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Indigenous Knowledge on Plant Species of Material Culture (Construction, Traditional Arts & Handicrafts) used by the Afar & Oromo Nations in & Around the Awash National Park, Ethiopia

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Abstract

Indigenous knowledge (IK) on plant species of material culture (construction, traditional arts and handicrafts) used by the indigenous people in and around the Awash National Park (ANP), Ethiopia was conducted ethnobotanically. The study aimed to investigate various aspects of IK on plant species of material culture. A total of 96 informants between the ages of 20 and 80 were selected using prior information. Data were collected using semi-structured interview, guided field walk, discussions and field observation.
???ô? ?”??similarity was applied for data analysis. A total of 156 plant species of material culture belonging to 115 genera and 70 families were collected. Of these, 79 species serve as sources of raw materials for various construction purposes, while 77 for traditional art and handicrafts. Out of these, 8 species were reported by the Afar Nation, 14 by the Oromo Nation and the rest by both Nations. About 93

Index terms— ANP, Ethiopia, indigenous knowledge, material culture.

tools, shelters and clothing as well as more decorative arts and handicrafts.

Plant species serve humans with many ranges of useful materials for building and construction of timber, poles, fencing and other purposes (Hill, 1952; **??**bbiw, 1990; **??**otton, 1996;Kochhar, 1998). Timber, which is a major forest product, has a considerable importance in the construction of temporary shelters and permanent homesteads, fences and other items within the traditional societies (Hill, 1952; **??**otton, 1996). Besides, other plant parts are used in roof construction especially stems and sheets of bark or split wood in traditional dwellings **??**Abbiw, 1990). He stated that in Ghana at least 15 various plant species are useful to make roof shingles. Furthermore, roofing materials are produced by the leaves of large palm fronds and/or various species of grasses for traditional dwellings **??**Abbiw, 1990; **??**otton, 1996; **??**unningham, 1996). For example, a number of thatching grasses, particularly Eragrosits pallens and Stipagrostis uniplumis, are used as construction material for roofs, hut walls, yards and mats in Botswana (IUCN, 2007). The roofing plant materials can be chosen according to functional properties like availability, durability and water-proofing nature **??**Abbiw, 1990).

Plant and plant products also have additional uses in traditional arts and handicrafts including tool handles, cooking utensils, mortar and pestles, walking/herding sticks, combs, paddles, containers and many others. For example, fibrous stems and roots are used to make basket, cordage and textiles **??**Cotton, 1996; **??**unningham, 1996). Likewise, plant extracts and exudates are sources of dyes, gums, tannins, latex, waxes, resins, adhesives and others. In turn, in many cultures, there are traditional plant based tools, which are used in hunting and defense such as harpoons, bows, arrows, spears, fishing reels and traps, hunting clubs and so forth **??**Abbiw, 1990; **??**otton, 1996). Therefore, the present study aimed to assess IK on plant species of material culture

(construction, traditional arts and handicrafts) used by the indigenous peoples of the Afar and Oromo (Kereyu and Ittu) Nations in and around the ANP and thereby record, compile and document the associated IK to assist in the proper utilization, management and conservation of useful plants and the settings of the Park as a whole.

