassion for the destruction of the vital natural forest
3.2	ከአረባባ ጎጆ የሚሻለውን	*Arababad goji yemishalewunni.*	Alas! Compared to the wretched's bungalow, it was superior.	

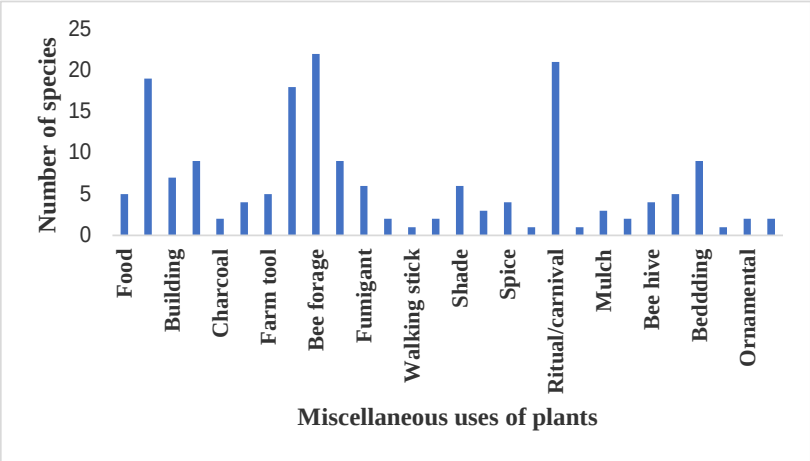

Fig. 4: Miscellaneous uses of cultural plants in BSNP

(milk container) when separating butter from milk; milk utensils are smoked burning the root of *Capparis tomentosa*. A SELABI is blocked by putting a twig of *Asparagus africanus* and a leaf of *Aloe* spp. under a stone at the middle of the road or footpath trail leading to the threshing ground. In addition, a few twigs of *Rumex nervosus* and *Rosa abyssinica* are put at the centre of the harvest until carried away to the silo. Similarly, crushed leaves of *Vernonia amygdalina* are dissolved in water and sprinkled all around the house and cattle kraal to ward off a MUARTEGNA (evil power).

Warding off JINI (bad sprit) and hyena:

During house construction, wood of *Osyris quadripartita* is incorporated into the house wall to ward off JINI. An infusion prepared from crushed leaves of this plant are sprayed early morning over the livestock in the stall supposing it would protect them from a hyena attack. Someone sprays the infusion at dawn before he urinates.

Prevention of Anthrax:

A twig of *Euphorbia ampliphylla* is put on the front gate believing that it would repel livestock diseases especially, the anthrax. One of the most elaborate cultural practices recorded for the prevention of anthrax is the application of *Crinum abyssinicum*. At dawn, a person silently digs the root of this plant using a hoe fitted to a handle made of horn or WOIRA (African olive). If the herb is to be fetched from a remote place, it is carried secretly in a sack made of hide. The person carrying the herb talks with nobody along his way and in case he sees someone coming, he quietly puts the sack down on a large rock before they meet, or else avoids this unwanted circumstance by transporting the herb on a donkey. At home, the plant is crushed on a large rock early in the morning and dissolved in cold water fetched from the spring early before birds leave their nest. The infusion is kept outside the gate stored in an unpolished gourd. A preadolescent boy quietly sprinkles the infusion around the house and the animal stalls while the livestock are inside. Left-over infusion is buried in a hole dug in front of the common gateway for both humans and livestock.

[illegible]

A person going to a wizard bathes his body with an infusion prepared from crushed leaves of *Vernonia amygdalina*. Often one goes to a wizard from the belief that the wizard has a healing power, or ability to investigate the real cause of an issue such as thefts and other criminal acts and get immediate verdict from the wizard. The bathe is believed to allure the wizard and be considerate towards the customer. In another situation, infusion made from the leaves of this plant are sprinkled around the house to block a witchcraft from inflicting harm on the person or the household.

