

Medicinal plant diversity and uses in the Sango bay area, Southern Uganda

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Abstract

An inventory is presented for the medicinal plants of the Sango bay area in Southern Uganda. Fieldwork was conducted between March and August 2004, using semi-structured interviews, questionnaires and participant observation as well as transect walks in wild herbal plant collection areas. One hundred and eighty-six plant species belonging to 163 genera and 58 families with medicinal values were recorded. Remedies from these plants are prepared mainly as decoctions and infusions and administered in a variety of ways. The majority (51.3%) of these plants are herbaceous, growing mainly in the wild. Grasslands provided the highest number of species for medicinal use (54.6%) followed by home gardens (25.4%) and fallow land (19.5%). A review of Ugandan and other literature indicated that 72 (38.5%) medicinal plants reported in this study have not been reported previously as having medicinal value. According to respondents, plant species including *Hallea rubrostipulata* (K. Schum) J-F Leroy (Rubiaceae) and *Warburgia ugandensis* Sprague (Canellaceae) are threatened because of poor harvesting techniques and unsustainable harvesting intensities. Suggestions for future conservation programs, sustainable utilization and ethnopharmacological studies are given.

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1. Introduction

Over 80% of the population in developing countries depends directly on plants for their medical requirements (WHO, 2002). Traditional medicine is a key element among the rural communities in developing countries for the provision of primary health care especially where there are inadequate primary health care systems (Tabuti et al., 2003; Shrestha and Dhillion, 2003). The existence of traditional medicine depends on plant species diversity and related knowledge of their use as herbal medicines (Svarstad and Dhillion, 2000; Tabuti et al., 2003).

Plant species and associated traditional knowledge are threatened in various ways. Continued utilization of medicinal plant species is threatened by habitat modification and unsustainable rates of exploitation (Joshi and Joshi, 2000; Tabuti et al., 2003), while the transmission of traditional knowledge across genera-

tions is hampered by loss of plant diversity (Tabuti et al., 2003; Shrestha and Dhillion, 2003), exposure to modern culture and access to modern conveniences, urbanization and modernization (Shrestha and Dhillion, 2003; Tabuti, 2007). Due to the lack of knowledge of their actual use and value to rural communities, medicinal plants have been harvested haphazardly, and in some cases over-exploited for commercial purposes (Tabuti et al., 2003; Kamatenesi-Mugisha and Oryem-Origa, 2005).

Despite many studies on medicinal plant resources (e.g. Bukenya-Ziraba et al., 1997; Ogwal-Okeng, 1998; Kakudidi et al., 2000; Oryem-Origa et al., 1997, 2001, 2003; Tabuti et al., 2003; Kamatenesi-Mugisha and Oryem-Origa, 2005; Adriaens, 2005), a large number of medicinal plants and associated indigenous uses still wait proper documentation (Tabuti et al., 2003). Besides, few studies have been carried out in the central region of the country. It is against this background that steps should be taken to sustainably utilize medicinal plant species and also ensure that traditional knowledge is documented and transmitted across generations.

This study documents the medicinal plants used by 13 villages in three subcounties surrounding the Sango bay ecosystem in Rakai district, central Uganda. Specifically, we investigated

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the local use of medicinal plants, modes of preparation and administration, including types of habitats from which they are harvested. We also compared the use of medicinal plants in the Sango bay area with other areas in the country and beyond to determine whether there are any differences in species used and the ways of utilization. Although we think that ethnobotanical research should go further than producing simple species lists, this study is presented as a response to the paucity of ethnobotanical information in the Sango bay area and we hope that it will inspire further ethnobotanical and ethnopharmacological research in central region and beyond.

2. Methodology

2.1. Study area

The Sango bay forest reserve is located in Southern Uganda near Lake Victoria and consists of Kaiso, Malabigambo, Namalala, Tero West, Tero East and Kigona forest blocks. The forest ecosystem stretches from the Tanzania–Uganda border in Rakai District in the South to Masaka District boundary in the north, and westwards from the Lake Victoria shores to close to the main Kyotera–Mtukula road. The Kaiso and Malabigambo blocks are contiguous with the Minziro forest blocks in Bukoba District, Tanzania. The reserve is situated in the subcounties of Kabira, Kasasa, Kakuuto and Kyebe of Rakai District.

There are three enclaves in the reserve namely Minziro, Kanabulemu and Gwanda-Kasensero. The reserve is located between latitude $0^{\circ}47'$ and $1^{\circ}00'S$ and longitude $31^{\circ}28'$ and $31^{\circ}43'E$. The total area of Sango bay Forest Reserve is 576 km^2 of which approximately 180 km^2 is forested and almost 400 km^2 is grassland. The terrain is characterized by moderate to steep hill slopes. It experiences bimodal rainfall with peaks around April/May and October/November.

The study was carried out in the villages of Kabale, Kanamiti, Kageye, Nakatoogo, Kanalaki, Kijonjo, Kyebumba, Matengeto, Bukaala, Gamba, Nkalwe, Serinya and Zirizi located in the subcounties of Kakuuto, Kabira and Kasasa in Rakai district. There are over 330 households and a combined population of about 2600 people. The major ethnic groups include the Baganda, Banyankole, Barundi, Banyarwanda and the Baziba from Northern Tanzania. These are mainly Christian peoples with a few Muslims. The inhabitants are mainly subsistence farmers living in small scattered settlements. Banana, maize, cassava, sweet potatoes and beans are the main food crops while coffee and of recent, beans are the main cash crops.

2.2. Methods

Ethnobotanical information on medicinal plants was collected through interviewing 205 respondents (117 females and 88 males) from 72 households. The research was carried out between March and August 2004. Household respondents were chosen through stratified random sampling whereby a household was picked randomly as we walked along paths in each of the villages with assistants. The head of the household and/or the wife including any other knowledgeable adult people were

interviewed. At least nine respondents were interviewed from each village. A structured questionnaire was used to collect data on local plants names, uses, parts used, and modes of preparation and administration (Appendix A). Prior to administering the survey, focus group discussions and pre-testing of the questionnaire were carried to increase the reliability and validity of questionnaire items. Focus group discussions verified if the survey's concepts were meaningful in the local context and also ensured that the syntax through which these concepts were communicated was appropriate. Efforts were made to ensure as much homogeneity in the groups as possible so that differences in sex, age, ethnicity and socio-economic background did not inhibit the participation of certain members (Lettenmaier et al., 1994). Using focus group outputs, the questionnaire was adjusted so that concepts are locally understandable and that the questions measure the intended concepts. This method has been successfully used by Fuller et al. (1993). Plant identification was partly carried out in the field using previous works (Hamilton, 1981; Katende et al., 1995, 1999; Phillips et al., 2003), and also at the Makerere University Herbarium (MHU) where they were deposited. The unidentified plant voucher specimens were given numbers in the field (see Table 1 for voucher numbers) and their identification in the herbarium involved comparison with the already existing plant specimens, use of identification keys and published taxonomic literature by Polhill et al. (1952). The identifications were done with assistance from experienced taxonomists and field botanists. The knowledgeable people that we came across and were willing to share their traditional knowledge with us, traditional healers and focus group discussions with knowledgeable people identified during the survey were used to verify and validate some of the information that had been gathered in the questionnaire, especially the species used. This proved to be very useful and helpful in getting the actual methods of preparation and use of the species collected. In addition to this, several informal discussions and transect walks with the local inhabitants were employed, wherever possible, to corroborate the field survey data and to gather extra information (Crane and Angrosino, 1992). A physician from the Kalisizo hospital in Rakai district and familiar with the socio-demographic and traditional primary health care conditions and practices of the study area was consulted to determine the clinical names of some of the ailments that were being described by the respondents.

