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Ethnobotany Survey of the Wonegizi, Ziama Clan-Lofa County, Liberia

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Research Article

Abstract

Background: Wonegizi landscape is one of the poorest areas in Liberia; lacks basic social services including road network, or inaccessible. The knowledge of indigenous medicine by these people has not being recorded separately, though some botanical research works have occurred. We conducted this research to record local knowledge on what plant resources are used daily for the well-being of Wonegizi people. The main objective is to draw attention to traditional practice of medication, providing a comprehensive list of indigenous medicinal plants of potential for the cure of diseases and wounds in Wonegizi, which will serve as the beginning of a systematic recording of medicinal plants in Ziama Clan separate from the previous works conducted in Liberia by western botanists.

Methods: The survey was conducted during May-June 2014 using photographic documentation of indigenous medicinal plants. The use of key-informants, community consultations, transects and articles and books on West Africa flora were used.

Results: A total of 101 plants of medicinal potential were surveyed belonging to 48 families and 97 genera. Accessed plants are used for treatment of 11 categories of different diseases and disorder common in Wonegizi area. The majority recorded were cure to internal complications and others for external body parts. Trees were the primary source for treatments of diseases and ailments followed by herbs and liana/climbers.

Conclusion: The Wonegizi survey demonstrated significant role of unique traditional medicinal practitioners whose beliefs prohibited the collection of plant specimens during field work. They believe their ancestral spirits must be consulted on the exclusive collection of medicinal plant parts through sacrificing cattle. Hence, traditional medicine continues to be extremely important for the people of Wonegizi in meeting their basic health services.

Keywords: Wonegizi; Ethnobotany; Indigenous knowledge; Health services; Recording.

1. Introduction

Ethnomedicinal healing systems vary across cultures [1]. In Africa, 70–80 percent of the vast majority of people still consult traditional medicinal practitioners [2]. Special families are responsible for traditional medication referred to as 'Zoes' in Wonegizi community. The introduction of synthetic medicine has never replaced the indigenous healing system, and traditional healers continue to be consulted for a variety of reasons in Africa [3].

There have been several botanical studies conducted in parts of Liberia beginning in the 1960s, *viz.* national forests of Liberia (Sapo National Park, Proposed and Protected Areas of Liberia including Wonegizi, Nimba and Grand Gedeh Counties) [4-7]. Yet many parts of the country remain unexplored exclusively for medicinal plants. In fact, the idea of plant collection is poorly understood by the country side, let alone their medicinal plants.

In general, this study sought to showcase the significant role of Traditional Medicinal Practitioners (TMPs) of Wonegizi in providing sustainable fundamental healthcare services for the community wellbeing.

Specifically, this study aimed to:

1. Assess, classify, and record indigenous medicinal

plants (MPs) and their traditional uses using local, common, and scientific names, after comparing specimens with field guides and manuals.

2. Make recorded information available to the community, local and national government, and all concerned stakeholders for decision making in support of indigenous medicinal plants conservation.

2. Material and methods

2.1 Site description

Wonegizi landscape is located in Ziama Clan, Zorzor District, Lofa County- Liberia, and is host to the Wonegizi Proposed Protected Area (WPPA) (Figure 2). It has a population of 40,000 people distributed in 16 major towns and 47 satellite villages. The landscape is proposed suitable conservation area due to its diverse biodiversity presence [8]. It is located in the northwest of the country and covers 37,979 hectares of forestland that hosts remnants of African forest elephants (*Loxodonta cyclotis africana*), and other threatened and endangered species. Wonegizi forms a trans-boundary conservation corridor between Liberia and Guinea. The area is recognized internationally as key biodiversity conservation hotspot, and includes Liberia's highest peak, Mt Wutevi (1,424m) [9] (Figure 1 and 2).