WUKABI (KALU BALECHENGER)

This spiritual rite is a supplication performed especially by the husband and wife to welcome the New Year. The procedure is mediated by an ABAGARI ('Good father' in OROMIFFA). Only those claiming to have inherited the spirit from their parents or have acquired it later in some way can carry out this ritual. In performing the ritual, a mixture of bark of *Myrica salicifolia;* leaves of *Ekebergia capensis, Clutia lanceolata, Acacia abyssinica, Rosa abyssinica* and *Hypericum revolutum* are crushed in a wooden mortar. The husband and wife start crushing the mixture both holding the pestle together and striking through the mortar three times, then pass it to the ABAGARI to finish the crushing work. The crushed mixture is dissolved in a bowl of water, and the couple wash their bodies with the infusion sitting on a MARAGEBIA (a farming tool made of the skin of ox forehead for separating teff grains). The remaining infusion is sprinkled around the house.

Table 2: A summary of cultural plant use in mytological contexts* (20 species)

Vernacular Name	Scientific Name	Family Name	Genus name	Habitat	∑Uv	Use total	Mythological context*					Rank order of Popularity
							Witch craft	Warding off Jini	Warding off Anthrax	Attracting the Wizard	Wukabi	
Girar nech	*Acacia abyssinica*	Fabaceae	Acacia	T	12.5	14					35	20
Eret wonde	*Aloe percrassa*	Asphodelaceae	Aloe	H	3	4	89					6
Setkest	*Asparagus setaceus*	Asparagaceae	Asparagus	S	4	4	60					16
Adey abeba	*Bidens prestinaria*	Asteraceae	Bidens	H	3	3					99	2
Gumero	*Capparis tomentosa*	Capparidaceae	Capparis	S	5	4	59					17
Fyelefeji	*Clutia lanceolata*	Euphorbiaceae	Clutia	S	3.5	4					68	15
Yejib Shinkurt	*Crinum abyssinicum*	Amaryllidaceae	Crinum	H	2.5	3			50			19
Sembo	*Ekebergia capensis*	Meliaceae	Ekebergia	T	13	13					75	11
Yekebir kulkual	*Euphorbia ampliphylla*	Euphorbiaceae	Euphorbia	T	5.5	6			56			18
Amja	*Hypericum revolutum*	Hypericaceae	Hypericum	S	7.5	8					70	14
Kessie	*Lippia adoensis*	Verbenaceae	Lippia	S	4	4					94	4
Shinet	*Myrica salicifolia*	Myricaceae	Myrica	T	10.5	11					75	11
Damakessie	*Ocimum lamiifolium*	Lamiaceae	Ocimum	S	5	5					100	1
Keret	*Osyris quadripartita*	Santalaceae	Osyris	S	11	11		74				13
Kega	*Rosa abyssinica*	Rosaceae	Rosa	S	6.5	7	85				85	8
Embuacho	*Rumex nervosus*	Polygonaceae	Rumex	S	5.5	6	90					5
Lomishet	*Satureja punctata*	Lamiaceae	Satureja	S	3	3					80	9
Lomishet	*Satureja simensis*	Lamiaceae	Satureja	H	2	2					80	9
Ketetina	*Verbascum sinaiticum*	Scrophulariaceae	Verbascum	H	3.5	4	86					7
Girawa	*Vernonia amygdalina*	Asteraceae	Vernonia	T	7	7		97		97		3

** Values in the cells of mythological contexts indicate the number of mentions*

The couple take bath in the order: husband first and wife next. To enhance the ritual, the floor is covered with a mat of green grass and aromatic herbaceous plants including *Bidens prestinaria, Lippia adoensis, Ocimum lamiifolium, Satureja punctata* and *Satureja simensis*. The couples smoke tobacco (GAYA METECHA) during coffee ceremony to create a good mood.

The social context:

Welcoming the New Year:

On the eve of the Ethiopian New Year (INKUTATASH), a stem of *Dombeya torrida*, debarked to half-length from below is placed on a heap of dung accumulated on the backyard after drained through a vent from an indoor stall. A bunch of flower of *Guizotia scabra* is mounted on the standing stem cut. The latter plant flower is also added to a DEMERA, a firework burnt outdoors at the New Year's Eve along with lighting a bonfire. In the morning, males lick the ash with their tongues; rub some of it on their body particularly over their noses, navels and tips of their penises. The practice is still a requirement to receive the new year but the youths' traditional practices are discouraged due to authoritative local pressures.

