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Plants used in material culture in Oromo community, Jimma, Southwest Oromia, Ethiopia

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Since antiquity, plants have been used as a source of material culture by the human societies. The purpose of this study was to assess the plant species and associated traditional knowledge used in making material cultures. A quantitative method (structured interviews and questionnaire) was used to collect data. A total of 75 key informants above 45 age groups were questioned and data on the plant species, handcrafts, traditional arts, cultural uses were recorded and analyzed in percentages, preference ranking, direct matrix and paired comparison. In addition, a total of 225 community members of several age groups and educational levels responded to determine the status of traditional knowledge transfer and its current application. A total of 46 plant species used in material culture were identified from the study area. About 54% of the material objects identified are made from trees and the rest 46% are obtained from shrub and herb. The most multipurpose and preferred plant species reported by informants were *Arundinaria alpine, Eucalyptus* spp., *Cordia africana, Baphia abyssinica, Galiniera saxifrage* and others. The traditional knowledge is widely held by male (53%) as compared to both male and female (27%) and female (20%). Finally, this study reveals the decline of the transfer of traditional botanical knowledge (TBK) through generation but a wide use of plant-based material culture by the rural communities.

Key words: Ethnobotany, ethnicity, preference ranking, traditional knowledge, Ethiopia.

INTRODUCTION

For a long time, the science of material culture has been focused on objects recovered from archaeological explorations (Cotton, 1996). However, since two decades, this interest has been shifted to plant based material culture used by different societies (Hoang et al., 2008). According to Cotton (1996), material culture refers to the cultural objects made with the knowledge of particular ethnic groups for specific and multipurpose uses from whole plant and plant part(s).

The major use categories of material cultures obtained from plants include agricultural implements, household furniture and/or utensils, construction, musical instruments and others (Singh and Pandey, 1982; Prance et al., 1987; Berlin, 1992; Hoang et al., 2008). For instance, certain Mestizo populations of Amazonian Peru recognize 19 separates use categories for timber, ranging from round-wood to sawn-wood used for purposes such as canoe construction, complex material structures including permanent housing and large vessels (Balee, 1994). A range of different species may be required, each fulfilling specific functions within the total structure (Christensen, 2002). However, the characteristics (size and shape) of plant material cultures made by different societies vary enormously in their design and construction based on their specific traditional knowledge, the availability of plants around and the prevailing environmental conditions (Katewa and Guria, 1997; Berkes, 1998). In different societies, many cultural plant products have been replaced by industrial synthetic alternatives (Cotton, 1996; Burkill, 1997), and these were

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extended to urban and rural peoples in developing countries (Anonymous 2005). For example, the introduction of metal and plastic containers has led to a decrease in the production of domestic baskets while the use of aluminum canoes has resulted in the loss of many skills required for traditional canoe construction (Alexiades and Sheldon, 1996). Nevertheless, recent report on existing material culture of traditional societies suggest that plants remain vital to many aspects of traditional life, due to their easy accessible and less costs as compared to the synthetic industrial products (Cotton, 1996; Zargwer, 2002).

In developing countries, much traditional equipment of plant derived materials is used for different purposes. The plough, yoke, harrow, cutter, seed drills are chief agricultural implements (Joshi, 1995). Plant fibres are also vital to traditional material culture in Africa, providing lashing materials for both the construction of buildings and the manufacture of wooden tools, for additional objects such as mats, baskets, brushes, hats and paper, while softer fibres are used for weaving textiles. Fibres from most types of plant organ have found some use in traditional material culture. For example, the flexible roots of tamarack (*Larix laricina*) have been used by the Chippewa community that reside on the Mole Lake Indian Reservation, for weaving bags and sewing birch bark canoes; fibres from the leaves of the palm *Phoenix reclinata* have been used for making brooms among the Pokomo in Kenya; wood fibres from the yellow cedar (*Chamacecyparis hootkatensis*) have been woven into soft textiles of high quality by the aboriginal peoples of British Columbia (Mitsuo et al., 2001). Although, there are studies on medicinal plants in reference to many ethnic groups and diverse topographies that have been reported from different regions in Ethiopia (Abebe and Ayehu, 1993; Abebe, 2003; Abera, 2003; Giday et al., 2003; Leulkal, 2005), there are only a few studies on plant-based material culture limited to certain areas and ethnic groups (Adal, 2004; Gemedo-Dalle, 2005; Bahru et al., 2012; Hussen, 2012). The purpose of this study was therefore to assess those plant species and associated traditional knowledge used in making material culture by Jimma Oromo community in Southwest Ethiopia. The four specific objectives were as follows: 1) to identify those plant species, their origin and growth habit and handcraft products used as material culture; 2) to document a traditional knowledge of the community applied to make hand crafts and traditional arts; 3) to identify the most multipurpose and more preferred plant species through preference ranking, direct matrix and paired comparison; and 4) to investigate the status of material culture and its current application.

GEOGRAPHICAL LOCATION

Study site and population

This study was conducted in Kersa (Figure 1); one of the 17 districts found in Jimma Zone, Oromia region, southwest Ethiopia. Kersa is situated 18 km away to the north east of Jimma town and 345 km southwest of Addis Ababa. The district has a total population of 176,667 and 978 km^2 and bounded by Limmu Kossa, Tiro Afttata, Ommo Nadda and Manna, Dedo to the north, east, west and south, respectively. The district has 31 Kebles and Serbo is the main town situated 25 km from the center of Jimma. It is found on 1600 to 2400 m above sea level. About 85% of the population economically depends on the agriculture in general and 65% on coffee production in particular. The total area of Jimma zone is 18,415 km^2, where four distinct seasons are considered throughout the year based on the kop pen's system of classification (Kifle, 1994). These include tropical high land with a short dry, tropical climate, tropical high land with winter dry and arid climatic steppe. Specifically, the study was conducted where the seasonal climate is tropical high land with winter dry season, and the mean temperature during the coldest season ranges from 3 to 18°C. This area is covered by forest, and the soil is very fertile, black in colour, and has a good retention capacity (Kifle, 1994).