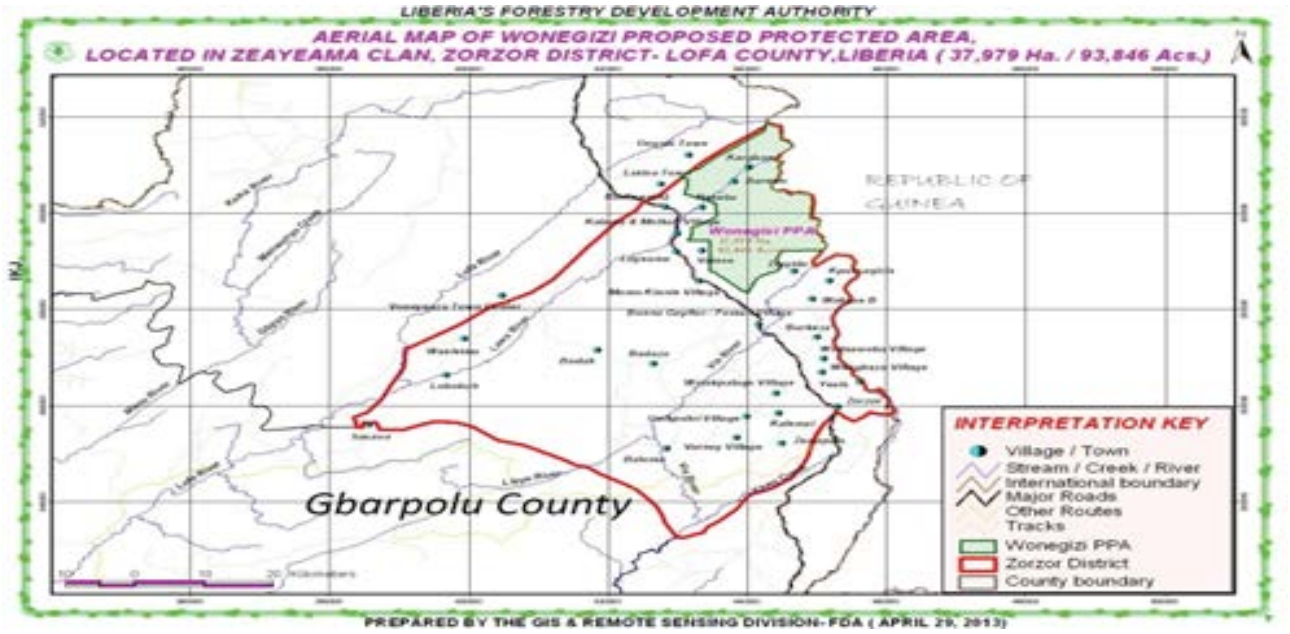

Figure 1. Map of Ziama and WPPA (FDA GIS Division 2013) [10].

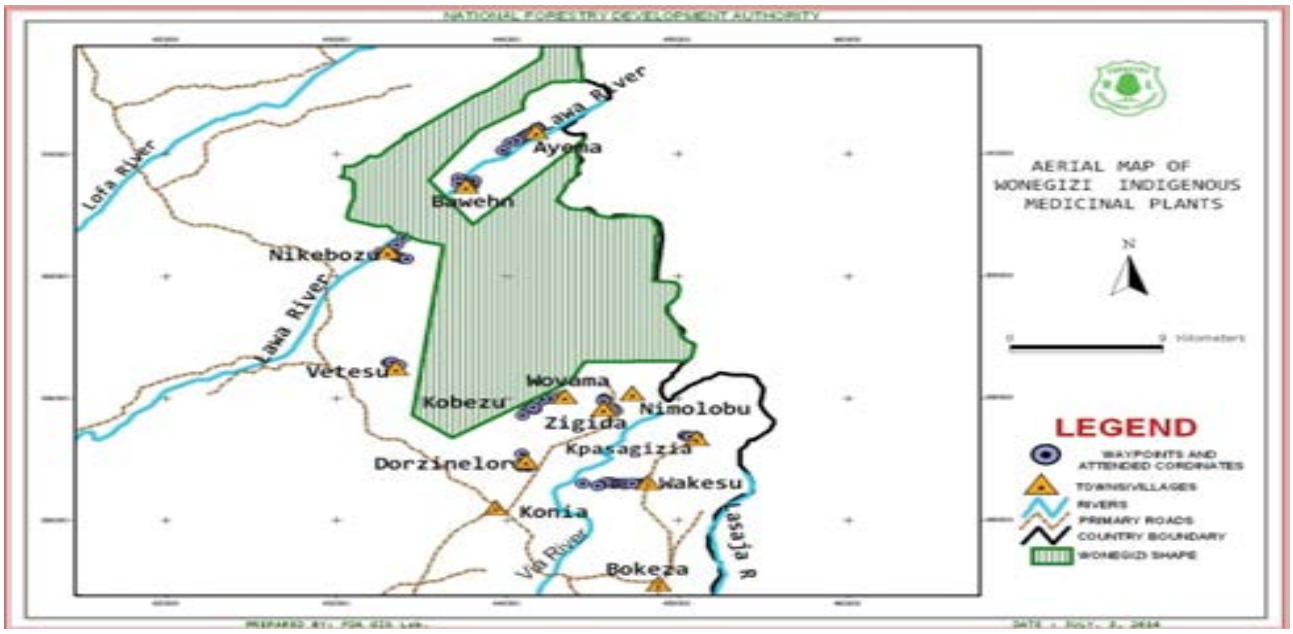

Figure 2. Towns surveyed around WPPA (FDA GIS Division 2014) [11].

The landmark contains the lone intact example of transitional vegetative type between lowland and montane rainforest in Liberia [11,12]. Liberia has a tropical climate; average temperature ranging from 70°F (21°C), with relatively small variations between day and night, and never exceeding 37°C. Its average rainfall is 170 inches (4.320mm) inland including Ziama land [13].

2.2 Ethnography of Ziama-Wonegizi

Ziama Clan was defined based on tradition, and cultural beliefs. There are only two major groups (Nephews and Uncles) of people in the Clan. Majority of people in Ziama belong to the nephew group called ''*darbey*''. This group occupies 11 of the 16 major towns. The towns are Amah, Barwen, Barzewen, Boi, Borkeza, Kpassagizia (Lokpo), Konia, Luyeama, Nikebouzu, Zeleemai and Zulor. Kpassagizia (Lokpo Massa) is the most senior brother town to the 11 by virtue of the Ziama tradition, and not the history for which town was built first; nor is the largest. The role of Lokpo Massa in Ziama tradition is to provide traditional medical security. In other words, Kpassagizia is the lead herbalist town referred to as the Zoe town. Lokpo Massa is assisted by the 10 nephew towns that refer to Lokpo as "*dea-zayzay",* big-brother. The name Lokpo Massa is exclusive title called by the uncle towns, and not others when they refer to the people of Kpassagizia. They are direct nephews to Ziggida (Vesseh), which proxies for Wozi (Loleye).

The second segment consists of the 5 uncle towns, which are responsible for the traditional administration of the clan. They are Dorzenilor, Warkesu, Wozi, Vetesu, and Ziggida. Vesseh administers on behalf of Loleye (senior uncle town) on traditional matters.

2.3 Ethnobotanical survey

A total of 46 well-informed indigenous medicinal practitioners (18 females and 28 males) between the ages of 30 and 80 participated from the 8 towns as key informants along with our team (Table 1). The towns' people chose herbalists based on experience and commitment to good services for their community. These men and women played important role in society apart from being herbalist. Some informants were senior local citizens, educators, traditional midwifes and etc (Table 2). Data were collected through interview, transects, consultation, participation and disclosure.