Marking the Easter holiday:

At the eve of Easter (HOSSAINA), followers of the Ethiopian Orthodox Church tie splits of culms of *Eleocharis marginulata* or *Schenoplectus corymbosus* over their head. The day is celebrated in April to remember the death of Christ and his return to life. The culm reminds the olive twig that the dove had returned with biting by its bill after reconnoitering the recession of the biblical flood. The olive twig was a sign communicated to Noah and survivors of the deluge about the recession of the water level and approaching of a safe time to go back home from Mount Ararat where the Ark was said to have landed. In the same way, tying culm over the head is a congratulation message conveyed to express that the Lord, Jesus Christ, has returned to life and Satan dishonored.

Traditional game linked to invocation:

Urera hypselodendron, Myrsine africana and *Osyris quadripartita* were used in a cultural game called GITIE that is now extinct. A stem of *Urera hypselodendron* is fixed on the ground in the open meadow as a target. Wooden spears are cut from sticks of either of the latter two species. Village youngsters group themselves into teams and compete for hitting the target by throwing their

Table 3: A summary of cultural plant use in social contexts (10 species)

Vernacular Name (Amharic)	Scientific Name	Family Name	Genus name	Habitat	∑Uv	Use total	Social context*					Rank order of popularity
							New Year	Meskel	Easter	Local carnival	Traditional game	
Adey abeba	*Bidens prestinaria*	Asteraceae	Bidens	H	3	3			100			1
Gramta	*Cyperus fischerianus*	Cyperaceae	Cyperus	H	4	4		82				4
Wulkfa	*Dombeya torrida*	Sterculiaceae	Dombeya	T	12	13	86					2
Mush sar	*Eleocharis marginulata*	Cyperaceae	Eleocharis	H	3	3			75			5
Akrma	*Eleusine floccifolia*	Poaceae	Eleeusine	H	4	4			60			6
Kechemo	*Myrsine africana*	Myrsinaceae	Myrsine	S	6	6					25	9
Keret	*Osyris quadripartita*	Santalaceae	Osyris	S	11	11					20	10
Geta	*Pennisetum sphacelatum*	Poaceae	Pennisetum	G	5	5				57		7
Ketema	*Schoenoplectus corymbosus*	Cyperaceae	Schoenoplectus	H	2	2		85				3
Lakuso	*Urera hypselodendron*	Urticaceae	Urera	S	6.5	7					30	8

** Values in the cells of mythological contexts indicate the number of mentions*

Appendix 1: List of cultural plants and their use description in BSNP

Scientific name	Local Name	Family	Habit	Biocultural value
Acacia abyssinica	Nech Girar	Fabaceae	T	Supplication welcoming the new year
Aloe spp.	Eret	Aloaceae	H	Warding off a Selabi
Asparagus africanus	Setkest	Asparagaceae	S	Warding off a Selabi
Bidens prestinaria	Adey abeba	Asteraceae	H	Supplication welcoming the new year
Capparis tomentosa	Gumero	Capparidaceae	S	Warding off a Selabi
Clutia lanceolata	Fyelefej	Euphorbiaceae	S	Supplication welcoming the new year
Crinum abssinicum	Yejib Shinkurt	Amaryllidaceae	H	Warding off anthrax
Cyperus fischerianus	Gramta	Cyperaceae	H	Marking the easter holiday
Dombeya torrida	Wulkfa	Sterculiaceae	T	Welcoming the new year
Ekebergia capensis	Sembo	Meliaceae	T	Supplication welcoming the new year
Eleocharis marginulata	Mush sar	Cyperaceae	H	Marking the easter holiday
Eleusine floccifolia	Akrma	Poaceae	H	Local carnivals
Euphorbia ampliphylla	Yekebir kulkual	Euphorbiaceae	T	Warding off anthrax
Guizotia scabra	Mech yedega	Asteraceae	H	Welcoming the new year
Hypericum revolutum	Amja	Hypericaceae	S	Supplication welcoming the new year
Lippia adoensis	Kessie	Verbenaceae	S	Supplication welcoming the new year
Myrica salicifolia	Shinet	Myricaceae	T	Supplication welcoming the new year
Myrsine africana	Kechemo	Myrsinaceae	S	Invocation game
Ocimum lamiifolium	Damakesie	Lamiaceae	S	Supplication welcoming the new year
Osyris quadripartita	Keret	Santalaceae	S	Warding off Jini, Invocation game
Pennisetum sphacelatum	Geta	Poaceae	H	Local carnivals
Rosa abyssinica	Kega	Rosaceae	S	Supplication welcoming the new year, warding off a Selabi
Rumex nervosus	Embuacho	Polygonaceae	S	Warding off a Selabi
Satureja punctata	Lomishet	Lamiaceae	S	Supplication welcoming the new year
Satureja simensis	Lomishet	Lamiaceae	H	Supplication welcoming the new year
Schenoplectus corymbosus	Ketema	Cyperaceae	H	Marking the easter holiday
Urera hypselodendron	Lakuso	Urticaceae	S	Local carnivals
Verbascum sinaiticum	Ketetina	Scrophulariaceae	H	Warding off a Selabi
Vernonia amygdalina	Grawa	Asteraceae	T	Warding off a Selabi