Data from the field was analyzed both qualitatively and quantitatively. Responses from the open-ended questions were categorized basing on similarity of ideas expressed while percentages, based on valid responses, were calculated from close-ended questions. The statistical program SPSS Inc. (1999) was used in the analysis.

3. Results

3.1. Medicinal plants diversity and knowledge by respondents

In this study a total of 186 medicinal plants species, belonging to 163 genera and 58 plant families was recorded (Table 1). The largest proportion of medicinal plants belonged to the families

Table 1

The growth habit and habitat types of medicinal plants, illnesses treated, parts used, preparation and administration of herbal medicine

Family, species (voucher no.), local name, habitat type ^a	Life form ^b	Part used ^c	Frequency of citation ^d	Common/clinical name of illness	Mode of preparation and administration
Acanthaceae					
<i>Acanthus pubescens</i> (T. Thoms.) Engl. (SSEGAWA 1125) Amatovu—Fe, Fl	SH	Le	4	Aphrodisiac	Decoction drunk in local brew, <i>tonto</i> ^e
		Ro		Pre-hepatic jaundice	Decoction drunk
<i>Dicliptera laxata</i> C. B. Cl. (SSEGAWA 953) Musesemya—G	HE	Le	2	Poison antidote	Infusion drunk
<i>Dyschoriste maghana</i> (Nees.) Bennet (SSEGAWA 984) Kalaza—G, Hg, Fl	HE	Le	2	Good luck charm when traveling	Crushed dried leaves mixed with petroleum jelly and smeared on the whole body
<i>Justicia heterocarpa</i> T. Anderson (SSEGAWA 966) Muzikiza—G, Fl	HE	Wp	5	Good luck charm	Decoction drunk
		Wp		Fever	Decoction drunk
Adiantaceae					
<i>Pallaea adiantoides</i> (Wild) J. Smith (SSEGAWA 913, 1075) Ngabo ekingira—G, T	HE	Le	2	Cough	Decoction drunk
Alangiaceae					
<i>Alangium chinense</i> (Lour) Harms. (SSEGAWA 1057) Omusiisa—Fe	TR	Le	6	Anemia	Infusion drunk
		Le		Prevent miscarriages	Infusion drunk
Alliaceae					
<i>Allium sativa</i> L. (not collected) Katunguluccumu—Hg	HE	Bu	4	Febrile convulsions	Sniff when crushed
Aloaceae					
<i>Aloe volkensii</i> Engl. (SSEGAWA 982) Akagagi—G	HE	Le	5	Fever	Infusion drunk
		Sa Le		Mouth ulcers Malaria	Apply on ulcers in mouth Infusion drunk
Amaranthaceae					
<i>Aerva lanata</i> (L.) Schuller (SSEGAWA 914, 1088) Lweza—G, Hg	HE	Wp	6	Good luck charm	Infusion drunk and bathed
<i>Psilotrichum elliotii</i> Bak. (SSEGAWA 968, 1137) Kanamukasa—Fe, G	HE	Wp	2	Uterine fibroids and menstrual problems	Infusion drunk
Anacardiaceae					
<i>Lannea edulis</i> (Sonder) Engl. (SSEGAWA 996, 1127) Mbatabata—G	SH	Ro	4	Pre-hepatic jaundice	Decoction drunk
<i>Mangifera indica</i> L. (not collected) Omuyembe—Hg, Bl	TR	Le, Bk	13	Cough	Decoction drunk
<i>Pseudospondias microcarpa</i> (A. Rich.) Engl. (SSEGAWA 962) Muziru—F	TR	Le, Bk	2	Cough	Decoction drunk
<i>Rhus natalensis</i> Krauss. (SSEGAWA 986, 1140) Museese—G, Bl	SH	Le	16	Syphilis	Infusion drunk
		Bk Ro		Pre-hepatic jaundice Skin rash	Decoction drunk Topical application of crushed roots' juice
<i>Rhus vulgaris</i> Meikle. (SSEGAWA 981) Akakansukansu—G, Bl	SH	Le	7	Stomach ache	Decoction drunk
Apiaceae					
<i>Centella asiatica</i> (L.) Urban (SSEGAWA 897, 1011) Kutukumu—Hg	HE	Le	4	Dermatitis	Infusion drunk
	HE	Le		Chasing away night dancers	Crushed leaves applied externally—embrocating
<i>Oenanthe palustris</i> (Chiov.) Norman (SSEGAWA 1131, 1144) Omuleretu—Wg	HE	Ro	1	Attracting buyers/customers to your shop	Crush, dry and lick twice a day while in shop
<i>Steganoaenia araliacea</i> Hochst. (SSEGAWA 972) Omuwanula—G	TR	Le	3	Diabetes	Decoction drunk

Table 1 (Continued)

Family, species (voucher no.), local name, habitat type ^a	Life form ^b	Part used ^c	Frequency of citation ^d	Common/clinical name of illness	Mode of preparation and administration
Apocynaceae					
<i>Carissa edulis</i> L. (SSEGAWA 1013) Nyonza—G	SH	Tw	8	Charms/bewitchment	Infusion drunk
		Tw		Intestinal worms	Infusion drunk
<i>Tabernemontana holstii</i> (K. Schum) Stapf. (SSEGAWA 927) Kibondo/Mabondo —F	TR	Bk	3	Pancreatic insufficiency	Decoction drunk
Asclepiadaceae					
<i>Mondia whitei</i> (Hook. f.) Skeels (SSEGAWA 999) Omulondo—Fl, Hg, F, T	HE	Ro	2	Induce labor	Decoction drunk
		Ro		Aphrodisiac	Masticate and swallow
Asteraceae					
<i>Bidens kilimandscharica</i> (O. Hoffm) Sherff. (SSEGAWA 999) Oluwongo—G	HE	Wp	3	Pre-hepatic jaundice	Decoction drunk
		Le		Pregnancy disorders	Decoction drunk
<i>Ageratum conyzoides</i> L. (SSEGAWA 917, 1020) Nnamirembe—Hg	HE	Le	10	Menstrual problems	Decoction drunk
		Le		Septic wound	Apply juice topically
		Le		Headache	Leaves crushed and sniffed for a while
<i>Anisopappus africanus</i> (Hook. F.) Oliv. & Hiern. (SSEGAWA 1100) Kanamwasi—G	HE	Le	7	Headache	Leaves crushed and sniffed for a while
<i>Aspilia africana</i> (Pers.) C.D. Adams (not collected) Makaayi—G, Bl, Fl	HE	St	17	Intestinal worms	Decoction drunk
		Ro		Fever	Decoction drunk
		Ro		Measles	Decoction drunk
<i>Bidens grantii</i> (Oliv.) Sherff. (SSEGAWA 925, 1126, 1107) Oluwongo—G	HE	Wp	11	Pre-hepatic jaundice	Infusion drunk
		Wp		Pregnancy disorders	Infusion drunk
<i>Bidens pilosa</i> L. (SSEGAWA 900) Ssere—Hg	HE	Le	11	Septic wound	Embrocate on wound
<i>Blumea perrottetiana</i> DC (SSEGAWA 1074) Kulya—G	HE	St	2	Anorexia—lack of appetite	Bake for 3–5 min in hot ash and squeeze the juice out, put in food
<i>Conyza adolfi-fridericii</i> (Musch.) H. Wild. (SSEGAWA 1106) Akeerwa—G	HE	St	2	Stomach ache	Infusion drunk
		St		Colic pain in babies	Infusion drunk
<i>Conyza sumatrensis</i> (Retz.) E.H. Walker (SSEGAWA 922, 1116) Kafumbe omusajja—Hg	HE	Le, Ro	3	Whitlow infection	Apply juice on infected area topically
		Le, Ro		Dermatitis	Apply juice on infected area topically
		Ro		Eye cataract	Apply juice on eyes
<i>Crassocephalum</i> cf. <i>crepidioides</i> (SSEGAWA 1071) Ssekkoteka ekyakiragala—Sr, Bl	HE	Wp	4	Crop yield improvement	Planted in garden
		Wp		Winning judicial cases	Place in house; infusion bathed
<i>Crassocephalum</i> sp. (SSEGAWA 914, 1111) Ssekkoteka ekimyuufu—G	HE	Wp	2	Febrile convulsions in babies	Infusion bathed
		Wp		Possessed by spirits	Infusion drunk
<i>Dichrocephala integrifolia</i> O. Ktze (SSEGAWA 950, 1138) Buzza—G, Fe	HE	St	2	Indigestion	Decoction drunk
<i>Erlangea tomentosa</i> S. Moore (SSEGAWA 926, 1014) Kisula—G	HE	St	2	Malaria	Decoction drunk
		St		Malaria	Decoction drunk
<i>Gnaphalium purpureum</i> L. (SSEGAWA 928) Kulya—F	HE	Le	2	Anorexia—lack of appetite	Decoction drunk
<i>Helichrysum</i> sp. (SSEGAWA 1098) Nakabululu—G	HE	Le	2	Malaria	Decoction drunk