2.4 Medicinal plants survey

Respecting Ziama tradition, we were not allowed to collect specimens in physical form. They believe this could be a bridge between them and their ancestral spirits who gave them the power to use the plant resources. A way of obtaining medicinal plants specimens required sacrifice with cattle to ancestral spirits, and approval through the lead *Zoe,* who performs the oracles of the land. Besides, medicinal plants or plant parts were not seen on both Borkeza and Konia general market-grounds for sale during the research. Informants told us that consultation with TMPs in Ziama was at the homes of "zoes''.

Medicinal plants were identified by touched from informants, which in most cases was captured through photograph. They were identified and initially authenticated by comparing [14-16]. Finally, plants surveyed were compared to specimens stored at the ArcelorMittal's temporary herbarium in Yekepa, for their authentication. Dr. William D. Hawthorne, an Oxford University Professor who did lot of recent collections in West Africa also made huge collections in Liberia stored in Yekepa. Plants surveyed around 8 towns of Ziama provide treatments against diseases in Ziama. Majority medicinal plants recorded were used as same treatment against diseases in the 8 towns. This notably indicated that medicinal plants recorded were the most effective and intensive used in the landscape (Table 2).

3. Results and Discussion

3.1 Medicinal plants surveyed and family with highest count

The survey began in Kpassagizia on 5 May 2014. Kpassagizia provides traditional medical assistance to Ziama, by virtue of the practice and norm of their ancestral kinsmen. Traditional medical fees are very minimal, if paid. Our initial plan was to work with one female and two male herbalists. The women herbalists didn't send their selected for the first day in keeping with the respect and dignity of their culture. The men were to start out first to soften the bush

Table 1. Team of recorders.

No	Name	Sex	Age	Occupation & Position	Institution
1	James T. Kpadehyea	M	47	Student & Survey Team Leader	University of the Philippines Los Baños
2	Francis K. Kpadeh	M	55	Forester & Asst. Manager	Forestry Development Authority
3	Kokuloku Sali	M	45	Forester; Conservation Zone Warden Wonegizi Proposed Protected Area (WPPA)	Forestry Development Authority

Table 2. Informants of Wonegizi indigenous medicinal plants.

No	Name	Sex	Age	Occupation & Position	Town
1	Gayduo Taloma	F	55	Chairlady; herbalist	Kpassagizia
2	Kebbeh Yanquoi	F	45	Herbalist	Kpassagizia
3	Flomo Yougie	M	40	Herbalist	Kpassagizia
4	Dudu Zaza	M	73	Herbalist/Elder	Kpassagizia
5	Woikpadeh Kpabee	M	35	Herbalist	Kpassagizia
6	Forkpa Zaza	M	38	Herbalist/Asst. town Chief	Kpassagizia
7	Krubo N'yanvee	F	73	Herbalist/Zoe-elder	Kpassagizia
8	Abraham Kolubah	M	32	Herbalist	Kpassagizia
9	Alexander Oua	M	41	Escort	Kpassagizia
10	Kolubah Monzubah	M	59	Herbalist/Zoe elder	Warkesu
11	Kebeh Seveh	F	55	Herbalist	Warkesu
12	Larwuo Gbarwolee	F	35	Herbalist	Warkesu
13	Joseph T. Daniels	M	47	Herbalist/Town Chief	Warkesu
14	Mulba Zumo Gain	M	39	Herbalist/ builder	Warkesu
15	Kolubah Dorbor	M	49	Herbalist/Zoe	Warkesu
16	Gayduo Bolowolee	F	67	Herbalist/Women Zoe	Ziggida
17	Zoebadeh Gbolumah	M	76	Herbalist/Elder	Ziggida
18	Korboi-yallah Youngor	F	64	Herbalist	Ziggida
19	Gayflor Vamuwu	M	50	Herbalist/Former Town Chief	Ziggida
20	Mulbah Sakwe	M	36	Herbalist	Ziggida
21	Tetelma Zaza	F	54	Herbalist	Ziggida
22	Krubo Suah	F	36	Herbalist	Ziggida
23	Tarnue Velewuzeye	M	51	Herbalist	Ziggida
24	Zoeballah Forkpa	M	60	Herbalist	Barwen
25	Kpadeh-koi	M	43	Herbalist	Barwen
26	Kebbeh Leayai	F	59	Herbalist/Women Zoe	Barwen
27	Kolubah Zubah	M	53	Herbalist	Barwen
28	Krubo Yourwuo	F	61	Herbalist	Barwen
30	Zubayea Kolor	M	42	Herbalist	A-mah
31	Forkpa Pumah	M	55	Herbalist/Zoe	A-mah
32	Zoekpadeh Zoewei	M	51	Herbalist	A-mah
33	Forkpayea Zokubah	M	61	Herbalist/Grand-zoe	A-mah
34	Mawolei Sali	F	43	Herbalist/traditional mid-wife	Nikebouzu
35	Yamah Kolu	F	64	Herbalist/Women Zoe	Nikebouzu
36	Gayflor Boiboi	M	54	Herbalist/Hunter	Nikebouzu
37	Tokpa Kollie	M	63	Herbalist/Elementary Teacher	Nikebouzu
38	Oliver Zaza	M	57	Herbalist/Chief hunter	Vetesu
39	Kebbeh Youwu	F	54	Herbalist/Women Chief	Vetesu
40	Krubo Gonoe	F	47	Herbalist/Town's mid-wife	Vetesu
41	Oldman-Forkpayea	M	79	Herbalist/Land Lord	Vetesu
42	Tarnue Kezelee	M	40	Herbalist/Asst. Town Chief	Dorzenilor
43	Yamah Gbatolo	F	59	Herbalist/Mid-wife	Dorzenilor
44	Sorbor Kezelee	F	48	Herbalist	Dorzenilor
45	Forkpa Viewu	M	44	Herbalist/Nephew	Dorzenilor
46	Mulbah Gayflor	M	38	Herbalist	Dorzenilor
47	Mama Samah	F	62	Herbalist/Chairlady	Dorzenilor

before women enter. On May 6, all three women herbalists joined their male counterparts to help us with the recording of plant resources they worked with. The women general focus was on birth attended traditional medication and children treatment. Most traditional medicines recorded for treatment of illnesses that affected their children were mentioned by women; though they were also kin on menstrual disorders.