Jimma has an estimated population density of 150.64 people per square kilometer (CSA, 2005). The five largest ethnic groups include the Oromo (81.57%), Yem (5.28%), Amhara (4.95%), Dawuro (2.9%) and Kafficho (1.78%); all other ethnic groups made up 3.52% of the population. Afaan Oromoo is spoken as a first language by 85.96%, 7.86% Amharic, 1.95% Dawuro and 1.45% spoke Yemsa, and 1.19% spoke Kafa; the remaining 1.59% speak all other primary languages reported. The majority of the inhabitants are Muslim (82.57%) followed by 15.78% Christianity and 1.47% Protestant (CSA, 2005).

Reconnaissance survey

Prior to data collection, a reconnaissance survey was carried out in households and in the field throughout Kebeles (Kebele = the least administrative hierarchy in Ethiopia) from 1 to 30 September, 2011: 1) to establish a rapport with community leaders, 2) to identify households where material cultures are used and areas where canopies of forest still exist, 3) to identify key knowledgeable elders of 45 and above age groups, and 4) to identify study sample sites. Accordingly, 5 kebeles were selected; one from the centre (Busa Bechane), and the others each from north (Mera Kebericho), south (kelecha), east (Degeso), West, (Bewatotabi) and these were considered as data collection sites (Figure 1).

Informant selection and data collection

Ethnobotanical data were collected between October and February, 2011 following the methods developed by Martin (1995), Cotton (1996) and Canningham (2001). Ethical clearance was obtained from Jimma University Ethics and Review Committee and dispatched to community leaders. Three field trips were conducted in 5 Kebeles totalling 15. Several methods including interviews, group discussion, participants' observation and questions were used based on the checklist of questions translated into Afan Oromo language to obtain IBK of the local people on plant species used in material culture.

A total of 75 key informants above 45 age groups, 15 each kebele were selected and responded, and data on the plant species, processing, plant products, cultural uses were recorded. In addition, a total of 225 community members of several age groups and educational levels responded and the status of traditional knowledge transfer and its current application were determined. The herbarium of the voucher specimens was prepared and identified using local floras or manuals and the entire herbarium sheet were deposited in herbarium of Jimma University. Finally, standard herbarium method was followed for preparations of herbarium (Bridney and Forman, 1989).

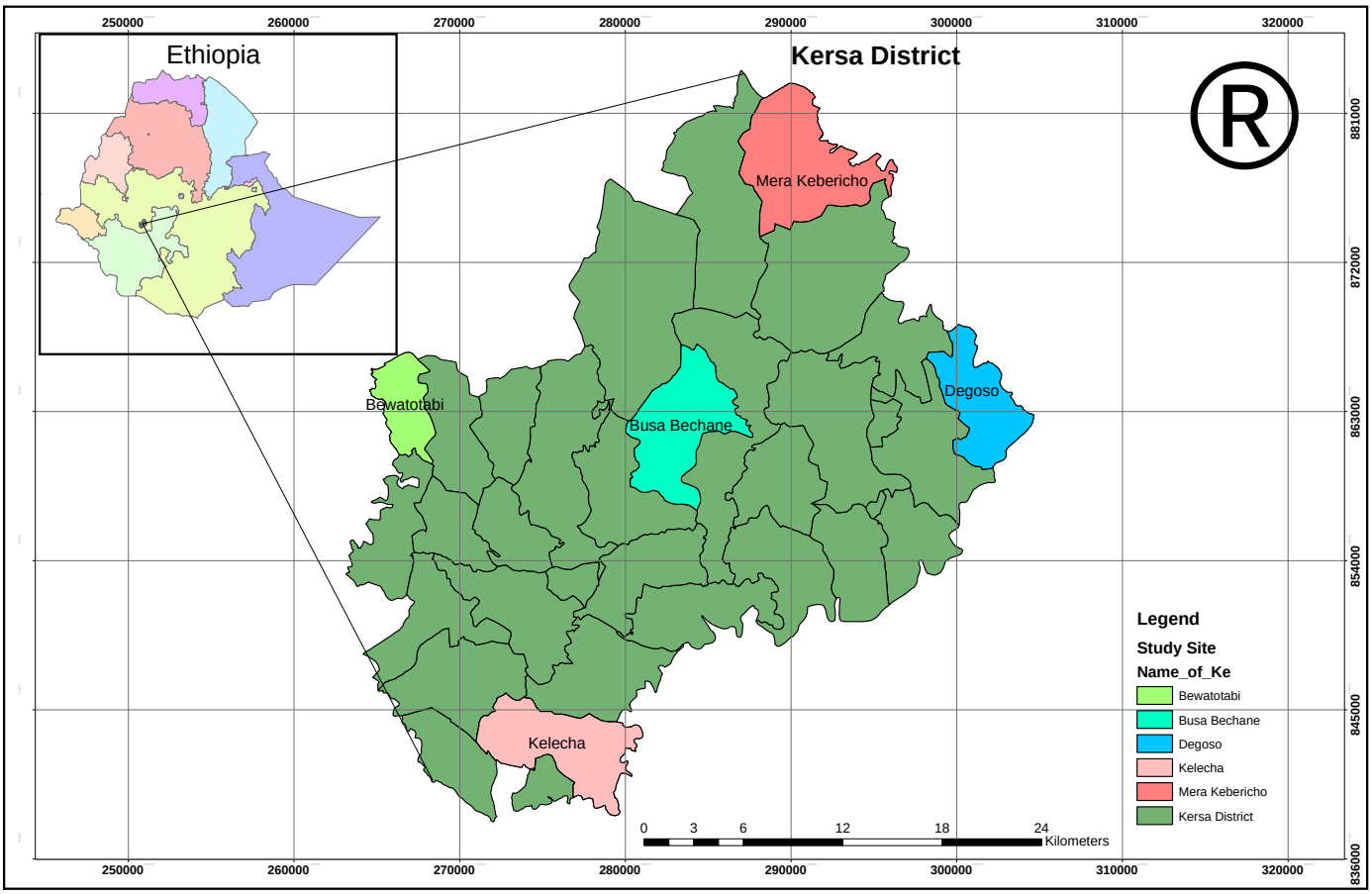

Figure 1. Map of the study area.