Table 1 (Continued)

Family, species (voucher no.), local name, habitat type ^a	Life form ^b	Part used ^c	Frequency of citation ^d	Common/clinical name of illness	Mode of preparation and administration
<i>Herichrysum panduratum</i> O. Hoffm. (SSEGAWA 1000) Kanaawera—G	HE	Wp	1	Good luck charm	Infusion bathed
<i>Microglossa pyrifolia</i> (Lam.) O. Ktze (SSEGAWA 963, 1025) Mufuga nkande—G	SH	Le	3	Hypermenorrhea	Decoction drunk; infusion bathed
		Le		Possessed by evil spirits	Infusion bathed
<i>Senecio nandensis</i> S. Moore (SSEGAWA 963, 1025) Kisenda—G	HE	Le	13	Malaria	Decoction drunk; infusion bathed
		Le		Pregnancy disorders	Infusion bathed
		Le		Hypertension	Decoction drunk
		Le		Baby skin rashes	Infusion bathed
<i>Senecio petitiianus</i> A. Rich. (SSEGAWA 1094) Mugina—G, Fl	HE	St	3	Fever/malaria	Infusion drunk
<i>Siegesbeckia orientalis</i> L. (SSEGAWA 929) Sseziwundu—G, Sr/Fl	HE	St	8	Wound	Juice extracted and poured on wound
<i>Solanecio manii</i> (Hook.f.) C.Jeffrey (SSEGAWA 935, 960) Omugango—G, Fl	HE	St	3	Relaxation of pelvic region for child birth	Infusion drunk; infusion bathed
		St		Malaria	Infusion bathed
		St		Chicken pox	Infusion bathed
<i>Tagetes minuta</i> L. (SSEGAWA 1136) Kawunyira—Gs, Hg	HE	St	5	Possessed by spirits	Infusion drunk, debris smeared whole body
<i>Vernonia amygdalina</i> Delile (not collected) Omululuza—Hg, Fl, Bl	HE	St, Ro	79	Fever/malaria	Infusion mixed with juice of <i>Citrus limon</i> and drunk
<i>Vernonia campanea</i> S. Moore (SSEGAWA 1142) Akakomokomo—G	SH	Le	3	Stomach ache; fever	Infusion drunk
		Le		Fever	Infusion drunk
		Le		Colic pain in babies	Infusion drunk
<i>Vernonia cinerea</i> L. (Less) (SSEGAWA 945) Nakayayana—G	HE	St	9	Good luck charm	Infusion bathed
		St		Induces labor	Infusion bathed
		St		Febrile convulsions	Infusion bathed
<i>Vernonia lasiopis</i> O. Hoffm. (SSEGAWA 1109, 1081) Akaluluza—G	SH	Le	24	Febrile convulsions	Bake and squeeze juice out to drink
<i>Vernonia stenocephala</i> Oliv. (SSEGAWA 1123) Akakukulu—G	SH	Le	9	Pre-hepatic jaundice	Decoction drunk
Bignoniaceae					
<i>Kigelia africana</i> (Lam.) Benth. (SSEGAWA 1008) Omusa—F	TR	Le, Bk	14	Hemorrhoids	Infusion/decoction drunk
		Le		Syphilis	Infusion drunk
		Le		Stomach ache	Decoction drunk
Burseraceae					
<i>Canarium schweinfurthii</i> Engl. (not collected) Muwafu—F, G, Fl	TR	Sa	15	Possessed by spirits	Burn incense
Canellaceae					
<i>Warburgia ugandensis</i> Sprague (SSEGAWA 951, 997, 1115) Omuya—F	TR	Bk	9	Malaria	Dry powdered bark swallowed
		Bk	4	Possessed by spirits	Burn dried, powdered bark and smoke inhaled
Cannabidaceae					
<i>Cannabis sativa</i> L. (not collected) Enjaga—Hg	HE	Le	4	Cough	Decoction drunk
Capparaceae					
<i>Cleome monophylla</i> L. (SSEGAWA 1031) Kayobyoko akasajja—G	HE	Le	4	Headache	Crush leaves and smear on head
Caricaceae					
<i>Carica papaya</i> L. (not collected) Amapapaali—Hg, Sr	TR	Se	3	Abdominal pain	Swallow

Table 1 (Continued)

Family, species (voucher no.), local name, habitat type ^a	Life form ^b	Part used ^c	Frequency of citation ^d	Common/clinical name of illness	Mode of preparation and administration
Celastraceae					
<i>Maytenus senegalensis</i> (Lam.) Exell. (SSEGAWA 892) Omunabuliko—G	TR	Bk, Le	3	Syphilis	Decoction drunk
<i>Pleurostyliea capensis</i> Loes. (SSEGAWA 938, 1132) Keerwa—G	TR	Le	2	Colic pain in babies	Decoction drunk
Chenopodiaceae					
<i>Chenopodium ambrosioides</i> L. (SSEGAWA 964) Katta dogo—Hg	HE	Le	3	Charms/bewitchment	Decoction drunk
		Le		Intestinal worms	Decoction drunk
<i>Chenopodium opulifolium</i> Koch & Ziz. (SSEGAWA 995) Omwetango—Hg, G	HE	St	7	Pregnancy disorders	Infusion drunk
		St		Possessed by evil spirits	Infusion drunk
<i>Chenopodium</i> sp. (SSEGAWA 1134) Mugosola/Lugosola Hg	HE	Le	8	Intestinal worms	Infusion drunk
Chrysobalanaceae					
<i>Parinari curatellifolia</i> Planch. (SSEGAWA 905) Omunazi—G	TR	Le	6	Stomach ache	Decoction drunk
		Le		Pre-hepatic jaundice	Decoction drunk
Commelinaceae					
<i>Commelina africana</i> L. (SSEGAWA 1114) Ennanda—Hg, Sr	HE	Le	1	Relaxation of pelvis region for child birth	Infusion bathed
Convolvulaceae					
<i>Hewittia sublobata</i> (L.) O. Ktze. (SSEGAWA 894) Musota taluma—G, Fl	HE	Le	2	Migraine	Tie around head
Convolvulaceae					
<i>Ipomea batatas</i> (L.) Lam. (not collected) Lumonde—Hg	HE	Le	1	Relaxation of pelvis region for child birth	Infusion bathed
<i>Ipomoea cairica</i> (L.) Sweet. (SSEGAWA 1117) Kalanda lugo—G	HE	Le	6	Vaginal fungal infection	Infusion bathed around genital area
		Le		Dizziness and laziness in pregnant women	Infusion bathed
		Le		Febrile convulsions	Infusion drunk/bathed
Crassulaceae					
<i>Kalanchoe marmorata</i> Bak. (SSEGAWA 931, 1061) Kakugwa akeeru—G, Fl, Fe	HE	St	3	Septic ear	Bake for a few minutes and squeeze out the juice, apply to ear
<i>Kalanchoe tubiflora</i> (Harvey) Hamet (SSEGAWA 993) Ntule—G, Fl	HE	Wp	1	Dermatitis	Embrocate on affected area
Cruciferae					
<i>Erucastrum arabicum</i> Fisch & C. A. Mey. (SSEGAWA 1009) Enkumba—G, R	HE	Wp St	4	Luck charm Red eyes	Infusion bathed Steam with food, juice extracted onto eyes
Cucurbitaceae					
<i>Momordica foetida</i> Schumach. (SSEGAWA 967) Olujjula—Sr, Bl	CL	Le Le Le Le	5	Small pox Measles Influenza Febrile convulsions	Infusion bathed Infusion bathed Infusion bathed Infusion bathed
Euphorbiaceae					
<i>Acalypha villicaulis</i> A. Rich. (SSEGAWA 1069, 1146) Kanajjira—G	SH	St	2	Stomach ache	Infusion drunk
<i>Alchornea cordifolia</i> (Schum & Thonn.) Muell. Arg. (SSEGAWA 912) Luzibaziba—Fe, Bl	TR	Tw Tw Tw	16	Pre-hepatic jaundice Fever Pregnancy-related illness	Decoction drunk Decoction drunk Decoction drunk
		Tw Tw		Baby skin rashes Measles	Decoction bathed Decoction drunk
<i>Bridelia micrantha</i> (Hochst) Baill. (SSEGAWA 940) Katazamiti—F	TR	Bk, Le Bk	7	Syphilis Pre-hepatic jaundice	Decoction drunk Decoction drunk