The people of Kpassagizia and the 7 other towns worked with our team in good faith; acknowledging that plant parts were forbidden to be extracted during field exercises. Total medicinal plants documented

amounted to 101 species belonging to 48 families and 97 genera. Species amount per individual family with their respective local name, and parts used are mentioned in Table 3.

The family Fabaceae had the highest count (14 species), equivalent to 13.86% of plants recorded. Two reasons responsible for Fabaceae topping could be that the family is large, and are common in various vegetation types visited. This commonality allowed easy access as areas visited were informants' chosen sites. Fabaceae was followed by Euphorbiaceae and Rubiaceae each at 9 species (8.91%). Apocynaceae family was the third with 5 species (4.95%), closely followed by Meliaceae and Moraceae each at 4 species (3.96%).

Out of 101 species surveyed in various habits, trees (50) stood at 49.5%. This indication further raised conservation concerns as the remaining fragmented forests continue to be destroyed due to competing interests in forest resource use. Concomitantly, forest resource usages were shifting cultivation, logging, mining, gathering, hunting and these furthered by

Table 3: Ethnomedicinal plants of Wonegizi.

Botanical name	Family	Wonegizi name (Vernacular name)	Parts used/Usage
Acacia kamerunensis Gand.	Fabaceae	***tarnagie***	**Leaves:** chew; cures leprosy; cancer
Adenia rumicifolia Engl. & Harms,	Passifloraceae	***terrboyalui***	**Leaves**: boil, keep extract in mouth 3-5 minutes, cures toothache; drunk to cure swollen neck
Aframomum atewae Lock & J.B.Hall.	Zingiberaceae	***ponitorfoi***	**Leaves:** collect 4 shoots, smoke cake plus tea spoon full of melegueta pepper seeds; pound, put in cone of leaves, pour water, put droplets in nose to heal epilepsy
Aframomum melegueta K.Schum.	Zingiberaceae	***taakeezagie***	**Fruit, Seeds**: chew 4 seeds 3X daily, cures sore-throat; headache; fresh-cold; spice
Agelaea paradoxa Gilg,	Connaraceae	***gaasava-yansai***	**Leaves**: cure for snake bite
Ageratum conyzoides (L.) L.,	Asteraceae	***beleezaawee***	**Leaves:** crush, apply on skin disease; snake bite; leprosy
Albizia adianthifolia (Schum.) W.Wight	Fabaceae	***kpakpaboigie***	**Bark:** boil, decoction drunk to cure cough
Albizia zygia (DC.) J.F.Macbr.	Fabaceae	***gbanangie***	**Leaves**: chew, cures heartache; for ear infection, add *Combretum cuspidatum* young leaves, roast and squeeze to put droplets in affected ear
Alchornea cordifolia (Schumach. & Thonn.) Müll.Arg.,	Euphorbiaceae	***zokai***	**Leaves**: boil, serve decoction to cure chest pain; cough; **Pith:** chew pith for cough
Amphimas pterocarpoides Harms,	Fabaceae	***kozee***	**Bark**: roast bark, steam foot fungus ; cancer
Ananas comosus (L.) Merr.	Bromeliaceae	***kevegie***	**Fruit**: boil when green, serve decoction to cure yellow jaundice; typhus
Anchomanes difformis (Blume) Engl,	Araceae	***gorvialukpoi***	**Rhizome**: roast to steam foot fungus
Anthonotha macrophylla P.Beauv	Fabaceae	***bebee***	**Leaves**: chew young leaves against amoebic dysentery; diarrhea
Artocarpus altilis (Parkinson ex F.A.Zorn) Fosberg	Moraceae	***weeteyangului***	**Roots:** boil, serve to cure hypertension **Leaves**: boil, serve decoction to cure diabetes; typhus
Aspilia africana (Pers.) C.D.Adams	Asteraceae	***wukugie***	**Leaves**: crush, place on baby head, joins skull bones; extract put in children ear to heal ear problems
Asplenium nidus L.	Drynariaceae	***yanfulargie; sevelagie***	**Leaves:** collect 4 each from different plant or 3 for man and woman respectively; boil; keep extract cool for bath to remedy infection
Asystasia gangetica (L.) T.Anderson,	Acanthaceae	***pelewobai***	**Leaves**: cook fresh leaves with palm-oil to be eaten by woman who just gave birth to recover from profuse bleeding; heal internal sore **Fruit**: patch, add palm-oil, eat to stop chest pain