1 a) Geographical location

The study was conducted in ANP, Ethiopia, which is 225 km away from Addis Ababa and situated between latitudes 8 0 50' and 9 0 10' north and longitudes 39 0 45' and 40 0 10' east (EMA, 1992) (Figure **??**). ANP is characterized by semi-arid climate or Qolla Zone and bimodal rainfall with the annual rainfall ranging between 400 and 700 mm (Jacobs and Schloeder, 1993). Out of the nine vegetation types of Ethiopia, the vegetation type of ANP is classified under Acacia-Commiphora woodland (Sebsebe Demissew and Friis, 2009) in the Somali-Masai Regional Center of endemism **??**White, 1983). Jacobs and Schloeder (1993) reported that ANP occurs in one of the most geologically active regions of the world. The phenomena of rifting and volcanism are continuous processes. Hence, it is estimated to have continued for 25-30 million years in Ethiopia, while about 5 million years in the ANP. According to Jacobs and Schloeder (1993), ancient alluvial and colluvial soils, soils of volcanic origin as well as recent alluvial soils are the three major soil types of the study area. The major water sources in the study area include Awash River with major tributaries around ANP including the Kesem and Kebena Rivers, Lake Beseka and the Hot Springs at the northern tip of the ANP. Thirteen data collection sites in ANP were: 1. Gotu, 2. Awash River, 3. Awash Gorge, 4. Karreyu Lodge, 5. Ilala Sala plain, 6. Hamareti, 7. Geda, 8. Sogido, 9. Mt. Fentale, 10. Sabober, 11. Dunkuku (Kudu Valley), 12. Filwuha, and 13. Sabure (Figure **??**). A reconnaissance survey of the study area was conducted from **??**ugust 15-30, 2008 in order to obtain an impression about site conditions, to collect information on accessibility of plant species that serve as material culture and to identify sampling sites. Accordingly, 13 study sites (see Figure **??**) were selected and established as data collection sites. Following this, ethnobotanical data were collected between September, 2008 and March, 2009, on three field trips that were carried out in each study site, following the methods by Martin (1995), **??**otton (1996) and Cunningham (2001). Semi-structured interview, guided field walk, discussions and observation, with informants and key informants were applied based on a checklist of questions using the Afar and Oromo languages with the help of Source : Raw data obtained from NMSA **??**2009) translators to obtain IK of the local people on plant species of material culture. Voucher specimens were collected, identified and kept at National Herbarium, Addis Ababa University.

During the study, information regarding the IK on plant species of material culture in and around the ANP was gathered and the selection of informants and key informants was carried out based on prior information obtained from clan and religious leaders, i.e., who have served in the ANP for more than 12 years and members of either the Afar or the Oromo Nations), pastoralists and agropastoralists. Others included individuals from different age groups, gender and Nations as well as field observation. Despite the effort made to involve as many women informants, only few women could take part in the study as they are not encouraged culturally within the society. Others are lack of permission from their husbands or other socio-cultural reasons, which they refrain from describing. Consequently, informants were selected from the Afar and/or the Oromo Nations based on the vicinity of their Kebeles to the Park. Four Kebeles from the Afar Nation (Awash, Doho, Dudub and Sabure Kebeles), whereas five Kebeles from the Oromo Nation (Benti, Fate Leidy, Gelcha, Ilala and Kobo Kebeles) were taken. Of these, 96 informants 7 or 8 individuals for each study site (76 men and 20 women) between the ages of 20 and 80 were selected using prior information. Out of these, 36 key informants (32 men and 4 women) were selected. Basic information on plant species of material culture including their vernacular names, habit, part (s) used, uses and their major use categories was/were collected from informants.

2 Ethnobotanical data analysis

The data were analyzed and summarized using simple statistical tools such as percentages, graphs and tables. The (JCS) was also calculated and the similarity in plant species a) Diversity and distribution of species of material culture

In this field study, a total of 156 plant species of material culture were recorded, being distributed in 115 genera and 70 families (Appendix 1). Of these, 79 species serve as sources of raw materials for various construction purposes and 77 are used for traditional art and handicrafts (Figure 3). Out of 156 plant species of material culture, 8 species were reported by the Afar Nation, 14 by the Oromo Nation and the rest by both of them. About of the species were reported with their vernacular names, where were reported by the Afar Nation and by the Oromo Nation. Shrubs 61 species contributed the highest proportion of growth forms, which was followed by trees 58 . Stems 119 (76.8%), followed by cut branches 24 ( ) were the most frequently utilized parts of the plant species in the study area by the local peoples. Some species are used in more than one material culture. c JCS = ———c + b + a , where a -is the number of species found only in habitat A, b -is the number of species found only in habitat B and c -is the number of common species found in habitat A and B.

Finally, JCS was multiplied by 100 in order to obtain the percentage similarity in species composition between the Afar and the Oromo Nations as applied by Kent and Coker (1992). composition between the Afar and the Oromo Nations were compared as it was described in Kent and Coker (1992). Accordingly, JCS was calculated between paired habitat types (A and B) as follows: Local communities in and around the ANP are highly

dependent on plant species for various construction purposes such as house construction, household furniture and/or utensils, tool handles, dry fencing, roofs and/or walls thatching and so many other uses. Findings showed that more than 87% of the plant species are used as a raw material for various construction purposes (house construction, furniture, b)

3 Number of Taxa

4 Global Journal of Human Social Science

Volume XII Issue XI Version I Roofs, in turn, were thatched with a variety of grass species, the most commonly used being Cymbopogon pospischilii, which is commonly used by pastoralists for house construction around the study area. A similar result was also reported by Jacobs and Schloeder (1993). Likewise, Afar pastoralists also used the leaves of Hyphaene thebaica and Typha spp., which are the most preferred species for roof thatching. Other commonly used roof thatching materials include Chrysopogon, Aristida adscensionis, Hyparrhenia species, Pennisetum setaceum, Sporobolus cosimilis and many others. The people in Cheffa further revealed that roofs are thatched with Hyparrhenia hirta and Hyparrhenia rufa during the construction of houses.