Table 1 (Continued)

Family, species (voucher no.), local name, habitat type ^a	Life form ^b	Part used ^c	Frequency of citation ^d	Common/clinical name of illness	Mode of preparation and administration
<i>Euphorbia grantii</i> Oliv. (SSEGAWA 1068, 1112) Munuula ngombe—G	HE	St	2	Good luck charm	Decoction drunk
<i>Euphorbia tirucalli</i> L. (SSEGAWA 1092, 1102) Mubajja nkoni—G	HE	Bk	2	Intestinal worms	Decoction drunk
<i>Flueggea virosa</i> (Willd.) Voigt (SSEGAWA 908) Olukandwa—G, Fe	SH	St	12	Pregnancy-related illness	Decoction drunk
		St		Pre-hepatic jaundice	Decoction drunk
		St		Measles	Decoction drunk
<i>Margaritaria discoides</i> (Baill.) Webster (SSEGAWA 1147) Mweya—F, G, Fl	TR	Bk	2	Pre-hepatic jaundice	Decoction drunk
<i>Meineckia phyllanthoides</i> Baill. (SSEGAWA 1002) Nantasikirwa mbazzi—G, Sr/Fl	HE	Le	1	Good luck charm	Infusion drunk
<i>Micrococca mercurialis</i> (L.) Benth. (SSEGAWA 965) Akalya abakyaala—G, Hg	HE	Le	2	Good luck charm	Infusion bathed
<i>Phyllanthus nummularifolius</i> Poir. (SSEGAWA 1001) Kimbambakika—F	HE	Wp	2	Pregnancy-related illness/morning sickness	Decoction drunk
<i>Phyllanthus ovalifolius</i> Forsk. (SSEGAWA 915) Mutuluka—G	HE	Ro	6	Cough	Decoction drunk
<i>Ricinus communis</i> L. (SSEGAWA 919) Ensogasoga—Fl, Hg	SH	Ro	5	Whooping cough	Decoction drunk
		Ro		Sore throat	Masticate and swallow
		Ro		Tooth ache	Masticate and swallow
		Le		Poison antidote	Infusion drunk
<i>Sapium ellipticum</i> Pax. (not collected) Omusasa—F, Fl, Bl	TR	Le	19	Retained placenta	Decoction drunk
		Le		Pre-hepatic jaundice	Decoction drunk
		Bk		Syphilis	Decoction drunk
<i>Tetrochidium didymostemon</i> (Baill.) Pax & K. Hoffm. (SSEGAWA 1098, 1148) Omukejje—F	TR	Bk	3	Indigestion—gastro-intestinal	Decoction drunk
Fabaceae					
<i>Acacia hockii</i> De Wild. (SSEGAWA 1133) Akasaana—G	SH	Fw	4	Anemia	Decoction drunk
		Fw		Colic pain in babies	Decoction drunk
<i>Albizia coriaria</i> Welw. (SSEGAWA 909) Omugavu—Fe, G	TR	Bk	6	Possessed by spirits	Decoction drunk
		Bk		Non-meat eaters to enable them eat meat	Decoction drunk
<i>Cassia alata</i> L. (SSEGAWA 896) Mpologoma tekiika—Hg	SH	Le	3	Pre-hepatic jaundice	Infusion drunk
<i>Cassia didymobotrya</i> Fresen (SSEGAWA 920) Omucuula—G	SH	Le	3	Constipation	Infusion drunk
<i>Crotalaria agathiflora</i> Scheinf. (SSEGAWA 898) Ekijebejebe—G	SH	Le	1	Stomach ache	Infusion drunk
<i>Crotalaria incana</i> L. (SSEGAWA 902) Akasamba ndege—G, Hg	HE	Le	2	Pregnancy disorders	Infusion drunk
<i>Crotalaria mesopotamica</i> Taub. (SSEGAWA 899) Mukaliza—G	HE	St	3	Uterine fibroids	Infusion drunk
<i>Crotalaria natalitia</i> Meissn. (SSEGAWA 916) Tulo—G	HE	Le	2	Colic pain in babies	Dry leaves, crush and mix with petroleum jelly and smear body
<i>Desmodium adscendens</i> (Sw.) DC (SSEGAWA 937) Mutasukka kkubo—G, Hg	HE	Wp	3	Remove spells	Decoction drunk
<i>Entada abyssinica</i> Steud ex A. Rich. (SSEGAWA 988, 1108) Omwoloola—G	TR	Le	21	Skin rashes in babies	Decoction bathed
		Le		Pregnancy-related illness/morning sickness	Decoction drunk
		Le		Back ache	Decoction bathed
		Bk		Syphilis	Decoction drunk
		Bk		Cough	Decoction drunk
		Le		Fever/malaria	Decoction drunk

Table 1 (Continued)