Axonopus compressus (Sw.) P.Beauv.	Poaceae	**teteforfoi**	**Plant**: wash, roast to massage fractured leg; arm
Bertiera spicata (C.F.Gaertn.) K.Schum.	Rubiaceae	***kpuvuluma-woligie; zea gbengan***	**Leaves:** boil, drink extract to remedy constipation
Blighia welwitschii (Hiern) Radlk,	Sapindaceae	**poai**	**Leaves**: crush in bucket of water, bath with decoction to cure epilepsy
Bridelia grandis Pierre ex Hutch.	Euphorbiaceae	***kuwui***	**Bark:** boil, serve decoction to cure ulcer **Seeds**: add 1 teaspoon melegueta pepper dust to a liter of water, serve decoction 4 times daily to cure typhus
Brillantaisia owariensis P.Beauv.	Acanthaceae	***koalameelefai***	**Leaves**: chew young leaves, remedy to poison
Bussea occidentalis Hutch.	Fabaceae	***kpebelee***	**Bark**: boil, wash feet 3-4 times daily to treat fungus; drink decoction twice as worm treatment.
Caladium bicolor (Alton) Vent.	Araceae	***gaybadeh-lefai; gaybadeh-boutegie***	**Rhizome**: pound with *Musanga cecrpioides* **bark** to treat skin cancer
Callichilia subsessilis (Benth.) Stapf,	Apocynaceae	***gillehwolo-worloryeze-yengie***	**Root:** add water or palm-wine, serve extract as remedy to constipation; gonorrhea
Canarium schweinfurtii Engl.	Burseraceae	***savawului***	**Bark:** pound, apply to cure leprosy; ringworm
Canna indica L	Cannaceae	***gor-lor-leleh***	**Shoot**: crush, add water; sieve to serve half glass of extractive to remedy fever; boil, serve to cure jaundice
Capsicum frutescens L.	Solanaceae	***kezegie***	**Fruits**: crush, apply on affected rheumatism area
Carapa procera DC.,	Meliaceae	***kovei***	**Bark:** chew inner bark, place on fresh wound, stops bleeding; bacteria repellant
Carpolobia lutea G.Don,	Polygalaceae	***sakewulugie; dervervalakpakugie***	**Root**: roast, chew to cure heartache; chest pain
Cercestis afzelii Schott	Araceae	***berbergie***	**Stem**: tie hip of woman in labor-pain, prolongs delivery for hospital service **Leaves**: chew young leaves to treat cough
Cissus producta Afzel.,	Vitaceae	***saliwuloba- lefai***	**Stem**: cut stem into pieces and add lime fruit to boil, give extract as remedy to poison.
Clerodendrum formicarum Gürke	Verbenaceae	**arwolai**	**Leaves:** crush, add water, drop extract in patient's mouth to cure liver infection
Combretum cuspidatum Planch. ex Benth.,	Combretaceae	***kpoloyaingie-sai***	**Leaves**: boil, serve decoction to cure thrush; diarrhea
Costus afer Ker Gawl.,	Costaceae	***torfoi***	**Inflorescence**: pound, add water, drop on eye to cure cataract; **Stem**: chew stem, boil, drink decoction to cure malaria, yellow jaundice; pound inflorescence mixed with melegueta pepper to cure piles; for gonorrhea and all internal infections treatment, add Costus spec. stem to Dracaena praetermissa **roots**, 7 rep **fruits** of *Capsium frutenscens, Adenia rumicifolia* **stem**, *Zingiber officinale* **rhizome** and pour wine to drink extract
Craterispermum caudatum Hutch.	Rubiaceae	***gbengan; yemeedoi***	**Bark**: pound to dust for sore or cut treatment **Leaves**: boil, serve decoction against yellow jaundice
Cyathula prostrata (L.) Blume,	Amaranthaceae	***darlagie, derlagie***	**Leaves**: boil leaves, serve extracts to cure fever, yellow jaundice, heartache, thrush and to initiate normal menstrual cycle
Dalbergia saxatilis Hook.f.	Fabaceae	***kpelegogo-boi***	**Leaves**: crushed leaves to apply on boil for pus removal
Dendrobium sp.,	Orchidaceae	***gulubalama-boblogie***	**Leaves:** crush, apply extractive on boil for fast relief
Desmodium adscendens (Sw.) DC.,	Fabaceae	***dorbor-leyangie***	**Leaves**: crush, add water, serve extract to cure cough, asthma; boil, serve extract to remedy dysentery and ulcer; dry plant, boil as tea for children having cough