wooden spears several times. At the end of the game, individuals from the winning team ride those of the losing team like horses, sitting on their backs. This explains the local saying, “he/she played GITIE on me”, which describes one’s disapproval of somebody else who took advantage of him/her in a deal. The game was normally played in its original form when there was a threat of drought, to invoke God to bring rain for the community, but it can be played at any time if youngsters choose.

Local carnivals:

In the past, there were two local festivals celebrated every year on October 5th and 12th in the Ethiopian Calendar, respectively. The festivals were linked with collecting mature rachis of *Pennisetum sphacelatum* (SINDEDO) and *Eleusine floccifolia* (AKIRMA). Dry splits of these plant materials are used to knit grass-thatched paraphernalia commonly used in rural households as containers, but the purpose of the festival is rather socio-cultural than economical. The girls used this event to trigger courting of boys in the green meadows.

These carnivals are named in OROMIFFA MIGIRA GURA and CHIKORSA GURA (SINDEDO KECHETA and AKIRMA KECHETA in Amharic) and were enjoyable socialization fairs during which young peers met and spend some time together. Today the carnivals are currently fading away due to habitat loss for the associated grasses and impacts of cultural transformation. On the carnival days, a group of unmarried girls wore fine clothes and jewelry, had their hair smeared with butter and shaded their eyes with KHUL (the alloy of Antimony) bought from market and went out to the nearby meadows hitting a tambourine (ATAMO in Amharic) to collect the plant materials. While collecting the rachis in the meadows, they sang ASHKERABEBAYE, AYABELEW BELEW and other types of songs to attract boys to join them for courting.

The boys of each village reacted to the solicitation of the girls by going to the meadows neatly dressed, holding wooden sticks cut from the stem of a variety of plant species. Judgement of the power and elegance of a boy by the girls was partly measured in terms of the quality of stick hence, males spent some money and time to decorate their stick. Some youths decorated their sticks with snail shells (ZAGOL) fastened on leather straps hanging down a hole drilled through the holding tip of the stick. Rings of animal skin cut from the tail or penis (locally called JINA) are tied at two or three places on the stick, smeared with bone marrow or butter and then put under the ceiling of grass-thatched roof to be stained brown.

The boys gathering together from each village move to the girls in the meadow singing in groups alternating tempos of songs collectively known as "HOTTA" including NEYZOMA ALEMALEM, LOGAW BIRALEW, HOIZER ABEBA, to mention few. Both sexes meet in the meadow flocking side by side to the biggest tree, play gender-specific dances and make a bid for romantic companionship under the tree. Couple with affection for one another pair themselves for lip kissing (forging a bond of YEKENFER WODAJ relationship). After lip kissing courtship is over, they disperse pairwise into the meadow whereby the boys assist the girls in collecting more rachis together. At the end of the courting day, all of them return to their homes. The carnivals were opportunities for peer groups to create permanent relationships in a manner that was acceptable to the society. Sometimes these carnival day relationships led to marriage.

Meskel (The founding of the true cross):

MESKEL is a festival celebrated on 17 Meskerem (September) (EC) to mark the founding of the true cross in Jerusalem. The following thesis commonly known to the Christendom elucidates why the day is being celebrated. After the resurrection of Jesus Christ, the cross cured the sick, freed the possessed and did a lot of miracle. In 34 EC, the Jews rulers eliminated the cross by burying it deep in the ground in Golgotha, ordered the people of the town to damp garbage on the site and harassed the Christians. Over 300 years, the area was encumbered with a mountain of garbage.