Family, species (voucher no.), local name, habitat type ^a	Life form ^b	Part used ^c	Frequency of citation ^d	Common/clinical name of illness	Mode of preparation and administration
<i>Eriosema stanerianum</i> Hauman (SSEGAWA 903) Kimyuula—G, FI	SH	Le	17	Malaria	Decoction drunk
		Le		Foul smelling belch	Decoction drunk
<i>Erythrina abyssinica</i> Lam. (SSEGAWA 923) Egirikiti—G	TR	Bk	15	Syphilis	Decoction drunk
		Bk		Fever/malaria	Decoction drunk
<i>Indigofera arrecta</i> A. Rich. (SSEGAWA 1139) Kabamba maliba—G	HE	St	6	Dislocated bone(s)	Steam, add ghee and massage affected part
<i>Indigofera congesta</i> Welw. ex Bak. f. (SSEGAWA 987, 991, 998) Namasumi—G	HE	St	17	Fever/malaria	Decoction drunk
<i>Indigofera drepanocarpa</i> Taub. (SSEGAWA 1121) Sebazinga nkata—G	HE	St	2	Winning judicial cases	Used alongside chant
<i>Indigofera emarginella</i> A. Rich. (SSEGAWA 956, 1104) Katunga nsonzi—G	SH	Le	3	Cough	Masticate and swallow
		Le		Ensure proper child delivery	Decoction drunk of dried crushed leaves
		Le		Febrile convulsions	Decoction drunk
<i>Kotschya africana</i> Endl. var. <i>bequaertii</i> (De Wild.) Verdc. (SSEGAWA 918) Empojja—Wg, Gs	HE	Le	3	Febrile convulsions	Decoction drunk
		Le		Pre-hepatic jaundice	Decoction drunk
<i>Mimosa pigra</i> L. (SSEGAWA 1050) Kawule—Wg, S	SH	Le	3	Intestinal worms	Decoction drunk
<i>Mimosa pudica</i> L. (SSEGAWA 979) Wewumbe—Wg, S	HE	St	1	Winning judicial cases	Infusion used to wash face
<i>Mundulea sericea</i> (Wild.) A. Chev. (SSEGAWA 992) Olumanyo—F	SH	Tw	3	Amnesia	Leaves crushed and eaten with indigenous vegetables
<i>Piptadeniastrum africanum</i> (Hook. f.) Brenan. (SSEGAWA 1033) Mpewere—F	TR	Bk	8	Cough	Decoction drunk
<i>Pseudarthria confertiflora</i> (A. Rich) Bak (SSEGAWA 970) Omubembe—G	SH	Ro, Le	11	Pre-hepatic jaundice	Decoction drunk
		Ro		Colic pain in babies	Decoction drunk
<i>Pseudarthria hookeri</i> Wight & Arn (SSEGAWA 1119, 1128, 941) Mukakala—G	SH	Le	25	Sore eyes	Decoction used to wash eyes
		Le		Syphilis	Decoction drunk
<i>Rhynchosia resinosa</i> (A. Rich) Bak. (SSEGAWA 1007) Kagamansa—G	SH	Le	3	Syphilis	Decoction drunk
<i>Rhynchosia</i> sp. (SSEGAWA 973) Kati nvuma—G	HE	Le, Bk	2	Fever/malaria	Decoction drunk
<i>Senna obtusifolia</i> L. (SSEGAWA 1118) Ewabula—G, FI	SH	St	4	Good luck charm before traveling	Pass shoot all over body while chanting
		Le		Malaria	Decoction drunk
<i>Sesbania sesban</i> (L.) Merr. (SSEGAWA 1124) Muzimba ndegeya—Wg, S	SH	St	7	Febrile convulsions in children	Infusion drunk
<i>Solanum campylacanthum</i> Hochst. (SSEGAWA 932) Katengo ntengo—G	SH	Le	3	Pre-hepatic jaundice	Decoction/infusion drunk
		Le		Stomach ache	Decoction/infusion drunk
<i>Tephrosia linearis</i> (Willd.) Pers. (SSEGAWA 954) Nakalimikamu—G	SH	Bk	2	Pre-hepatic jaundice	Decoction drunk
Guttiferae <i>Harungana madagascariensis</i> Poir. (SSEGAWA 1032) Mukabira—F, Fe, G	TR	Bk	4	Ante-natal treatment	Decoction drunk
		Bk		Good luck charm	Bark powder mixed with petroleum jelly and smeared the whole body
<i>Psorespermum febrifugum</i> Spach. (SSEGAWA 1023) Akanzironziro—G	TR	Bk, Le	20	Syphilis	Decoction drunk; bathed
		Bk, Le		Skin rashes in babies	Infusion bathed
		Bk		Induce labor	Infusion bathed
		Bk		Pre-hepatic jaundice; fever	Decoction drunk

Table 1 (Continued)

Family, species (voucher no.), local name, habitat type ^a	Life form ^b	Part used ^c	Frequency of citation ^d	Common/clinical name of illness	Mode of preparation and administration	
<i>Symphonia globulifera</i> Linn.f. (SSEGAWA 1105) Omusaali—Fe	TR	Bk	10	Cough	Decoction drunk; Sap burned like incense	
		Sa		Chasing away evil spirits		
		Bk		Intestinal worms		
		Bk		Pre-hepatic jaundice, fever	Decoction drunk	
Labiatae						
<i>Aeolanthus repens</i> Oliv. (SSEGAWA 961) Mubiru—G	HE	Le	13	Febrile convulsions	Infusion bathed	
<i>Hoslundia opposita</i> Vahl. (SSEGAWA 994) Kamunye—G, T	HE	St	39	Stomach ache	Infusion drunk	
		St		Pre-hepatic jaundice		
<i>Hyptis pectinata</i> Poir. (SSEGAWA 949, 1130) Bongoloza—Hg, Sr	HE	Le	5	Malaria	Decoction/infusion drunk	
<i>Indigofera spicata</i> Forsk. (SSEGAWA 974) Kibwa-nkurata (Runyankole) G	HE	St	2	Spleen	Infusion drunk	
		St		Wounds		Topical application of crushed leaves
<i>Leonotis nepetifolia</i> L. R.Br. (not collected) Kifumufumu—Fl, Sr	HE	St	11	Back ache	Infusion drunk, rubbed on back	
		St		Febrile convulsions		Infusion bathed
<i>Ocimum gratissimum</i> L. (SSEGAWA 1005) Omujajaja—Fe, Fl, T, Bl	SH	Le	4	Stomach ache	Decoction drunk with tea	
<i>Pycnostachys eminii</i> Gurke (SSEGAWA 1113) Akajajaja—G	SH	Le	9	Malaria	Decoction drunk and bathed	
		Le		Colic pain in babies		Decoction drunk
		Le		Pregnancy-related illnesses		Decoction drunk and bathed
<i>Solenostemon latifolius</i> (Benth.) J. K. Morton (SSEGAWA 907) Kyemirampiki—Fe, T	HE	Le	6	Intestinal worms	Infusion/decoction drunk	
		Le		Malaria		Infusion/decoction drunk
<i>Tetradenia riparia</i> (Hochst) Codd. (SSEGAWA 1063) Kacuncu—G	SH	Le	3	Febrile convulsions	Infusion drunk	
<i>Ocimum kilimandschricum</i> Gurke (SSEGAWA 1034) Kafumba mwanyi—G	HE	St	3	Influenza	Squeeze out juice and sniff it	
	SH	Le		Good luck charm	Pass it around yourself when going to travel	
Malvaceae						
<i>Hibiscus acetosella</i> Welw ex Hiern. (SSEGAWA 989) Kasaayi—G, Fl	HE	St	4	Anemia	Decoction drunk	
<i>Hibiscus calphyllus</i> Cav. (SSEGAWA 1058) Kinsambwe—Wg	HE	Le, Fw	2	Pre-hepatic jaundice, fever	Decoction drunk	
<i>Hibiscus fuscus</i> Garke (SSEGAWA 934) Olusaala—G	HE	Le	6	Cough	Decoction drunk; dried leaves pounded and licked frequently	
<i>Sida cuneifolia</i> Roxb. (SSEGAWA 1135) Akeyeyo—G	HE	St	4	Dislocation of bone(s)	Steam, add ghee and massage affected part	
<i>Sida rhombifolia</i> L. (SSEGAWA 1046) Akavuvu—Fe, T	SH	Le	5	Eye cataracts	Apply to eyes twice a day	
		Le		Morning sickness in early pregnancy	Infusion drunk in sweet banana juice	
		Le		Prevents miscarriages	Infusion drunk in sweet banana juice	
		Le		Cough	Decoction drunk	
Melastomataceae						
<i>Tristemma mauritianum</i> J.F. Gmel. (P. SSEGAWA 1145) Katulu—Wg	HE	Wp	3	Syphilis	Decoction drunk	

Table 1 (Continued)