Dichrostachys cinerea (L.) Wight & Arn.,	Fabaceae	***dadai***	**Bark**: tie the fibrous bark in climber rope as snake repellent
Elaeis guineensis Jacq.	Arecaceae	***torkpoi; dorwului; tuwuwului***	**Cabbag**e: grand, apply on fresh sore as anti-bacteria
Eleusine indica (L.) Gaertn.	Poaceae	***teteforfor-zenai; dovogui; etelorlevegui***	**Plant**: boil, drink decoction against yellow jaundice; typhus
Englerina gabonensis (Engl.) Balle,	Loranthaceae	***teneegui***	**Leaves**: boil, wash head against severe headache
Entada gigas (L.) Fawc. & Rendle,	Fabaceae	***tuwuvegui***	**Sap**: sore eye medicine
Entandrophragma cylindricum (Sprague) Sprague	Meliaceae	***kpetelegui***	**Bark**: chew inner bark, add palm-wine for sexual stimulant
Entandrophragma utile (Dawe & Sprague) Sprague	Meliaceae	***kpetelee-kpoigie***	**Bark:** chew inner bark, add palm-wine for sexual stimulant; potential
Eremomastax speciosa (Hochst.) Cufod.	Acanthaceae	***borlor-bordai***	**Leaves:** eat to stop poison
Ficus exasperata Vahl	Moraceae	***nyanlai-wolegie; koliwoligie***	**Leaves:** crush, add water, serve decoction to remedy worm, ring-worm and skin cancer
Ficus sur Forssk.,	Moraceae	***nyanlai-boigie***	**Leaves**: crush, add water, serve decoction to remedy worm; add *Milicia* spp. to cure chronic skin disease
Fleroya stipulosa (DC.) Y.F.Deng,	Rubiaceae	***porwor-wului***	**Bark:** pour water, palm-wine, serve decoction to cure ulcer
Funtumia africana (Benth,) Stapf,	Apocynaceae	***borlorworleh-zyneh'***	**Bark**: soaked in water, extract drunk to cure diarrhea **Latex**: drunk to stop prolonged menstrual cycle
Garcinia kola Heckel,	Guttiferae	***doloyangui***	**Bark**: extracts from bark cures pressure **Fruit**: aphrodisiac, cures pressure **Root**: cure for yellow jaundice
Geophila afzelii Hiern	Rubiaceae	***koawee***	**Plant:** wash, fry with red-oil, serve 3Xs every 4hrs to cure heartache, eat fresh after washing; add palm-wine, treat jaundice, chronic gonorrhea; serve as appetizer;
Gongronema latifolium Benth.	Apocynaceae	***yeneyai-yensai***	**Sap**: drunk by baby-ma, to instill healthy breast-milk
Harungana madagascariensis Lam. ex Poir.	Guttiferae	***kpodogui***	**Leaves**: crush to cure ring worm; eat against dysentery **Bark**: scrape, soak in water, serve decoction to cure yellow jaundice **Sap**: applied to cure ringworm
Heisteria parvifolia Sm.	Olacaceae	***kpada-wee***	**Flower**: eat to relief headache; cough and cold
Ipomoea involucrata P. Beauv.	Convovulaceae	***zowei-kpolor-yansai***	**Leaves**: chew to cure cough; steam against rheumatism; **Root**: add *Aframomum* root plus water, palm wine, extract drunk to instill good menstrual cycle
Landolphia dulcis (Sabine ex G.Don) Pichon,	Apocynaceae	***kinnegui***	**Leaves**: boil with *Pterocarpus* spec. **bark,** serve decoction to cure dysentery; STI;
Macaranga heterophylla (Müll. Arg.) Müll.Arg.	Euphorbiaceae	***zea-lakolegui; wonsamee-gbaloi***	**Leaves**: tie 3 bundles, boil, serve extract to the pregnant to relief pain from hot liquid that disturbs fetus
Macaranga hurifolia Beille,	Euphorbiaceae	***darkolegui***	**Leaves**: boil, serve extract to initiate sperm fertility; chew young *Macaranga* and *Microdesmis* against cough
Maesobotrya barteri (Baill.) Hutch.	Euphorbiaceae	***doloyangui***	**Bark:** pound with clay, produce chalk to treat high-fever, malaria, chest pain; free lungs by eating fruits
Manniophyton fulvum Mull.Arg.	Euphorbiaceae	***foinworgui***	**Laves**: eat to cure dysentery; ulcer
Mareya micrantha (Benth.) Mull.Arg.	Euphorbiaceae	***wanawanagui***	**Leaves**: cure snake bite; cook, add salt to kill worms in stomach

Massularia accuminata (G.Don) Bullock ex Hoyle,	Rubiaceae	***dorbor-lee***	**Bark**: pound with melegueta pepper, rub to cure jaundice **Leaves**: boil, extract drunk for malaria cure; tea
Microdesmis keayana J.Léonard	Pandaceae	***nikee***	**Leaves**: eat to cure dysentery
Milicia regia (A.Chev.) C.C.Berg,	Moraceae	***semagui; kodawului***	**Bark**: pound, mix with Ageratum, white clay rub externally to treat leprosy, severe skin disease; chew cambium as aphrodisiac
Mimosa pudica L.	Fabaceae	***zenatavazui***/	**Plant:** boil, serve to cure thrush
Momordica cissoides Planch. ex Benth.	Cucurbitaceae	***golowopokpoloi***/ Climber/Wild/Often	**Leaves:** crush, add water, drunk to treat tongue trouble; treat severe headache
Monodora tenuifolia Benth.	Annonaceae	***vornehgului***	**Bark**: chew inner bark, put wine, drunk as aphrodisiac; add *Trichilia***bark**, pealed *Costus***stem** and *Aframomum* **root,** boil with palm-wine, drunk for normal menstrual cycle
Morinda morindoides (Baker) Milne-Redh.	Rubiaceae	***suolehmia; kojolobo***	**Leaves:** boil, serve extract to cure worms; jaundice; body pain; malaria and fever
Musa x paradisiaca L.,	Musaceae	***yemeegai***	**Leaves:** slash shoot, add water, cures cholera
Musanga cecropioides R.Br. ex Tedlie,	Cecropiaceae	***tozugui; gozugui***	**Bark**: Chew as cough cure; heartache
Mussaenda elegans Schumach. & Thonn	Rubiaceae	***terzyneh-la-boi-gui***	**Leaves**: add Sclera spec. crush, serve decoction to stop vomiting
Mussaenda erythrophylla Schumach. & Thonn.	Rubiaceae	***terzyneh-labelle-boi-gui***	**Leaves**: add Sclera spec. crush, serve decoction to stop vomiting
Myrianthus libericus Rendle	Cecropiaceae	***gbaloii***	**Leaves**: boil, serve decoction to induce blood
Newbouldia laevis (P.Beauv.) Seem.	Bignoniaceae	***torloi; yootefai'***	**Leaves**: crush, apply extract on piles; chew leaves to cure dysentery; slice, fry with palm-oil, eaten by barren for pregnancy
Newtonia aubrevillei (Pellegr.) Keay,	Fabaceae	***keleigului***	**Bark**: chew as aphrodisiac
Octoknema borealis Hutch. & Dalziel	Olacaceae	***korlorquillegui***	**Bark**: add water, served extract against constipation
Palisota hirsuta (Thunb.) K.Schum.	Commelinaceae	***phonigie; foenigui***	**Stem**: extract cures gonorrhea; ear ailments and all that affect the head
Pentaclethra macrophylla Benth.	Fabaceae	***kovelei***	**Bar**k: extract served to cure trash; skin cancer
Petersianthus macrocarpus (P.Beauv.) Liben,	Lecythidaceae	***teveagui***	**Bark**: boil, serve decoction against worms; ulcer; thrush
Phyllanthus muellerianus (Kuntze) Exell	Phyllanthaceae	***woniwolo-zaingui***	**Leaves**: crush, add water to treat fire burnt
Portulaca oleracea L.,	Portulaccaceae	***borborlor-quee***	**plant:** roasted to massage baby to remedy ribs pain
Pterocarpus santalinoides DC.	Fabaceae	***kpatoi***	**Bark**: extract cures dysentery; ulcer; worms
Pycnanthus angolensis (Welw.) Warb.	Myristicaceae	***kporsoi***	**Bark:** boil, serve decoction to cure dysentery; ulcer; worms
Rauvolfia vomitoria Afzel.	Apocynaceae	***kalazulugui***	**Leaves:** crush fresh, squeeze to treat snake-bite; **Bark**: dry, pound with clay, rub to cure leprosy
Ricinodendron heudelotti (Baill.) Heckel,	Euphorbiaceae	***kpoloi***	**Bark**: add to bark of *Distemonanthus benthaminus,* boil to steam skin cancer
Rutidea depuisii De Wild.	Rubiaceae	***kolu-lefai; lorweifazai'***	**Leaves**: crush fresh leaves, apply to abate bleeding
Scleria boivinii Steud.	Cyperaceae	**garvai**	**Sap**: drop sap to cure sore-eye