Fröman and Persson (1974) described that the tall and stemmy Hyparrhenia species are widely used for roof thatching. As informants stated that, in a rare case, if other resources are not available, the leaves of Calotropis procera are also used as roof thatching. This result is reported conversely in Ghana by **??**bbiw (1990) and **??**otton (1996), where the stems of Calotropis procera was used as roof thatching. However, the corrugated iron sheets are replacing the use of roof thatching grasses through time due to modernization. Another reason might be due to shortage of tall grasses in the area. In turn, materials for house construction and traditional household utensils were replaced gradually by plastics and industrial products as a result of urbanization and loss of traditional way of life.

On the other hand, out of 77 plants of traditional art and handicrafts, 57 species (36.8%) are sources of farm implements, tool handles, household utensils and fencing tool (FELKA (Af); KOKO (Or)). The rest species serve for ritual values, soften leather, toothbrush, bed making, walking/herding sticks, bows and arrows, coloring/soften hair and many others (Appendix 1). Most of the species such as Acacia tortilis, Balanites aegyptiaca, Berchemia discolor, Ceiba pentandra, Celtis toka, Cordia monoica, Dobera glabra, Tamarindus indica, Terminalia brownii, Ximenia americana, Ziziphus species and many others are widely used for farm implements, tool handles, household utensils and fencing tool (FELKA (Af); KOKO (Or)). In turn, Grewia species are used for walking and/or herding sticks by children or elder persons; Terminalia brownii for coloring the body; the resin of Ficus vasta as adhesive and sealant and so forth. Again, the most widely used species for toothbrush reported by the informants were Salvadora persica, Cadaba farinosa, Olea europaea subsp. cuspidata and Sida rhombifolia. **??**006) documented Salvadora persica and Cadaba farinosa in Tanzania for the same purpose. Of these, Salvadora persica is the best toothbrush from all and it is even sold in local and national market areas including Awash Sebat Kilo, Metehara, Addis Ketema, Sabure, Melka Jilo and Addis Ababa towns as well as along the main highway.

They have also certain cultural values within both Nations due to sharing of resources. For instance, both the Afar and the Oromo Nations use Vernonia cinerascens as cultural comb having only one stick, which is thinner or pointed at both ends. Again, Acacia brevispica, Acacia tortilis and Balanites aegyptiaca are used by both Nations for fencing tool (FELKA (Af); KOKO (Or)), which is a long stem ending with forked ends.

Similarly, the smoke bath from Terminalia brownii wood with other ingredients (e.g. Boswellia papyrifera incense, sandals, etc.) is commonly used by women to scent (ERITOLE (Af); BUKBUKA (Or)) their bodies and clothes as well as to flavouring milking utensils (AYINE (Af); CHOCHO (Or)). Such diverse uses of plant species over wider geographical areas between both Nations indicated that the existence of common knowledge (Kebu Balemie and Fassil Kebebew, 2006) as well as cultural diffusion (Teshome Soromessa and Sebsebe Demissew, 2002; Kebu Balemie and Fassil Kebebew, 2006) across a range of diverse cultures and geographical areas. Consequently, both Nations share most of the useful plant species around them within each other (Kebu Balemie and Fassil Kebebew, 2006).