Data quantification, verification and interpretation

The number of medicinal plants named by individual respondent was summed, averaged and converted into percent using MS Excel data entry spreadsheet. This was used to determine the status of knowledge transfer in reference to age groups and educational levels. The remaining data were quantified and verified as per the methodologies of Alexiades and Sheldon (1996) and Trotter and Longman (1986), respectively through preference ranking, double matrix and paired comparison. Finally, obtained results were interpreted and illustrated in tables and figures.

RESULTS AND DISCUSSION

Plant identification

A total of 46 plant species belongs to 44 families and 55 genera used in material culture were identified in the study area. Of these, 6 species belong to Poaceae followed by 5 species of Fabaceae, 4 species of Euphobiaceae and Myrtaceae each, and 2 species of four families each (Asteraceae, Oleaceae, Sapotaceae and Verbenaceae), while the rest 38 families are represented by one species (Appendix 1). The highest numbers of species belonging to Poaceae followed by Fabaceae in this study is probably due to their growth habit (tree and shrub) and suitability for the makings of many and simple furniture used by the local community. Many studies also reported that the highest number of plant species belong the Fabaceae used in material culture (Gemedo-Dalle et al., 2005).

Growth habit

Of the 3 growth habits recorded, 25 (54%) trees, 10 (22%) shrubs and 11 (24%) herbs were identified as sources of material culture used by the community of the study area. Tree held the highest number due to its woody growth form, and high utilization by the community of the study area ranging from simple furniture making to house construction and agricultural implements. Bahru et al. (2012) reported that the highest proportion growth form contributing to making of material culture in eastern Ethiopia was contributed by shrubs followed by trees. This may be due to the availability of more tree population in the forest of southwest as compared to

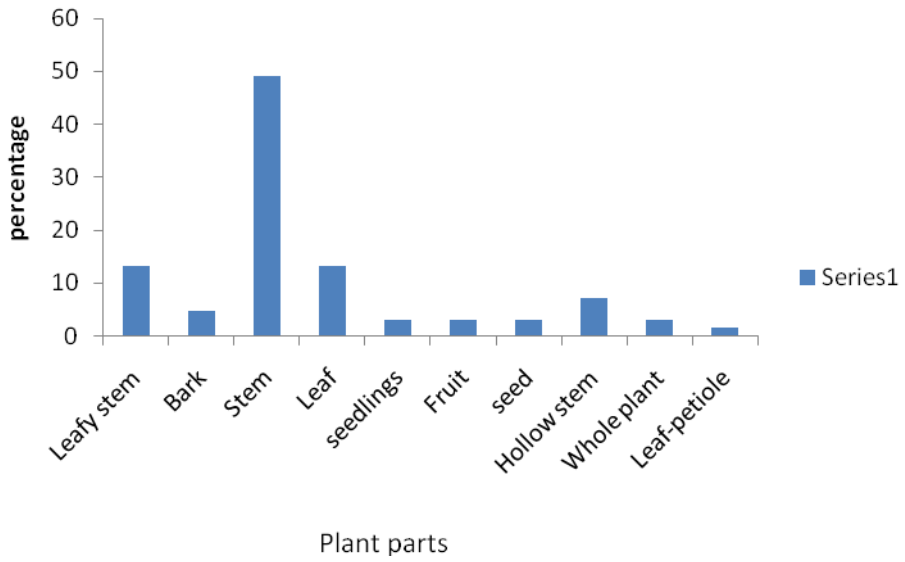

Figure 2. Plant part (s) used in the production of different material cultures.

other regions of the country.

Plant part(s) used

Of the plant parts used for the production of material culture in the study area, woody-stem held the highest percentage (49%) followed by leafy-stem and leaf (13% each), and hollow stem, while the rest except leafy-petiole holds the same percentage in use (Figure 2). This result is in agreement with the report made by Bahru et al. (2012) recorded from the Indigenous Knowledge (IK) of Oromo and Afar nations, east Ethiopia.

Major use categories of plant material culture in the study area

The local community of the study area still today relies on traditionally made agricultural tools, household furniture, utensils, house and other traditional arts obtained from a diversity of plant species.

Agricultural implements

The agricultural implements identified in this study include plough, yoke, axe and digger made from several plant parts (Appendix 1) supplemented with locally made metal instruments. For instance, plough is made from cut and curved woody-stem of *Albizia schemperiana*, *Cordia africana*, *Prunus africana* and *Podocarpus falcutus* estimated to be 2½ m in length. The second part connected to a plough is a yoke (QANBARRII) made from stem cuttings of *A. schemperiana, Croton macrostachys, and Syzygium guineense.* The two implements are connected by forming a hole at the tip of a plough and at the mid of yoke, and tied to the neck of the oxen. A digger (GASOO) or plank- a long, thin flat piece of timber made from buttress roots of *P. africana*, *Allophylus abyssinicus, C. macrostachyus* and *Olea welwischii* used for the fractionation of soil and removal of weeds during ploughing was mainly carried out by household or young family members (Dargaggoo or shamaran). Axe is widely used for cutting trees in order to prepare farm land, and the axe handle is made from stem cuttings and curving of *Accacia abyssinica*, *Coffee arabica*, *Mimusops kummel, Psidum gusigava.* Similarly, Adal (2004) (North Shoa, Ethiopia), Chaudhary et al. (2008) (India) and Bahru et al. (2012) (East Ethiopia) have reported the making and application of the same farm implements but differ in plant species. For instance, Adel et al. (2004) reported the use of *Ehertia cymosa* and *Terminalia brownii* for farm tools.