Family, species (voucher no.), local name, habitat type ^a	Life form ^b	Part used ^c	Frequency of citation ^d	Common/clinical name of illness	Mode of preparation and administration
Meliaceae					
<i>Azadirachta indica</i> A. Juss. (not collected) Neem—Fl, Hg	TR	Le	6	Malaria	Decoction drunk
Menispermaceae					
<i>Cissampelos mucronata</i> A. Rich. (SSEGAWA 1101) Kavamagombe—G, Fl	CL	St	4	Headache	Crush, infusion drunk
		Ro		Intestinal worms	Decoction drunk
Moraceae					
<i>Ficus natalensis</i> Hochst. (not collected) Omutuba—Hg, Fl	TR	Le	1	Colic pain in babies	Infusion drunk
<i>Moringa oleifera</i> Lam. (not collected) Moringa—Fl, Hg	TR	Le		Malaria	Infusion drunk
Musaceae					
<i>Musa paradisiaca</i> L. var. <i>paradisiaca</i> (not collected) Ekitooke ekiganda—Hg	HE	Le	4	Nightmares, hallucinations	Put under pillow when going to bed
<i>Musa paradisiaca</i> L. var. <i>sapientum</i> (not collected) Gonja—Hg	HE	Le	3	Pre-hepatic jaundice	Infusion bathed
Myricaceae					
<i>Myrica kandiana</i> Engl. (SSEGAWA 930) Mukikimbo—F	TR	Ro	7	Syphilis	Decoction drunk
Myrsinaceae					
<i>Maesa lanceolata</i> Forssk. (SSEGAWA 958) Lubanga—Fe, Bl	SH	Wp	2	Pre-hepatic jaundice	Decoction drunk
Myrtaceae					
<i>Eucalyptus grandis</i> Hill ex Maiden (not collected) Kalituunsi—Hg, W	TR	Bk	8	Cough	Decoction drunk
<i>Psidium guajava</i> L. (not collected) Omupeerapeera—Hg, Fl	TR	Le, Bk Le, Bk Le, Bk	18	Cough Pre-hepatic jaundice Diarrhea	Decoction drunk Decoction drunk Decoction drunk
<i>Syzygium cordatum</i> Sond. (SSEGAWA 969, 991, 998) Mugeege—F	TR	Le Le	2	Pre-hepatic jaundice Pregnancy-related illnesses	Decoction drunk Decoction drunk
		Le		Anemia after child birth	Decoction drunk
		Bk		Pre-hepatic jaundice	Decoction drunk
<i>Syzygium guineense</i> (Willd.) D.C. (SSEGAWA 889, 976, 1077) Kalunginsavu—F	TR	Bk	4	Pre-hepatic jaundice	Decoction drunk
Ochnaceae					
<i>Cissus adenocaulis</i> Steud ex A. Rich (SSEGAWA 1045) Ekibombo ekinene—Bl, G	SH	Le	3	Influenza	Decoction drunk mixed with cow ghee
Oxalidaceae					
<i>Oxalis corniculata</i> L. (SSEGAWA 906) Kajjampuni—Hg, G	HE	Le	2	Colic pain in babies	Infusion drunk
Passifloraceae					
<i>Passiflora edulis</i> Sims (not collected) Akatatunda—Hg	SH	Le	2	Luck in sale of shop items	Hidden among items for sale
		Le		Skin rash in babies	Decoction bathed
Phytolaccaceae					
<i>Phytolacca dodecandra</i> L'Herit (not collected) Oluwoko—Fl, Hg	HE	Le, Ro	3	Relaxation of pelvic region for child delivery	Bake leaves in hot firewood ash and massage pelvic region
Plantaginaceae					
<i>Plantago palmata</i> Hook. f. (SSEGAWA 921) Bukumbu—Fe	HE	St	2	Remove spells	Infusion wash face every morning

Table 1 (Continued)

Family, species (voucher no.), local name, habitat type ^a	Life form ^b	Part used ^c	Frequency of citation ^d	Common/clinical name of illness	Mode of preparation and administration
Poaceae					
<i>Digitaria abyssinnica</i> (A. Rich.) Stapf. (SSEGAWA 936) Olumbugu—Hg, Sr	HE	St	2	Measles	Decoction drunk
<i>Pennisetum purpureum</i> Schumach. (not collected) Ekisagazi—Bl, Fl	HE	In	4	Nightmares, hallucinations	Put under pillow when going to bed
		St		Pregnancy-related illnesses	Infusion drunk
<i>Cymbopogon nardus</i> (L.) Rendle (SSEGAWA 971) Kiteete—G	HE	St	5	Foul smelling belch	Decoction drunk
Polygonaceae					
<i>Oxygonum sinuatum</i> (Meisn.) Dammer (SSEGAWA 1076) Kafumita bagenda—G, Fl	HE	Le	2	Whitlow infection	Ash-baked leaves applied topically
<i>Rumex usambarensis</i> (Dammer) Dammer. (SSEGAWA 943) Kaseke kambajjo—G	HE	Le	6	Malaria	Decoction drunk
		Le		Aphrodisiac	Decoction drunk
Portulacaceae					
<i>Talinum paniculatum</i> (Jacq.) Gaertn. (SSEGAWA 1079) Mukisa—G	HE	Le	4	Good luck charm	Infusion bathed
Rhamnaceae					
<i>Maesopsis eminii</i> Engl. (not collected) Omusizi—F, Hg, Fl	TR	Bk, Le	10	Gonorrhea	Decoction drunk
		Bk, Le		Pre-hepatic jaundice	Decoction drunk
		Le		Constipation	Decoction drunk
Rosaceae					
<i>Rubus apetalus</i> Poir. (SSEGAWA 944) Olukenene—Fe	SH	Le	3	Syphilis	Decoction drunk
		Le		Cough	Masticate stem piece
Rubiaceae					
<i>Coffea canephora</i> A. Froehner (not collected) Emwanyi—Hg, Sr	TR	Le	6	Pre-hepatic jaundice	Decoction drunk
<i>Craterispermum schweinfurthii</i> Hiern. (SSEGAWA 1110) Musekera—F	TR	Le	6	Good luck charm	Leaves masticated raw
<i>Hallea rubrostipulata</i> (K. Schum.) J-F. Leroy (SSEGAWA 959, 978, 1091) Muziku—F	TR	Bk	41	Pre-hepatic jaundice; malaria	Decoction drunk
		Bk		Pregnancy-related illnesses	Decoction drunk
		Bk		Back ache	Decoction drunk
		Bk		Salpingitis	Decoction drunk
<i>Mussaenda arcuata</i> Poir. (SSEGAWA 891) Mazzi g'abaana—Fe	SH	Ro	2	Pre-hepatic jaundice	Decoction drunk
		Ro		Baby skin rash	Decoction bathed
<i>Rubia cordifolia</i> L. (SSEGAWA 1022) Kasala bakkesi—Fe, Bl	CL	Wp	7	Intestinal worms	Decoction used/drunk
		Wp		Umbilical cord scar healing	Decoction bathed
		Wp		Hemorrhoids	Decoction drunk
<i>Rytigynia beniensis</i> (De Wild) Robyns. (SSEGAWA 904) Kalokola—F	TR	Le	7	Septic ear	Ash baked crushed leaves mixed with cow ghee, apply to infected ear
		Le		Sore throat	Decoction drunk
<i>Uncaria africana</i> G. Don. (not collected) Kirobo—F	CL	Ro	3	Intestinal worms	Decoction drunk
<i>Vangueria apiculata</i> K. Schum. (not collected) Tugunda—Hg, Fl	TR	Le	2	Constipation	Infusion/decoction drunk; infusion bathed
		Le		Poison antidote	Decoction drunk
		Le		Good luck charm	Infusion bathed
Rutaceae					
<i>Citropsis articulata</i> (Spreng.) Swingle & Kellerm. (SSEGAWA 980) Katimbolo—F	SH	Ro	8	Aphrodisiac	Masticate and swallow