On the contrary, useful plants also have certain cultural and ritual values within particular social groups. For instance, stem and leaves of Doum palm tree (Hyphaene thebaica) and Typha spp., which are restricted in the Northern tip of ANP, are a very important resource for house and granary (major means of storing crops) construction, basketry, bed making and roof thatching around the Sabure, Doho and Dudub Kebeles by the Afar Nation. Women also make mats for sitting or sleeping on, as well as for drying crops. In line with this, Ziziphus mucronata and Ziziphus spina-christi are used body as well as coloring/soften hairs. Whereas, Ficus sycomorus, Acacia tortilis and Balanites aegyptiaca are b) Plant species of material culture use diversity Overall, plant species that serve as material culture in the study area were found to have multi-purpose values (use diversity) in various ways. These are forage/fodder, fuel wood (charcoal and firewood), medicine, food as well as miscellaneous uses. Out of the total recorded plant species which serve as material culture, 16% of the species were found to have 4 and 5 distinct uses each, while 34% with 6 uses to the local people (Appendix 1) c) Variation of indigenous knowledge between the Afar and the Oromo Nations

Research outputs during data collection revealed that both Nations equally reported 19 species for material culture independently, whereas 118 were common to both Nations (Table 1). The percentage similarity (about

76%) for the species, in turn, indicated that since the two groups situated almost in close geographical settings, there is a cultural diffusion and sharing of experiences and knowledge between them. Thus, they commonly utilize the same species. Indigenous people in and around the study area mainly depend on plant species of material culture for various construction purposes as well as traditional art and handicrafts. As a result, high diversity of species is recorded even if human-induced and natural factors influence the species. Planting of these important species around homesteads and farmlands for household use and sale; raising tree seedlings at nursery for large scale plantation of more exploited species (e.g. Terminalia brownii, Acacia spp., Olea europaea subsp. cuspidata, Tamarindus indica, etc.); better animal husbandry practices and improved shortage of grazing lands to minimize overgrazing of thatched grasses (e.g. Cymbopogon pospischilii, Chrysopogon plumulosus, Hyparrhenia spp., etc.); sustainable utilization and conservation of the species and awareness raising of the local people are recommended.

The main author would like to acknowledge the Horn of Africa Regional Environment Center and Network (HoA-REC/N), members of the Afar and the Oromo Nations, Awash-Fentale Wereda and Fentale Wereda Offices, all the staff members of National Herbarium and ANP, the Department of Biology and others which directly or indirectly offered their various supports.

5 Abbiw, D. K. (1990). Useful plants of Ghana: West

African uses of wild and cultivated plants. [1] [2] [3]

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Figure 1: Figure 1 :Figure 2 :

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[3] 18 2012 © 2012 Global Journals Inc. (US) Year