Honey production is one of the most commercial produce of agricultural sectors produced by the community of the study area using a diversity of plant species distributed in the forest for hanging beehives. Of the flowering plants, the most selected plant species that highly attract bees for honey production are *Erythrina brucei, Euphorbia ampliphylla, Juniperus procera, C. macrostachys, Vernonia auriculifera while Vernonia leopoldii* makes beehive (Appendix 1).

House construction

The majority of the household of the study area live in the house constructed with the diversity of plant species including trees, shrubs and herbs (Appendix 1). The

Construction of the house is always carried out by Daboo (a group of neighbouring male) without special or private skill requirement of the members of the community. The type and construction of the house depends on the interest of the household (size and shape), the availability of appropriate plant species in the area and climatic conditions. The stand house consists of two major parts. The circled and/or squared house wall and the above coverage, roof. The wall is constructed by planting woody stems of *Adansonia gregori, C. africana, Eleutine jaegeri, Juniperus procera, Olea welwitschii, Podocarpus falcatus* (for window frames), *Setaria megaphylla* and *Hyparrhenia hirta,* similar in height but differ in thickness. The stand sticks are longitudinally tied by rope (hiddaa) obtained from *Acalypha fruticosa*, and *Ensete venticosum* plant species. The roof consists of two layers; the inner layer is thatched from vertically laid woody stems of *Eucalyptus globulus C. Africana* and the outer is covered by a bunch of grass species such as *E. jaegeri.* The majority of rural houses have single door made from the timber of *C. africana*. Similarly, the study conducted in east shoa Zone, Ethiopia by Adal (2004) reported similarity of the majority of the plant species but frequent use of *Acacia* species due to the scarcity of other indigenous species as a result of agricultural expansion.

Home furniture and other traditional arts

Out of 46 plant species about 35% are used as source of household furniture including beds, seats, baskets, plate and grinders while the rest species serve for firewood, ritual values, toothbrush, hunting and musical instruments. The most preferred plant species for bed, seat and grinder makings are *A. schemperiana, C. africana, P. africana, Olea welwitschii*. Different types of baskets differ in size and shape and serve as a container for grain storage, market and placing of clothes by the local community both for self-service and commercialization, and the most suitable plant species used for making such material cultures are *Arundinaria alpine* (bamboo) and *Phoenix reclinata* (Meexxii). *Curcubita pepo* is widely used for making containers for drinking water, local beverages (tella and Taji) and feeding (Appendix 1). This report is similar to that of Adal (2004) report from North Shoa, Ethiopia, Chaudhary et al. (2008) from India and Bahru et al. (2012) from East Ethiopia. Again, three species were reported by informants to be used as toothbrush including *Steospermum kunthianum* (bark), *Clerodendron myricoides (*stem)*, Clausena anisata* (stem) different from species reported by Bahru et al. (2012) and Gemdeo-Dalle et al. (2005) both from Ethiopia and Munishi et al. (2006) from Tanzania. The bark of *S. kunthianum* is the best toothbrush sold in local towns and markets by mobile children the same for *Salvadora persica* in other regions of Ethiopia and Tanzania (Munishi et al., 2006; Bahru et al., 2012). *Ficus vasta* (Odaa) is the most respected, vigorous and ritual plant species providing a multiservice in Oromo culture, religion and administration, where thanks to the God, holydays and meetings are held under the shade; the same goes for other Oromo community in Oromia Regional State, Ethiopia (Gemedo-Dalle et al., 2005; Bahru et al., 2012).

Traditional botanical knowledge (TBK) versus age group of Gada system

The TBK is largely held by elder age groups. The knowledge of naming of the local names of individual plant species, choice of preference of plant species, processing and application for specific cultural value declines with age groups and life styles. The new generations and the urban community (less than 30 years old age groups) of the study area showed a decline in traditional botanical knowledge; in naming and identification of the plant species around them (Table 1). The highest average percentage (76%) of plant species were recorded by Yuba II and I (49 and above age groups) as compared to others, which showed a decrease to Dabballee (1 to 8 age groups). Similarly, the average percentage of plant species named by rural students was greater than those of urban students with increasing educational levels of all variables (Table 2). The decline of the TBK in generation is due to the interference of and shifts to the use of more synthetic industrial products not only in the urban but also extending to the rural areas. Various reported studies indicate that the traditional knowledge of the majority of the developing nations has been transmitted from mouth to mouth (orally) through generations, and consequently express their strong feeling that even the same is rapidly declining due to the dominance and extensive growth and development of scientific knowledge and technology (Gemedo-Dalle et al., 2005).

Gender versus TBK

This study revealed that the TBK and the skill of making are widely held by male (53%) as compared to both male and female (27%) and female (20%) (Figure 3). However, there are labour divisions between male and female of the study area for instance while house construction is carried out by male, weaving is always done by the females. This difference is probably due to the exposure of males more to the field works and in contrast the engagement of females to the household activities in developing countries.

Similarly, various studies reported the existence of more cultural botanical knowledge by males in traditional medicine as compared to the females (Assefa et al., 2010).

Table 1. Traditional botanical knowledge versus age groups of the rural and urban community with reference to the naming of the local names and use of plant species in material culture.