Table 1 (Continued)

Family, species (voucher no.), local name, habitat type ^a	Life form ^b	Part used ^c	Frequency of citation ^d	Common/clinical name of illness	Mode of preparation and administration
<i>Citrus limon</i> (L.) Burm f. (SSEGAWA 1141) Eniimu—Hg	TR	Fr	15	Malaria	Juice extracted and mixed with other anti-malarial herbs
<i>Teclea nobilis</i> Del. (SSEGAWA 893) Enzo—F	TR	Le	2	Headache	Leaves boiled and steam inhaled
<i>Toddalia asiatica</i> Lam. (SSEGAWA 1120) Kamule—Fe	SH	Le	3	Intestinal worms	Decoction drunk
<i>Zanthoxylum chalybeum</i> Engl. (SSEGAWA 901) Ntale ya ddungu—F	TR	Ro	10	Malaria	Decoction drunk
		Ro		Back ache	Decoction bathed
Sapindaceae					
<i>Blighia unijugata</i> Bak. (SSEGAWA 1016) Mukuza nyana—F	TR	Ro	2	Cough	Decoction drunk
Sapotaceae					
<i>Manilkara obovata</i> (Sabine & G. Don) J.H. Hemsl. (SSEGAWA 1029) Enkunya—F	TR	Bk	5	Stomach ache	Infusion drunk
Scrophulariaceae					
<i>Sopubia ramosa</i> (Hochst.) Hochst. (SSEGAWA 1097, 1122) Kakulunkanyi—Fl, Hg	HE	St	2	Pre-hepatic jaundice	Decoction drunk
Solanaceae					
<i>Discopodium penninervium</i> Hochst. (SSEGAWA 957) Omuyire—G, Fl	HE	Le, Ro	1	Possessed by spirits	Decoction drunk
		Le, Ro		Pre-hepatic jaundice	Decoction drunk
<i>Physalis micrantha</i> Link. (SSEGAWA 975, 1080) Akatuntunu—G, Hg	HE	St	8	Febrile convulsions	Infusion drunk
		St		Swollen penis	Embrocate on affected area
<i>Physalis peruviana</i> L. (SSEGAWA 983) Entuntunu ennene—Hg	HE	Le	7	Febrile convulsions in children	Decoction/infusion drunk
<i>Solanum anguivii</i> Lam. (SSEGAWA 1129) Akatula lukayira—Hg, Sr	SH	Le	3	Measles	Decoction drunk
		Le		Constipation	Decoction drunk
<i>Solanum lycopersicum</i> L. (not collected) Enyaanya—Hg, Fl	HE	Le	2	Headache	Decoction drunk
<i>Solanum macrocarpon</i> Linn. (SSEGAWA 952) Ntengontengo—Fl, Hg	HE	Ro	4	Snake bite	Apply topically on snake bite area; masticate and swallow
		Ro		Febrile convulsions	Decoction drunk
		Ro		Measles	Decoction drunk
<i>Solanum aethiopicum</i> L. (not collected) Ekitulatula—Hg	HE	Le	3	Poison	Infusion drunk
		Le		Intestinal worms	Infusion drunk
Tiliaceae					
<i>Triumfetta annua</i> L. (SSEGAWA 895, 990) Luwugula—G	HE	Wp	2	Removes spells	Kept in house
Verbenaceae					
<i>Clerodendrum capitatum</i> (Willd.) Schum. & Thonn. (SSEGAWA 911, 1095) Kisekeseke—F	SH	Le	3	Intestinal worms	Decoction drunk
		Le		Prevent miscarriages	Decoction drunk
<i>Clerodendrum myricoides</i> (Hochst.) Vatke (SSEGAWA 1143) Akakonge—G	CL	Bk	2	Syphilis	Decoction drunk
		Bk		Syphilis	Decoction drunk
<i>Lantana trifolia</i> L. (not collected) Akawukiwuki—G, Bl	SH	Tw	9	Cough	Decoction drunk
		Tw		Pre-hepatic jaundice, fever	Decoction drunk
<i>Priva adhaerens</i> (Forssk.) Chiov. (SSEGAWA 1072) Enkami—G	HE	St	2	Diarrhea	Infusion mixed with clay water drunk
<i>Priva cordifolia</i> (L.f.) Druce (SSEGAWA 890) Enkami—G	HE	Le	4	Headache	Crush leaves and smear on sides of face

Table 1 (Continued)

Family, species (voucher no.), local name, habitat type ^a	Life form ^b	Part used ^c	Frequency of citation ^d	Common/clinical name of illness	Mode of preparation and administration
Vitaceae					
<i>Cyphostemma adenocaula</i> (A. Rich) Wild & Drummond. (SSEGAWA 985, 1149) Akabombo—G, Fe	CL	Le	7	Genital warts	Infusion smeared on infected area
		Le		Induce labor	Infusion drunk
		Le		Measles	Infusion drunk

^a Habitat types: home gardens, Hg; forest edges, Fe; forest, F; grassland, G; bush land, Bl; fallow land, Fl; secondary regrowth, Sr; thicket, T; swamps, S; wet grassland, Wg; roadsides, R; woodlots, W.

^b Life forms: shrub, SH; tree, TR; herb, HE; climber, CL.

^c Plant parts: leaves, Le; roots, Ro; shoot, St; whole plant, Wp; sap, Sa; internode, In; twig, Tw; bark, Bk; bulb, Bu; seed, Se; flower, Fw; fruit, Fr.

^d Frequency of citation as medicine: number of respondents per species out of 205 respondents.

^e tonto, local brew made from *Musa paradisiaca* L. var. *sapientum*.

of Fabaceae (16%), Asteraceae (14.4%), Euphorbiaceae (7.5%) and Labiatae (5.9%) in decreasing order of frequency of reported use.

There was a highly significant difference between age of respondents and knowledge of medicinal plants (Wilcoxon's test, $p < 0.001$). Respondents who were 40 years and above were generally more knowledgeable about medicinal plants than those who were younger. The most knowledgeable respondent knew 13 medicinal plants used to treat various ailments; 5 of these were specifically used to treat malaria. The most cited medicinal plants included *Vernonia amygdalina* Delile, *Hallea rubrostipulata* (K. Schum.) J-F Leroy and *Hoslundia opposita* Vahl. and are all used to treat malaria (Fig. 1 and Table 1). Herbs were the main source of medicinal plants in terms of number of species (51.3% of total species) followed by trees and shrubs each with 23% and climbers (2.6%).

3.2. Plant parts used

The plant parts used for medical preparations were leaves, shoots, roots, bark, twigs, sap, bulbs, flowers, seeds, internodes and fruits (Fig. 2). In some cases the entire plant is utilized including the roots. The most frequently utilized plant part were the leaves (48.7%) followed by the shoots (18.2%) and roots (12.3%). In some instances the bark of *Hallea rubrostipulata* was stripped off completely even at the relatively higher parts of the stems.

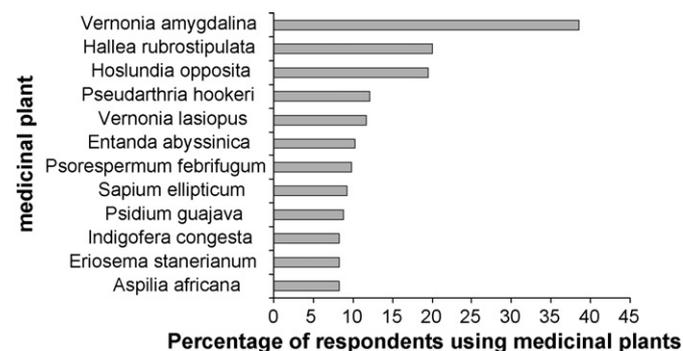


Fig. 1. List of the 12 most cited medicinal plant species used by the communities as reported by the respondents during the ethnobotanical survey. Refer to Table 1 for detailed information and other medicinal plants used.