The Roman Emperor, Constantine fighting brutally with the Jews told his warriors to catch cross in their hand or hook the same on their horses' saddlery during fighting against his enemies following a revelation about the war. After defeating his enemies, he ordered to reopen the Christian temples and destroy the Jews statues. His mother Empress Eleni, one with a Jews blood, went to Jerusalem to look for the true cross, but she could know about it from nobody since the Christians had forgotten about the cross through generations of suppression.

A priest named Kirakos told her to try to locate the exact burial site of the cross guided by a smoke. On 16 September, she burnt a huge biomass (DEMERA) mixed with incense. The smoke ascended high up the sky and descended back to the ground like swirling mists and pointed the exact location of the cross in the pile of garbage. Effort of digging was started on 17 September and ended on 10 March when the cross was finally found. Since March is a fasting month, celebration of the founding of the cross was delayed until 17 September, the initial date of digging to find the cross. Empress Eleni kept the cross in a temple she built in Jerusalem.

Later, conflict arose among priests living in Jerusalem, Rome, Antsokia, and Alexandria that was to be resolved by dividing the cross into four parts between the competing groups. The priests of Alexandria, with which the Christians in Ethiopia were affiliated, took the right arm of the cross (GIMADE MESKEL). When the Christians in Alexandria were left under the suppression of Muslims, they sought for help from the Ethiopian brothers. Emperor Naod and later Emperor Dawit, (His Son) sent an army to liberate the Christians.

As they were liberated, the Christians were happy to present trophies of gold and silver to the soldiers, but preference was made for the cross that they were also happy to offer. Emperor Dawit died in Nasir (Sudan) as he was going to bring the cross, and his son Emperor Zere Yakob brought the cross to Ethiopia in 1446 (EC). Zere Yakob kept the cross in Debre Berhan, North Shewa for some time, until later he was guided by the GOD to find its definitive site, the Gishen Amba. The latter is a geographic landscape looking-like a natural cross found in Ambasel Wereda, South Wollo Administration Zone, Amhara National Region.

On the festival day, a group of unmarried boys and girls move from house to house to wish elders a happy MESKEL singing 'ABEBAYEHUSH'. Girls wear a circle of stems of *Schoenoplectus corymbosus* or *Cyperus fischerianus* (QIETEMA or NGCA in *Amharic*) over their dresses at their waist, running down their hips and thighs. They present handful of *Bidens* flowers and/or stems of *Schoenoplectus corymbosus/Cyperus fischerianus* to the head of the household. Similarly, boys present stems of *Schoenoplectus corymbosus/Cyperus fischerianus*. After the household head offers a blessing and some gift of cash or makes a promise, the group move to the next house.

DISCUSSION

Biocultural values associated with natural vegetation:

Biocultural values attached to human-vegetation interaction and, cultural plant use are valuable means to develop additional ecotourism products. It has become customary that ecotourists travel not only to see natural features, but also the traditional life-style of people at the destination. Biocultural values drawn from the folk memory of the study participants in the form of folksongs describe the emblematic vegetation of BSNP. These common chants are reflective of the past human-natural vegetation interaction, their power of intuition, analysis and interpretation of information generated from environmental perceptions of the changing local environmental and socio-economic conditions. The folksongs reflect the elegance of the natural vegetation in the past and partly account for the unique cultural identity of the local people through expression of their past and present intimate relationships with the natural vegetation. Everlasting ethno-ecological messages are transferred via these lyrics while passing down to succeeding generations through words-of-mouth.

The chants convey clear ethnoecological messages via the underlying meanings of the verses composing each lyric. Understanding the meaning of the chants stipulates on adequate interpretation of the lexicons forming the lyrics. This is possible only if one has sufficient knowledge of the Amharic poetry, also known as QENE or SEMNNÀ WERQ (Wax and Gold), familiarity with the local culture and is proficient in anthropology, literature and folklore studies. Amharic QENE is a unique style of poetry in which the apparent meaning (SEM or wax) and underlying meaning (WERQ or Gold) of a lexicon or a phrase are essentially different and even sometimes not easily understood.