Sherbournia calycina (G.Don) Hua.	Rubiaceae	***kenegbowuloi***	**Fruit**: boil, strain, drink 1 glass of decoction every 3hrs against yellow jaundice; keep in mouth 5-8 minutes after every 3hrs to cure toothache; gum swollen
Smeathmannia pubescens Sol. ex R.Br.	Passifloraceae	***zolowo-darkai***	**Leaves**: boil, serve extract to remedy thrush
Sterculia tragacantha Lindl.	Malvaceae	***kovagui***	**Leaves**: boil dry leaves, steam patient with rheumatism
Terminalia ivorensis A.Chev.	Combretaceae	***bazee***	**Leaves**: boil, keep extract in mouth for 5-10 minutes to cure tooth bacteria
Tetracera affinis Hutch.	Dilleniaceae	***dopawongui***	**Sap**: cut stem, drop sap on eye, cures sore-eye **Leaves:** crush *Aframomium* shoot and *Tetracera* leaves, drop extract on cataract affected eye as cure
Tetrorchidium didymostemum (Baill.)Pax & K.Hoffm.	Euphorbiaceae	***selewoligui; sevewoligui***	**Leaves**: boil, serve extract to stop constipation
Tiliacora leonensis (G.F.Scott-Eliott) Diels	Menispermaceae	***kpein-yansai***	**Stem**: slash, add water or palm-wine, drunk to cure yellow jaundice; kidney problems
Trema orientalis (L.) Blume	Ulmaceae	***wonboi***	**Bark:** chew inner bark to cure hopping cough; TB and chest pain
Trichilia monadelpha (Thonn.) J.J. de Wilde	Meliaceae	***zaawoi; zakpanigui***	**Bark:** scrip, boil with *Xylopia aethiopica* **bark,** serve decoction to induce fertility in woman
Vismia guineensis (L.) Choisy	Guttiferae	***kpodo-senai***	**Leaves:** boil, serve extracts to cure thrush **Bark:** thrush medicine
Zanthoxylum gilletii (De Wild.) P.G.Waterman	Rutaceae	***voai***	**Bark:** chew to cure cough; TB **Leaves:** boil with bark, keep warm extract in mouth for 3-8 minutes to cure toothache; swollen gum

natural occurrences. Herbs and lianas/climbers were the second most mentioned. There were 19 cases of each. Shrubs, Grass and Epiphytes were among the least mentioned, with six, four and three respectively (Table 4). Wonegizi people high depend on Trees for medicine (Table 4). The mentioned are mega representative of the bulk to be surveyed. In effect, there is a greater need to form common ground between various interests in forest resource use, taking in to account the result of this exercise conducted in one month. Trees are the most important source of good health in Wonegizi.

3.2 Bio-medical terms for diseases with symptoms treated by tmps in wonegizi

There were 11 categories of sicknesses with attended descriptions in the Ziama Lorma that roam Wonegizi. The most common and devastating was malaria, followed by sexually transmitted diseases (STDs), and tuberculosis (Table 5).

3.3 Plant part(s) used as medicine

Plant parts utilized showed that leaves were the most applied, and mostly prepared at fresh though. This was followed by Bark,Root, Fruit, Sap, and Stem respectively (Table 6). Although all parts of the plants were used in fresh form, it was also reported that all, depending on the sickness, were used in dried forms either pounded to obtain desire results .

4. Conclusion

TMPs of Wonegizi still remain the most easily accessed and consulted in providing health services to their communities. *S*urvey result showed that the people are heavily dependent on indigenous medicinal plants for their survival. This is critical, due to the numerous competing interests for natural resource use; flora being among the highest through logging and shifting cultivation as further fragmentation medium. Few elders knowledgeable in medicinal plant use are willing to teach the youths who are not willing due to modern exposure. Hence, conservation concerns for the wealthy knowledge and attended plant resources.