Age group	Local name of age groups in Gadaa System	Residence/societal role	Respondents/number of plants named by respondents														Mean plant species	100/46 x mean = %
			R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15		
1-8	Dabballee	Rural/None or immature	0	0	1	0	0	0	0	0	0	2	0	0	0	0	0	0.2	2
		Urban/pupil	0	0	1	0	0	0	0	0	0	2	0	0	0	0	0	0.2	2
9-16	Foollee	Rural Herd livestock	1	2	1	3	2	2	2	3	2	2	4	3	2	1	1	2	4
		Urban/ Junior pupil	1	2	1	3	2	2	2	3	2	2	4	3	2	1	1	2	4
17-24	Qondaala	-Herd at distance	3	5	4	5	6	5	4	4	3		5	4	3	2	4	4	8
		-Heavy work	3	5	4	5	6	5	4	4	3		5	4	3	2	4	4	8
25-32	Kuusaa	Future Gada leader	14	13	16	15	8	9	6	15	16	18	13	11	8	7	5	11	22
			14	13	16	15	8	9	6	15	16	18	13	11	8	7	5	11	22
33-40	Raabaa Doorii	Waraanaa/Military stage	34	22	25	21	14	34	16	23	15	22	21	14	12	21	22	21	42
			34	22	25	21	14	34	16	23	15	22	21	14	12	21	22	21	42
41-48	Gadaa (Luba)	Abbaa Gadaa/Gadaa leader	30	25	28	25	14	31	26	28	25	32	15	23	17	12	24	23	46
			30	25	28	25	14	31	26	28	25	32	15	23	17	12	24	23	46
49-56	Yuba I	Gorsaa/Advisor	34	39	25	21	24	44	26	33	35	42	28	23	20	24	21	29	59
			34	39	25	21	24	44	26	33	35	42	28	23	20	24	21	29	59
≥ 57	Yuba II	Jaarsa/Retired	34	32	25	41	34	49	36	49	35	42	33	30	41	43	34	37	76
			34	32	25	41	34	49	36	49	35	42	33	30	41	43	34	37	76

Table 2. Traditional botanical knowledge versus educational levels with reference to local names of plant species used in material culture.

Educational level	Residence	Respondents/number of plants named by respondents																
		R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15	Mean	Percentage
Illiterate	Rural	31	21	26	20	19	34	16	23	15	21	22	22	34	15	18	22	16
0-4	Rural	4	5	6	7	4	3	6	2	4	2	4	3	5	5	4	4	3
	Urban	3	2	2	2	4	4	3	3	5	4	4	5	4	5	3	3.5	2.6
5-8	Rural	5	3	5	6	5	4	6	4	5	4	4	5	4	4	4	4.5	3.3
	Urban	3	2	5	1	4	4	6	3	5	4	2	5	4	3	4	3.6	3.5
8-12	Rural	15	14	12	10	9	10	10	12	11	13	14	12	13	11	14	12	9
	Urban	5	4	3	7	5	3	7	6	5	3	4	7	8	2	4	4.8	3.6

Table 2. Cont.

University students	Rural	16	18	13	12	11	14	15	14	13	13	18	19	12	15	12	13.6	10
	Urban	5	6	4	7	6	9	5	6	5	5	7	6	5	10	8	6.3	4.6

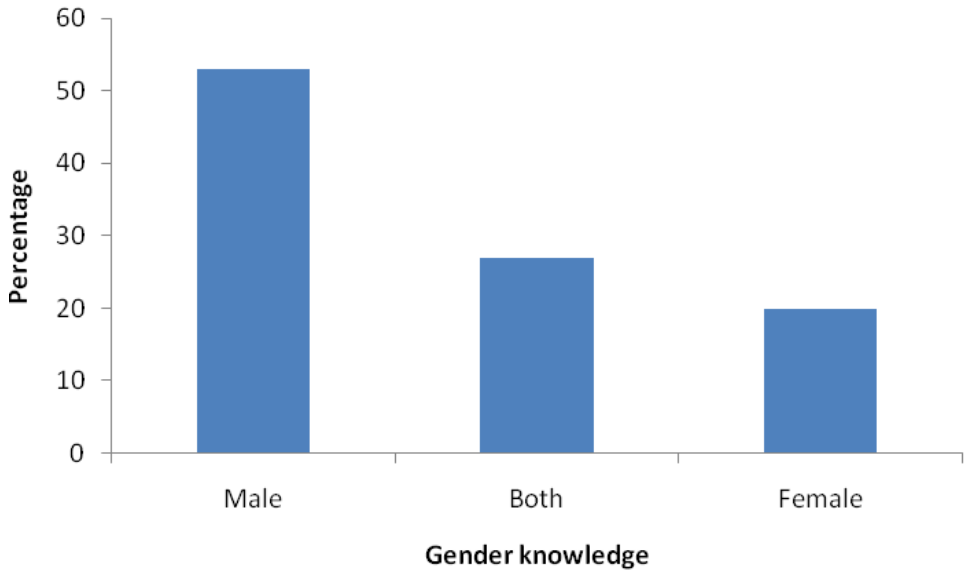

Figure 3. Genders versus traditional botanical knowledge (TBK).

Multipurpose plant species

According to Table 3, the highest value, 51 (1st rank) was assigned to *Arundinaria alpine followed* by *C. africana*, *F. ovata* and *Pouteria adolfi-friederici* with the value of 49 and 40 in the 2nd and 3rd places, respectively. *Ficus sur, Hallea rubrostipulosa* and *Hippocratea africana* are the other multipurpose species ranking 4th, 5th and 6th, respectively. *Diospyros abyssinica, Baphia abyssinica* and *Manilkara butuji* are the other multipurpose species ranking 4th, 5th and 6th, respectively.

The least ranked species in multipurpose aspect from the chosen species were *Hippocratea africana* and *Malotus oppositifolius* but this does not mean that the least ranked species are the less threatened and the dominantly distributed species in the area. This is because they are highly used for construction and house hold equipment as observed in the area. Thus, the survival of the species according to their rank is under question, because of the daily demand of the Oromo community, which is not supplemented by planting these plants.

Use status of material culture

The highest percentage of respondents (90%) reported that they still use handcrafts (traditionally made from plants) for storage purposes followed by, for seat, feed and sleeping services (75, 70,

Table 3. Direct matrix ranking for most multipurpose plant species.