In the first line of the first lyric, the Amharic lexicon **'ሽበት'** (SHIBET), refers to 'usually lichens of the genus *Usnea*'. In its apparent meaning, it expresses the presence of "lichens" on the trunks and branches of older trees growing in the forest, often the characteristic of a mature forest. But in its underlying meaning, "lichens" is used in the noun phrase **'ሽበት ቀነ ቀነ ''** (SHIBET KENEKENE) to compare the "ageing of the forest" with the analogue "the physical change and decline of an aged man with his black hair turned grey". The second line indicates that the forest is safe for men and women to cross without fear of becoming lost or sacked by a SHIFTA (bandit). In the past, this was unthinkable due to dense vegetation cover and the likelihood of attack by SHIFTAS hiding in its depths. This lyric is chanted by one pondering to hide in the forest as a SHIFTA because of discomfort with civic life, but is questioning the reliability of the natural cover and practicality of living as a bandit in a bare forest denuded by harmful human action.

The first line of the second lyric expresses the hope of better life opportunities in the forest for one whose life within society has become untenable whereas the second line implies a promise to the forest if it welcomes the person that is requesting a safe haven. One can speculate that the current biodiversity within BSNP was partly the result of reduced deforestation rate from the presence of bandits hiding inside the forest. Such argument came from Gizaw Zewde, one of the local elders, that SHIFTAS who used to hide in the vegetation contributed to the longevity of the Denkoro Forest and of the Limesk GUASSA as well.

The third lyric hints that in the past, local people loved the forest and were more concerned about the destruction of the forest that was everything to them: a source of hope, courage and even home for those opting for alternative life in the forest**.** Its first line expresses local peoples' sympathy for the destruction of the vegetation from irresponsible slash and burn activities carried out in the forest that they came to know about through a hearsay. This makes us consider the history of the study area to make further investigations of the root cause of deforestation along with contradictions of deforestation and protection. It informs us that concurrent gradual changes in the vegetation

structure of the forest and the socio-economic conditions of the local people occurred over a long period of time. The second line expresses the local peoples' feelings of compassion for the diminishing forest due to consequent loss of a substantial means of living.

Overall, these lyrics demonstrate indigenous insights into the past people-forest relationships and the historical interactions with the natural vegetation. If recognized and applied appropriately, the folksongs could generate local people support for national park development 7and biodiversity conservation. Compiling the lyrics into a tourist dossier or producing a TV documentary and advertising the values through appropriate public media would add to the touristic significance of the BSNP. This will offer a return in the form of increasing ecotourists visiting the area. Furthermore, demonstrating the indigenous insights underlying these lyrics and involving local people in presenting them in films would generate local income through royalty payments and ecotourism. Moreover, the values can be instrumental to bring biodiversity conservation activities into a focus as these can inspire young Ethiopians to appreciate their own ancestors' perception of the land, the vegetation, and other components of the ecosystem.

Biocultural values developed through local plant use:

Cultural plants and their traditional use constitutes part of the biocultural systems established in the study area in an intertwined holistic system shaped by human management of the environment over long periods of time. In a previous study, Adal, (2014) identified 132 of 354 plant species providing a range of useful products for local livelihood development in the plant biodiversity of BSNP. Domestic consumption, direct local market sale, skill development such as making artifacts for sale, and prospective ecotourism product development are possible means to diversify local income from biodiversity.

The plants mentioned in the two cultural domains in this study altogether are sources of 28 miscellaneous uses ranging between 2-14 types of uses for some species. But when it comes to species popularity, a species mentioned in several categories of uses may not qualify for the highest rank order of popularity. *Bidens prestinaria* or *Ocimum lamiifolium,* known for one or few dominant use types are most popular for one type of cultural practice over some other plant species with several types of uses such as *Acacia abyssinica*. Some useful plants may be less popular since the knowledge about the medicinal use of these plants may be held only by few herbalists.