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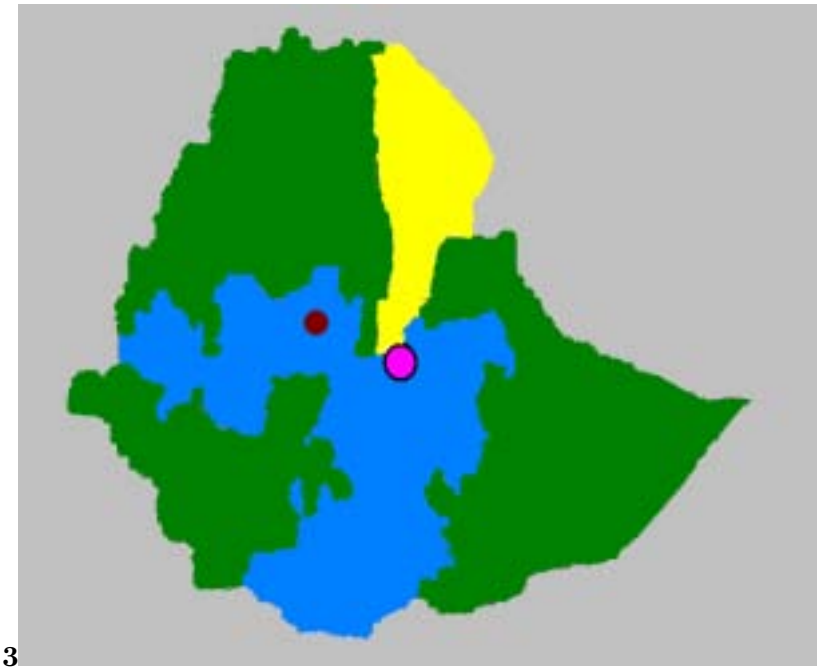
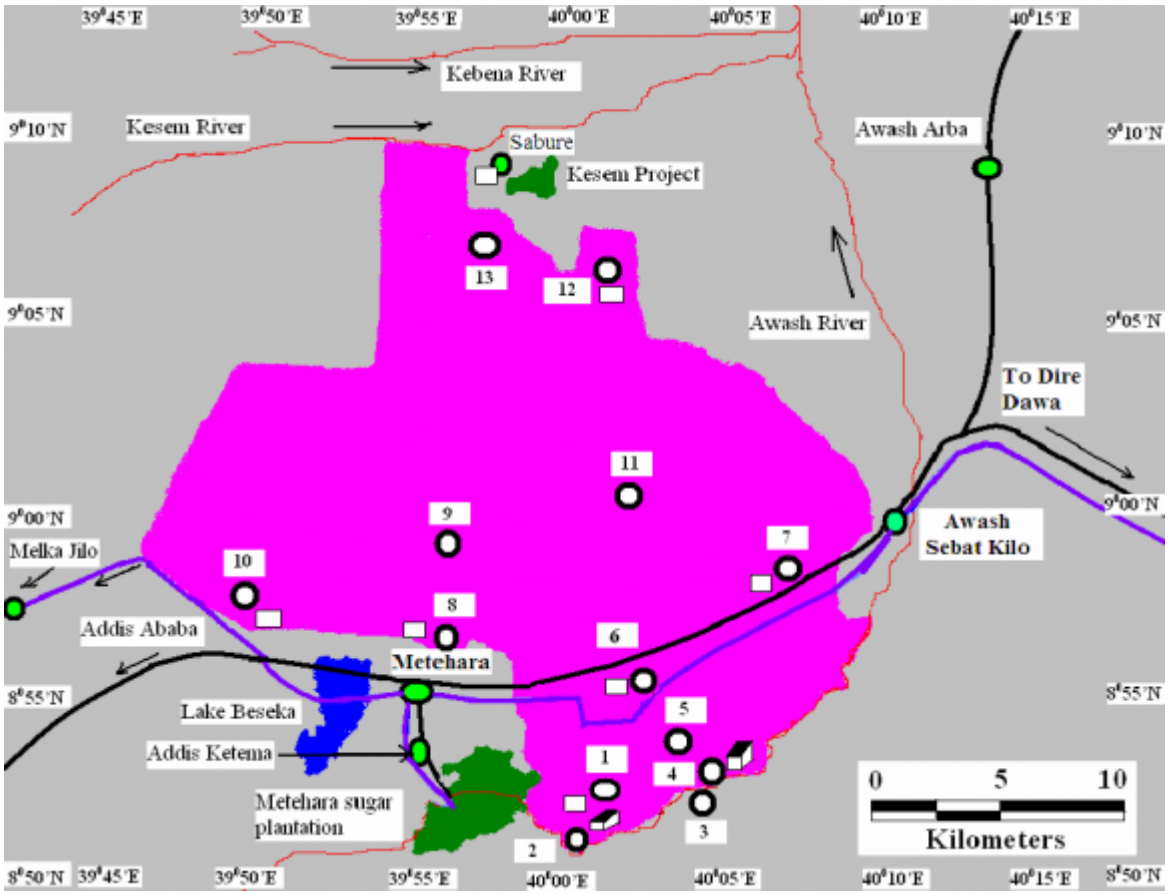


Figure 2: Figure 3 :