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Table 4. Habit of medicinal plants recorded.

Category	Tree	Shrub	Liana/Climber	Herb	Grass	Epiphyte	Grand Total
Total	50	6	19	19	4	3	101

Table 5. Disease indicators suggested by Wonegizi TMPs and corresponding bio-medical terms.

Category Of Sicknesses	Bio-Medical Names	Local Term (Ziama Lorma)
Fevers	Ordinary fever Diaphoretic Malaria (***) Typhoid	*korleh-velai* *kolor-kpademai* *kpeen-koloi* *kai-wonoi*
Urinal-genital problems	Sexual debility Infertility Leucorrhoea Gonorrhea Menstrual disorders Frequent urination Aphrodisiac STD (**)	*towozaa-zebeh; buzaa-zebeh* *to-kpaan-zeebeh* *zea-wolegie* *kalayan-kpoigie; kalayan kolegie elewolehzu* *guea-taamai* *towo-zubagie* *Geh-so-ga-pa' zeebeh*
Respiratory Diseases	Common cold Cough Asthma Bronchitis Chest pain TB (*)	*korleh* *kor-zorgie* *fer-boi worzorgie* *kaka-wonneh'* *keke-wonneh'* *zee-ma-bolo kor-zorgie*
Oral and dental disorders	Toothache Mouth sore	*yeengeh-wonneh'/yeengehlabah* *daa-valah*
Skeletal-muscular pain and swelling	Body ache Rheumatism Head ache Sprain Swelling	*kolorsu-labaai* *kalai* *woon-tabai* *kowor-lebe-zeebeh'* *fe-say-beh*
Ear, Nose, Throat problems	Earache Throat sore Nose bleeding	*gwee-labai* *pala-folei-zu* *sopka-niningie-goloi*
Cardio-vascular disorders	Cardiac Blood pressure	*zee-labai* *fordor-leeh-zeebeh'*
Mental disorders	Mental tonic Epilepsy	*bolowa-zeebeh'* *voin-zeebeh'*
Dermatological disorders	Wounds Boils Skin rushes Ring worm Leprosy	*pala-zeebeh'* *dovolo-seebeh'* *dorwor-zeebeh'* *mon-oiegie* *gii*
Gastro-intestinal disorders	Diarrhea Dysentery Constipation Vomiting Stomach ache Intestinal worms Piles	*kuzuwuloi* *kuzuweigie* *kuzuvoi* *woonpiligie* *kuzulabai* *kpeen-kuzu-zeebeh'* *puzywulo-zeebeh'*
Others	Diabetes Fracture Eye problems	*kpolo-zeebeh'* *kai-yali-zeebeh'* *gaazolaba-zeebeh'*

Table 6. Different parts of plant used.

Part	Plant	Flower	Fruit	Stem	Rhizome	Root	Bark	Leaves	Sap	Seed	Others
Total 132 counts	5	1	6	6	3	7	36	57	6	2	3

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References

[1] Bekalo TH, Woodmatas SD, Woldemariam ZA. (2009). An ethnobotanical study of medicinal plants used by local people in the lowlands of Konta Special Woreda, southern nations, nationalities and peoples regional state, Ethiopia. *Journal of Ethnobiology and Ethnomedicine*. **5**: 26.

[2] Cunningham AB. (1993). African medicinal plants: Setting priorities at the interface between conservation and primary healthcare. People and Plants working Paper-1.UNESCO.

[3] Freeman, Mostei. (1992). Thesis; View – International Repository: 1185.

[4] Germen, Voorhoeve AG. (1960). History of Botanical Research in Liberia.

[5] Jongkind CCH. (2002). Rapid survey of the plants of North Lorma, Gola and Grebo National Forests. Rapid Assessment Program: bulletin of Biological Assessment 44.

[6] Voorhoeve AG, Jongkind CCH. (2011). Plant Atlas of Liberia-Fauna and Flora of Liberia.

[7] Hawthorne WD, Bilivogui D, Epeh P. (2010) Rapid Botanical Survey: ArcelorMittal Nimba.

[8] Hawthorne WD, Bilivogui D, Epeh P. (2011) Rapid Botanical Survey: Putu Iron Ore Mining Company.

[9] Mulbah P.(2009). Final Report- The Rufford Foundation.

[10] Bell RHV, Caluzi E. (1984). Bell-Liberia country report on conservation and wildlife management in Africa.

[11] Hawthorne WD, C C H Jongkind. (2004). The woody Plants of western African Forests. A guide to the forest trees, shrubs and lianas from Senegal to Ghana.

[12] Hawthoene WD, Jongkind.C.C.H. (2006). Woody Plants of Western African Forests: Agiude to the Forest Trees, Shrubs, and Lianes from Senegal to Ghana. Royal Botanic Gardens, Kew Richmond Surrey TW9 3AB, UK.

[13] C A M Marshall, W D Hawthorne. (2013). Important plants of northern Nimba County, Liberia: A guide to the most useful, rare or ecologically important species, with Mano names and uses. Oxford Forestry Institute, Oxford, UK.

[14] Jongkind CCH. (2002). Rapid survey of the plants of North Lorma, Gola and Grebo National Forests. Rapid Assessment Program: bulletin of Biological Assessment 44.

[15] Voorhoeve, A.G. (1965). The Liberian High Forest Trees. Asystematic botanical study of the 75 most important or frequent high forest trees, with reference to numerous related species: Centrum voor landbouwpublikaties en landbouwdocumentatie.

[16] Voorhoeve AG, Jongkind CCH. (2011). Plant Atlas of Liberia-Fauna and Flora of Liberia.