As noted in Posey (1999), Klubnikin et al. (2000) and Mathez-Stiefel et al. (2007), the social and mythological values drawn from cultural plants documented in the current study derive from the worldview of the local people. In the mythological context, 20 plants are sought to avoid undesirable events compromising their personal wellbeing, the health of their livestock, and the safety of their property. The use values of these plants have been maintained by the local peoples' connectedness to the earth, the spirits, the past and the future generations. Invocation ceremonies like WODAJA, KALUABAGARI and other rituals performed during periods of anxiety such as threats of drought, excessive rainfall, thunderstorms, and disease epidemics; thanksgiving during harvest day, and blessings during coffee ceremonies are parts of the knowledge-belief-practice system guiding the local peoples' actions. These kinds of practices are universal to all traditional cultures (Balick & Cox, 1996; Berkes, 1999; Klubnikin et al., 2000; Cocks, 2006; Mathez-Stiefel et al., 2007). As in Weldeyes (2011), many local people believe their origin to be the soils of their homeland and that the present generation is connected to the past and the future through spirits that are members of a larger community. The spiritual values of certain sites and species are often important enough for local people to conserve and protect the ecosystems that contain them (Verschuuren, 2012).

In the social context, *Pennisetum sphacelatum* (SINDEDO) and *Eleusine floccifolia* (AKIRMA) were means for socializing young people during carnival days in a manner that was acceptable to the society. Notwithstanding, local government authorities regarded biocultural values of plants associated with mythological and social contexts of the local people as 'backward cultural traditions' hence locally discouraging the traditional culture through an eradication campaign involving authoritarian measures. Such campaigns may fail to discriminate between useful and harmful traditional practices which the local people perform in their normal way of doing things. As a matter of fact, shared biocultural values performed in groups are nearly erased from the list of the local peoples' traditional cultural practices. KALUABAGARI and WODAJA have survived extinction due to the dedication of some households practicing the rituals in defiance of the local government efforts.

GITIE and the courtship carnivals of unmarried young people are notable examples of threatened biocultural values. Often such biocultural loss occurs without realizing their values to the life, continuity of the cultural identity of the local people and their long-term survival. Practices associated with cultural plants are instrumental to link NTFPs-based culture with ecotourism, ensure

NTFPs and ecotourism work for each other, local people, nature conservation and national park development. Hence, the myths, rituals and local carnivals associated with the cultural plants can be selected and developed as candidate ecotourism products to open them to the ecotourism market. Traditional cultural practices which today seem to be of no economic value may pay-off tomorrow if developed through ecotourism product development activities.

Reinvigorating cultural traditions is in line with the millennium declaration of the World Tourism Organization (WTO) to achieve pro-poor tourism as a tool for poverty alleviation. Moreover, the International Labor Office (ILO) links tourism with the Millennium Development Goals (MDGs) of eradicating poverty with the creation of 'descent work' that benefits poor people as well as governments that are deficient of foreign currency. Each country is encouraged to integrate tourism activities into its poverty reduction strategy papers (PRSPs) (ILO, 2008). Stronkhorst (2005) suggested the importance of overcoming the economic marginality of NTFPs and scaling up local autonomy over tourism products for synchronizing NTFPs and tourism. NTFPs and ecotourism are two possible sustainable forest contributions to poverty alleviation (Salafsky &Wollenberg, 2000). The CBD emphasizes traditional cultures of indigenous communities associated with the traditional use of cultural plants (CBD, 1992; 2006). Hence, increasing benefits from ecotourism through mainstreaming the revival of vanishing traditional biocultural practices in the area is crucial.

In conclusion and recommendations, The BSNP offers biocultural values permanently associated with the natural vegetation and forested landscape of the national park, and those developed through generations of plant use. If reinvigorated and adequately developed, these biocultural values can add to the existing ecotourism attractions in the national park. These biocultural values have been created because of the local peoples' intimacy with the natural environment, their continuous interaction with its components and maintained through cultural transmission to the next generation. However, these biocultural traditions are fading away due to prevailing challenges of acculturation and neglect. The biocultural values associated with biodiversity are necessary for the current and future life of the local people, hence are well worth integration into the development of BSNP. The following recommendations are made based on the results of the study, discussion and conclusion.

- Make the local biocultural values currently fading away important targets of ecotourism attraction through awareness raising and mechanisms of reinvigoration;
- Evaluate and promote biocultural values through appropriate media, production of tourist dossiers, compiling field guides to plants and, organizing local carnivals;
- Apply biocultural values in conservation management through understanding these values in a mindset different from the conventional Western-style management approaches which tend to undermine cultural traditions.

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