List of species	Use categories							Total	Rank
	Construction	Musical instruments	Farming implements	Household articles	Weapon	Tool handles	Beehives		
Cordia africana	8	7	6	7	6	7	8	49	2nd
Maesa lanceolata	6	1	4	3	3	4	1	22	8th
Hallea rubrostipulosa	7	5	3	7	5	3	8	38	5th
Galiniera saxifraga	7	7	8	4	6	6	2	40	3rd
Ficus sur	7	2	5	7	8	2	8	39	4th
Croton macrostachyus	7	4	5	5	2	5	6	34	7th
Arundinaria alpina	8	8	6	8	7	6	8	51	1st
Hippocratea africana	8	4	4	8	1	4	6	35	6th

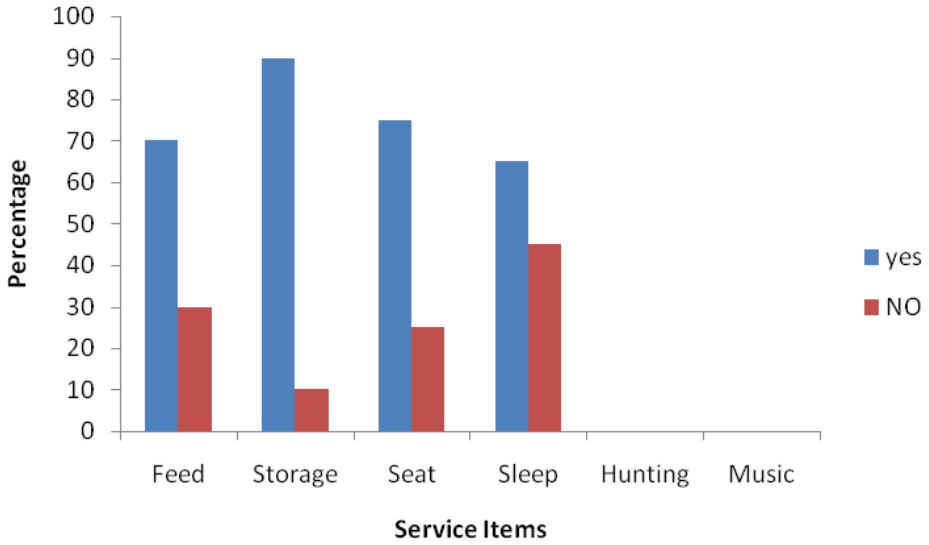

Figure 4. Use status of handcrafts and traditional arts in the household of the local community for different services.

65%, respectively) in their home. No respondent reported the use of traditional arts for hunting and as musical instruments locally obtained from plants (Figure 4). This result indicates that the plants remain in wide use among rural household communities as a source of handcrafts (Cotton,

Table 4. Factors influencing the use of material culture as ranked by 15 respondents.

Major factors	Respondents															Total	Rank
	R1	R2	R3	R4	R5	R6	R7	R8	R9	R 10	R 11	R 12	R 13	R14	R15		
Increment of sophisticated industrial products				6	6	7	3	6	6	5	6	4	5	6	2	73	1st
Ignorance of cultural identity	7	6	6	7	7	8	8	7	5	7	8	5	7	7	6	101	3rd
Suitability of synthetic industrial products	7	7	8	9	8	9	8	7	7	7	8	8	7	8	7	115	4th
Lack of formal and informal indigenous education in material culture	3	4	6	7	6	3	4	4	5	6	7	7	4	5	5	76	2nd
Migration to urban life																	5th

1996) although, the application in traditional arts is disappearing.

Factors influencing the use of material culture

Currently, interest towards utilizing material culture is diminishing among the younger generation. According to this study (Table 4), the major factors include the wide distribution of synthetic and sophisticated industrial products; a lack of formal indigenous knowledge education and ignorance of own cultural identity. For instance, the introduction of metal and plastic containers has led to a decrease in the production of domestic baskets while the use of aluminum canoes has resulted in the loss of many skills required for traditional canoe construction (Alexiades and Sheldon, 1996). Oral based transmission of indigenous knowledge in developing nations has played a pivotal role for the deterioration of the exploitation of cheap and access material culture (Gemedo-Dalle et al., 2005). Asefa et al. (2010) similarly indicated that the tendency for modern education, the migration to cities for profitable jobs and education, the decline of the plant population due to deforestation are some of the reasons for the decline of the use of traditional plant based material culture. In addition, some elderly people were becoming reluctant to share their knowledge and use material culture when they have already experienced more suitable equipment. Due to these factors, the practice is now becoming more and more outdated. In the present study, more information was obtained from elderly informants than the young ones. This could indicate a lack of interest which ultimately results in loss of knowledge.

Conclusion

A total of 46 plant species used in material culture were reported by Oromo community of Jimma Zone, Southwest Oromia, Ethiopia. Of these, 54 % of the material objects identified are made from trees and the rest 46% are obtained from shrub and herb. The most multipurpose and preferred plant species reported by informants were *Arundinaria alpine, Eucalyptus spp, Cordia africana, Baphia abyssinica, Galiniera saxifrage* and others. Finally, this study revealed the decline of the transfer of Traditional Botanical Knowledge (TBK) through generation but a wide use of plant-based material culture by the rural communities.

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Annex 1. List of plant species used in material culture with reference to Oromo community, Kersa District, Jimma, southwest Ethiopia.