Figure 3: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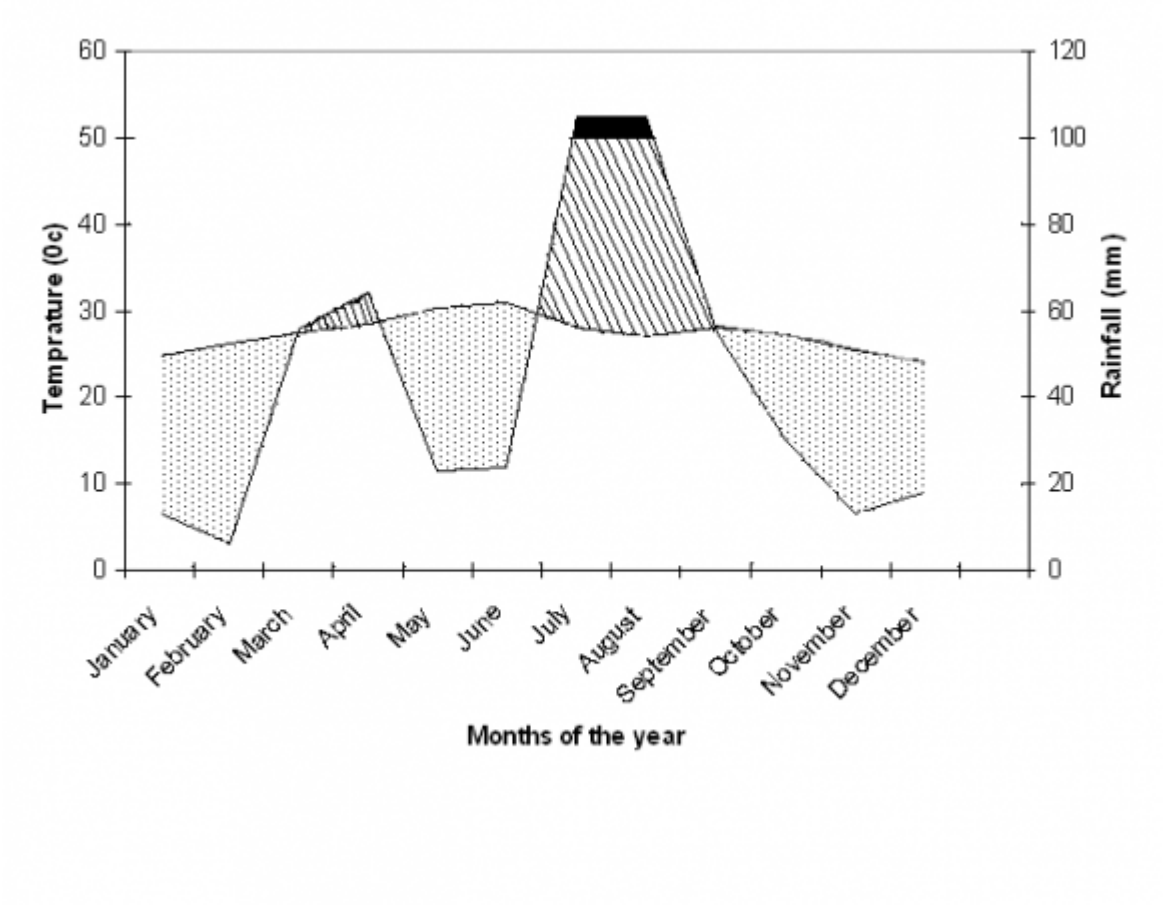

Figure 5:

Figure 6:

D D D D) b
(

[Note: to scarcity of indigenous tree species. Again, the fiber from the bark of Acacia oerfota, Acacia tortilis and Grewia species provide as ropes for tying the walls and roofs during house construction. On the other hand, plant species having thorns as well as faster growing rate were preferred more by the local peoples for dry fencing around homesteads, animal enclosures and farmlands. For instance, local people use various types of dry fencing by piling up branches of thorny plant species particularly Acacia, Ziziphus and Cadaba species, Balanites aegyptiaca, Commiphora habessinica and Prosopis juliflora.]

Figure 7:

1

Total number of species	Total number of species reported by: The Afar Nation	The Oromo Nation	Both Nations	coefficient of similarity	Percentage similarity
156	19	19	118	0.76	76

Figure 8: Table 1 :

4. Cotton, C. M. (1996). Ethnobotany: Principles and Applications. John Willey and Sons Ltd. Chichester. 424pp. 5. Cunningham, A. B. (1996). People, park and plant use. Recommendations for multiple-use zones and Appendix 1 : List of plant species as a raw material for construction purposes) in the ANP . material culture (Acacia r obusta Burch. Fabaceae T GERE'INITO (Af); WANIGAYO (Or) F, Fu, Mc Stem; cut branches House construction, fence posts; dry fencing Capparis tomentosa Lam. Capparidaceae S HARENIGEMA (Or) F, Fu, M, Fo, Mc, Mi Cut branches Dry fencing Crotalaria incana L. Fabaceae H IJISISE (Or) Fu, M, Mc, Mi Stem; cut branches House construction; dry fencing Grewia schweinfurthii Tiliaceae S ADIBI'ATO (Af); MUDHE GURE (Or) F, Fu, Fo, Mc Stem; bark Persicaria setosula Polygonaceae H ALELITU (Or) Mc Above Used for roof thatching House construction; fiber used as tying material (A. Rich.) K. L. ground part thatching grass is scarce Wilson if Rhynchosia minima (L.) DC. ** Fabaceae C KELELA (Or) Mc Tying material Stem during house and Burret fence construction