Species, family, local names, growth habit	Plant part(s), processing	Knowledge owner/gender	Product	Used for
Acacia abyssinica Hochs ex.Benth, Fabaceae, Laaftoo, tree	Naturally bent stem shape is cut, curve in size and inserted into the hole of metal axe without using a nail	M	Axe	Cutting
	Leafy- stem portion is cut and dried in sun.	F, M	Firewood	Firewood
	Leafy- stem thorn portion is gathered and lined surrounding cultivation boundary.	M	Fence	Crop protection against animals
Acalypha fruticosa Forssk, Euphorbiaceae, dhoqonu, shrub	Bark is removed and double stranded (twisted)	F, M	Rope	Tying
	Bark is removed, and stirred with juice prepared locally from *Glinus lotoides* for the treatment of tape worm infection	F	Lubricant	Make it easy to swallow the juice (palatable)
Adansonia gregori F.Muell. Malvaceae, ----, tree	Long stem is cut and split into pieces by axe	M	Timber, furniture	House construction
	Long stem is cut, divided in cross section based on the length of the interest object	M	Wooden bowl or container	Food service
Albizia schemperiana Oliv. Fabaceae, Imalaa, Tree	About 2 m in length and half m in diameter stick is cut, bark is removed, and two holes are made at extreme ends.	M	Yoke	Agricultural implement
	Many stems are cut, bark removed, curved, dried, tied together by rope.	M	Bed	Bed
	Many Stems are cut, bark removed, dried, tied together by rope.	M	Chair	Seating
Albizia gummifera (J.F.Gmel.) C. A. Sim, Fabaceae, Ambabbeessa, Tree	The seedlings are purposefully collected and planted in forests	M	Shade	Coffee shading
Arundinaria alpina K. Schun Bambusaceae, Shomboqqoo, Shrub	Mature bambo is harvested, dried, whole length split in to two thoroughly	F, M	Fence	Home fence
	Mature bambo is harvested, dried, whole length split in to two thoroughly	F, M	Beehives	Honey production
	Mature bambo is harvested, dried, whole length split in to two thoroughly	F	Plate	Home furniture
	Mature bambo is harvested, dried, whole length split in to two thoroughly	M	Storage	Grain storage
	Mature bambo is harvested, dried, cut into 1 m in length	M	Sound instrument	Musical instrument
Calpurnia aurea (Ait.) Benth. Fabaceae,, Ceeqaa, Shrub	The stem is cut to 3 meters long stick, and introduced into the hole of Gindo (plough).	M	Handle	Plough handle
Carissa edulis L. Apocynaceae, Hagamsa, Shrub	Stem-leafy cuttings of mother Plants are vegetatively grown around home and cultivation sites	M	Fence	Home fence Cultivation fence

Annex 1. Cont.

Clausena anisata (WIlld.) Benth. Rutaceae, Ulumaa'ii, Shrub	The stem, 3-4 meters long is cut and used as a stick (kazara), and hand-held during long trip.	M	Tooth-brush	Clean teeth
Clerodendron myricoides (Hochst) R. Br. ex Vatke Verbenaceae, Maraasisa, Tree	The stem, 3-4 cm is cut, and used for cleaning teeth	M	Tooth bush	For brushing teeth
	The stem is cut and made as axe handle for cutting purposes	M	Axe handle	Cutting
Coffea arabica L. Rubiaceae, Buna, tree	Natural bent stem is cut and introduced into fork	M	Pitchfork	Digging
	Fruit is collected, seed released, washed, burnt to brown-black color and powdered	F	Coffee	Stimulant
	Stem part is cut, split into pieces, timber is made, stained and used to produce various products.	M	Bed, window, door, cabinet, drums	Home furniture and construction
Cordia africana Lam. Boraginaceae, Waddeessa, tree	Stem part is cut, bark removed and 1-3 m in length 2 m in width of rod-shaped stick is made.	M	Pestle	A rod-shaped object used for crushing and grinding substances (mooneye bunaa fi midhaani)
	Stem part (2-3 m in length, 2 m in width) is cut, bark removed and a long low narrow open container is made by handsaw.	M	Tough	Feed service for livestocks
Croton macrostachys Del. Euphorbiaceae, Bakkanniisa, Key: M=Male, F=Female	Many leafy-petioles are collected and cover grains in a clay pot for 2-3 days.	F		Provide moisture for speedy germination of gains for local beverage
Key: M=Male, F=Female	Leafy-Stem branches are gathered	F	Firewood	Food preparation
	Stem part (2 m length, 4 cm width) is cut, dried, and hole made at two extremes	M	Yoke	Agricultural implement
	Round-enlarged, matured, and dried fruits are collected from the mother plant. A sealed mouth is made at one, narrow end.	F	Home Containers	Milking, filtrating butter and holding yogurt through regular cleaning.
Curcubita pepo L. Curcubitaceae, Buqqee, herb	The same fruit as described above but different in size is decorated and lid is made from the same.	F	CermoneyContainers	Hold and carry cultural foods to public festivals and ceremony as well as during marriage
Cynadon dactylon (L.) Pers Poaceae, Coqorsa, herb	Harvested and given to cattle	F, M	Feed	Livestock feeding
	Whole plant is harvested	F, M	Feed	Livestock feed during dry seasons
Cyperus digitatilis Roxb.Cyperaceae, Caffee/Baballii, herb	Parallel-veined leaves harvested, dried and sewed by rope obtained from plant fibers	F, M	Rainhood	Herds use as umbrella during rainy season
	Parallel-veined leaves are harvested and spread over the floor	F, M	Bed floor	Sleeping for guests during holydays
Dracenea steudneri Schweinf. Ex Engel. Agavaceae, Afarffattuu, herb	The leaf is collected and given to cattle during dry seasons.	F, M	Feed	Feed for livestock

Annex 1. Cont.

Eleustine jaegeri Pilg. Poaceae, jajjaba, herb	Leafy-stems harvested, dried, moistened, tied in bunches and spread on hut roof vertically	M	Hut cover	House (Hat) construction
Ensete venticosum Welw. Musaceae, Qoccoo, herb	Leaves collected, main mid-vein isolated and double stranded	F, M	Rope	Tying purposes
	The stem part is cut and used to make timber for furniture production such as stool, bed, bowl	F, M	Furniture	Cattle feed
Erythrina brucei Schweinf. Fabaceae, Waleensuu, tree	The leaves are gathered and given as fodder for cattle	F, M	Fodder	Honey production
	The tree is used to hung beehive for honey production	F, M	Hanging beehives	
	Straight stem (1/2m, length; 25cm width) is cut, 20 cm hole is made	M	Monyee	powdering coffee and spices
Eucalyptus globules Labill. Myrtaceae, Bargamoo, tree	Straight stem (2 m length; 50 cm width) is cut, 60 cm hole is made	M	Monyee	Grinding barley and maize to remove layers
	Leafy-stems gathered and sunny dried for 2-3 days	F	Firewood	Bake enjera
Euphorbia ampliphylla Pax Euphorbiaceae, Adaamii, tree	The stem portion is cut into 2-2.5 m long, split into two, the inner portion is removed. Finally, the outer skins are attached/ tied to one another by local threads obtained from specific plant known as hiddaa or quncee.	M	Beehive	Honey production
	The milky substance released is collected from the skin		Huhu	Used as huhu for different purposes.
Ficus exasperata Vahl., Moraceae, Baalaansoofi, tree	The leaves are collected	M		For surface softening of wood to make furniture.
	The wood is collected by bushmen as part of the equipment	M	--	Fire formation
Ficus sur Forssk. Moraceae, Odaa, tree	The wood of the broom cluster fig is collected	M, F	Part of mortar	Grinding coffee, making drums.
	Whole plant, shade	F, M	--	It is used as a shade for traditional ceremony
Ficus vasta Forssk. Moraceae, Qilxuu, T	Leafy-stems are cut and gathered	F, M	Fence	Crop protection
Gossypium hirsutum L., Malvaceae, Jirbii, shrub	Fruit is collected and dried, seeds are released by hand from interwoven fibre by hand, converted to a long thread by cali	F	Fiber	Used to make different traditional clothes (dress and gabi)
*Hippocratea africana (*Willd.) Loes. Celacteraceae, Xiyyoo, shrub	Stem part is cut, sliced into multi-thin sticks (width-not more than 2 cm, length-unlimited), 15-20 sticks tied together by rope.	F	Fiber, plate	Home furniture
Hyparrhenia hirta (L.) Stapf. Poaceae, daggala, herb	The aboveground part is wholly harvested and used for covering hat	M	--	Hat
	The hole is made at the enlarged portion of the mid stem as a host for bee	M	As beehive	Honey production
Juniperus procera L. Cupressaceae, gaattiraa, tree	The wood is collected and burnt	F, M	Charcoal	Firewood
	The wood is cut and curved to the size interest	M	Timber	Roof, house construction

Annex 1. Cont.

Loppia adoensis Hchest. Ex Walp. Verbanaceae, Kusaayee, herb	Leafy-stem is collected	F		Cleaning milk containers
Mimusops kummel Bruce ex DC Sapotaceae, Qolaattii, tree	The bent stem is cut, curved by axe	M	Handle	Cutting
Olea europaea L.Subsp. Caspidata (Walle Don) Cif Oleaceae, Waddeessaa, tree	The hard, heavy and golden-brown wood is cut, curved to the size required	F, M	Furniture, ornaments, spoons and durable fence posts	Food service
Olea welwitschii (Knobl.) Gilg & Schellenb. Oleaceae, Bahaa, tree		M	Timber	House construction
Oxythenanthera abyssinica, Bambusaceae, *(*A. Rich) Munro Shimala, Shrub	Two to three internodes estimated to half meter in length is cut, dried and hallowed.	M	Instrument	Musical instrument for herds
Phoenix reclinata Jacq. Arecaceae, meexxii, herb	Leaves collected	F	Broom	Make mats, baskets and hats. Sweeping around rural dwellings are made from the dried inflorescences
Podocarpus falcatus (Thumnb.)Mirb. Podocarpaceae, Birbirsa, tree	The stem portion is cut and curved.	M	Furniture	Used extensively for furniture, roof beams, floorboards, door and window frames.
Prunus africana (Hook.f.) Kalkm. Rosaceae, Hoomii, tree	The wood is cut and curved	M	Timber	House construction
Psidum gusigava L. Murtaceae, zayituunii, tree	The bent stem is cut and processed by axe to make a handle for axe.	M	Handle	Axe handle
Pneninsetum schimperi A. Rich., Poaceae Migira, shrub	The stem part is cut, sliced into multi-thin sticks (width-not more than 2cm, length-unlimited), 15-20 sticks tied together by rope.	F	Plate	Home furniture
Pouteria adolfi-friederici (Engl.) Baehni Sapotaceae, Qararoo, tree	The stem is cut, curved	M	Timber	Making home furniture.
Ricinus communis L. Euphorbiaceae, Qobboo, shrub	Seeds are collected and mulched	F	Lubricant	Baking enjera
Setaria megaphylla (Steud.) Th. Dur. & Schinz Poaceae, Caffee (baballii), herb	The long paralleled leaves are collected and dispatched in salon (during holydays or ceremony) and also spread on hut	F, M	Hut coverage	Sleeping, hut construction
Steeospermum kunthianun Cham Bignoniaceae, Botoroo, tree	Bark is removed, cut into pieces of 3-5 cm in length	F, M	Tooth- brush	Cleaning teeth
Syzygium guineense subsp.*guineensis* (Willd.) DC. Myrtaceae, Goosuu, tree	Wood is cut, and curved into 2 m long	M	Yoke	Agricultural implement
Syzygium guineense (Willd.) *DC.* subsp.*afromontanum* F. White. Myrtaceae, Badeessaa, tree	The stem is cut, curved and processed into its appropriate size and shape	M	Single-seat bench with three legs	Home furniture as seat

Annex 1. Cont.

Vernonia amygdalina L. Asteraceae, Eebicha, tree	Leafy-petiole is collected	F	Cleaner	Cleaning clay pots with water during making of local beverage (tella)
Vernonia auriculifera Heirn Asteraceae, Reejjii, shrub	Planted in line around home to attract bees	M, F	Plantation	Honey production
	Stem portion is collected, cut by 2 m long each, tied together in hollow structure at ends and at the middle.	M	Beehive	Honey production
Vernonia leopoldii (Sch.Bip), Asteraceae, Sooyyama, shrub	Ten to fifteen long leafy-stems are tied together	M	Firewood	Firing during celebration (finding of the true cross) in September, annually.

M = Male, F = female.