Intermediate technology publications, London and the Royal Botanic Gardens, UK. 337pp. 2. Abiyot Berhanu, Zemede Asfaw and Ensermu Kelbessa (2006). Ethnobotany of plants used as insecticides, repellants and anti-malarial agents in Jabitehnan District, West Gojjam. SINET: An Ethiopian Journal of Science 29(1): 87-92. Major use category Part (s) used Uses F, Fu, Fo, Mc Stem; cut branches House construction, fence posts; dry fencing F, Fu, Mc, Mi Stem; cut branches Fence posts; dry fencing F, Fu, M, Fo, Mc, Mi Stem; cut branches House construction, furniture; dry fencing F, Fu, Mc Stem; cut branches Fence posts; dry fencing F, Fu, M, Fo, Stem; cut House (Af); BURKUKE (Or) Mc, Mi branches construction, fence posts; dry fencing F, Fu, M, Fo, Mc, Mi Stem; cut branches; bark House construction; dry fencing; fiber used as rope & tying material F, Fu, Mc Stem; cut branches House construction, fence posts; dry fencing F, Fu, Mc Stem; cut branches House construction, fence posts; dry fencing F, Fu, M, Fo, Mc, Mi Stem and branches; cut branches House construction, furniture; dry fencing F, Fu, Fo, Mc Stem; cut branches; bark House construction, fence posts; dry fencing; F, Fu, Fo, Mc Stem; cut branches; bark House construction, fence posts; dry fencing; fiber from bark is used as rope F, Fu, M, Fo, Mc, Mi Stem; cut branches; bark House construction, furnit ure; dry fencing; bark used for ropes F, Fu, Mc, Mi Stem & branches Temporary house construction Mc, Mi Stem; leaves House construction; fibers are used to make strong ropes F, Mc Whole part Roof thatching F, Fu, M, Fo, Mc, Mi Stem; cut branches House construction, fence posts, furniture; dry fencing F, Fu, Fo, Mc Stem House construction, fence posts, furniture F, Fu, Fo, Mc Stem House construction F, Fu, M, Fo, Mc, Mi Stem; cut branches House construction; dry fencing Fu, M, Mc, Mi Stem; leaves House construction; used for roof thatching if thatching grass is scarce F, Fu, M, Fo, Mc, Mi Stem and branches; cut branches House construction, furniture; dry fencing Mc Stem Tying material M, Fo, Mc Cut branches Dry fencing F, Fo, Mc Stem; bark Furniture; fiber used as tying material F, Fu, Mc, Mi Stem House construction, fence posts, furniture F, Fu, Mc Stem Furniture, fence posts F, Fu, Fo, Mc, Mi Stem; cut branches Furniture, fence posts; dry fencing F, Fu, Fo, Mc Stem House construction, fence posts, furniture F, Fu, Fo, Mc, Mi Stem House construction, fence posts , furniture F, Fu, Fo, Mc Stem Furniture F, Mc Whole part Roof thatching F, Mc Whole part Roof thatching Fu, M, Fo, Mc, Mi Stem House construction, fence posts, furniture Fu, M, Fo, Mc, Mi Stem House construction, fence posts, furniture F, Fu, Fo, Mc Stem Furniture, fence posts F, Fu, Fo, Mc Stem; bark House construction; Fu, Mc, Mi Stem & branches; bark House construction, to construct granary Fu, M, Mc House construction, F, Mc Whole part Roof thatching Stem fence posts, furniture HADAYITO/ Bwindi Impenetrable National Park, Uganda. People and development alternatives

Appendix 2 : List of plant species as sources of traditional arts and handicrafts (material culture) in the ANP .

.1 Scientific name

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[Martin ()] *Ethnobotany: A Method of Manual*, G J Martin . 1995. London: Chapman & Hall. p. 268.

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[Gemedo-Dalle et al. ()] 'Plant Biodiversity and Ethnobotany of Borana Pastoralists in Southern Oromia'. Gemedo-Dalle , B L Maass , J Isselstein . *A. Economic Botany* 2005. 2005. Ethiopia. The New York Botanical Garden Press. 59 (1) p. .

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[Iucn ()] *The Real Jewels of the Kalahari: Drylands Ecosystem Goods and Services in Kgalagadi South District*, Iucn . 2007. Botswana. p. 51P. (The world conservation union)

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