3.3. Ailments treated

Gastro-intestinal problems and psycho-spiritual problems were among the most frequent ailments treated with the medicinal plants (Table 2). Most of the species were found to have more than a single therapeutic use. The largest number of remedies (23.5% of all remedies) were used to treat gastro-intestinal problems (stomach ache, diarrhea, worms, constipation, indigestion and abdominal pain) while 0.5% of the remedies were for the treatment of cardiovascular and circulatory diseases (e.g. hypertension). The most commonly used species in the treatment of gastro-intestinal problems included *Rhus vulgaris* Meikle, *Carissa edulis* L., *Aspilia africana*, *Hoslundia opposita* Vahl. and *Ocimum gratissimum* L. while, the most familiar plant families used included Asteraceae, Euphorbiaceae, Fabaceae and Labiatae. These families were also popular in the treatment of malaria and related ailments.

3.4. Traditional knowledge, treatments and preparations

Most people interviewed were familiar with the species for treatment of common ailments like cough, fever, headache (Table 1) and plant remedies which were used regularly. Local

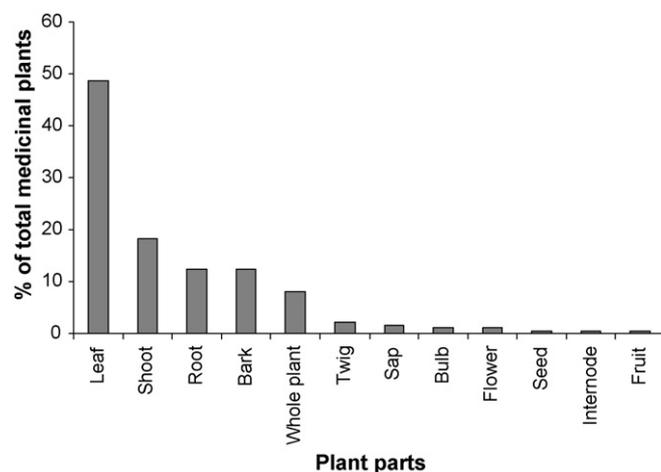


Fig. 2. The list of plant parts used as medicines, showing the respective percentages of the total number of medicinal plants for which that plant part is used.

Table 2
Number of plant species used to treat ailments within different disease systems

Disease category	Number of plants	Percentage
Cardiovascular and circulatory diseases	1	0.5
Gastro-intestinal ailments	44	23.5
Ear, nose and throat (ENT)	3	1.6
Eye diseases	3	1.6
Female genital system (including gynecological and obstetrics)	33	17.6
Male genital system	6	3.2
Skeletal-muscular problems	6	3.2
Nervous system and mental disorders	2	1.1
Respiratory tract infections	21	11.2
Skin diseases and subcutaneous tissues	9	4.8
Infectious diseases	24	12.8
Parasitic diseases, not of the digestive system	20	10.7
Specific diseases and conditions	7	3.7
Childhood diseases and conditions	31	16.6
Psycho-spiritual	36	19.3
Specific symptoms not mentioned elsewhere	42	22.5
Others	17	9.1

Disease categories are adapted from Adjanohoun et al. (1993) with modifications.

knowledge regarding the use of herbal medicines was got from elders and close family friends or neighbors who share knowledge of mode of collection, preparation and administration of medicinal plants. However, knowledge of a few ailments such as epilepsy, hypertension, syphilis was generally restricted to the elders and traditional medicine practitioners.

Many of the medical remedies were monotherapies based on preparations from a single plant. However, there were some exceptional remedies where more than one plant was used. For instance three species, *Hallea rubrostipulata*, *Erythrina abyssinica* Lam. and *Citrus limon* (L.) Burm f. were mixed to provide a remedy for malaria and fever-related ailments. The treatment of syphilis sometimes involved the drinking of the decoction of the bark of *Psorospermum febrifugum* Spach., *Sapium ellipticum* Pax. and the leaves of *Pseudarthria hookeri* Wight & Arn. A decoction of the twigs or leaves of *Pseudarthria hookeri* *Indigofera congesta* Welw. ex Bak. f. and *Hoslundia opposita* Vahl. was also used to treat and prevent skin inflammation in newly born babies. The decoction of *Crotalaria mesopontica* Taub. and *Bidens kilimandscharica* (O. Hoffm) Sherff. was drunk to treat menstrual problems among women. The main preparation methods included decoction (58.8%) and infusion (35.8%). Other methods included, juice extract, paste, powder and unprocessed raw material.

Crushing, pounding and grinding were done with a grinding stone or pestle and mortar. Some times the crushing was done by rubbing the plant part (say leaves) between the palms to squeeze out the juice. This was commonly done with *Bidens pilosa* L., which was applied topically on fresh wounds. The powder was obtained by drying and grinding the plant parts while the decoction was obtained by boiling in water. Steaming

was done while cooking food. The plant part was wrapped in banana leaves alongside the food and steamed in a saucepan.

3.5. Administration of medicines

The main administration routes of the remedies were oral absorption (75.4%) and poultice/topical application (26.2%). Others included inhalation and rubbing/massaging. Some of the remedies were baked in hot wood ash before topical application, for example in the treatment of wounds. There were some unusual ways of administering medicine, for example some remedies were hanged at the entrance of shops (*Crassocephalum* sp.). Others were planted in the garden (*Crassocephalum* cf. *crepidioides*) to ensure rich harvests, while some were administered alongside chants for instance *Indigofera drepanocarpa* Taub. Treatment of spiritual conditions and illnesses also involved, in some cases, washing with or sprinkling of concoctions onto patients, recitation of incantations.

3.6. Comparison of the new and previously known medicinal plants

The recorded information of medicinal plants was compared with that gathered by earlier published ethnobotanical surveys. A review of published Ugandan, Eastern, Western and Southern Africa literature indicated that 72 (38.7%) out of 186 medicinal plant species recorded in this study are new. Notable among these was the use of the infusion from leaves of a garden herb, *Aeolathus repens* Oliv. for febrile convulsions among children and babies, use of the crushed leaves of *Anisopappus africanus* (Hook. f.) Oliv. & Hiern. and sniffed to cure headaches, use of the baked leaves of *Blumea perottetiana* DC. to treat anorexia, *Dyschoriste magchana* (Nees.) Bennet was important for its dried leaves that were used as a good luck charm when traveling long distances. The dried leaf powder was mixed with petroleum jelly for smearing the whole body, sometimes with chanting.

3.7. Management and utilization of habitat types for medicinal plant harvesting

Most of the medicinal plants grow wild or 'semi-wild' (84.5%) and only 15.5% are cultivated. The majority of the medicinal plants are indigenous (79.1%) although none of them is endemic to Sango bay area. *Mundulea sericea* and *Pycnostachys eminii* are categorized as restricted range species, having been recorded in only one floral region (Polhill et al., 1952). Medicinal plants are collected from fallow roadsides, woodlots, swamp or swamp edges, thickets, wet grasslands, secondary regrowth, bush land, forest edge, forest, fallow land, home garden and grassland (Fig. 3).

Grasslands provided the highest number of species for medicinal use (54.6%) followed by home gardens (25.4%) and fallow land (19.5%). Grasslands were dominated by *Hyparrhenia rufa* (Nees.) Stapf. (Poaceae) and *Hyparrhenia filipendula* (Hochst) Stapf. (Poaceae) and *Themeda triandra* Forssk (Poaceae) with scattered *Phoenix reclinata* Jacq. (Palmae) trees. Grasslands were the main source of herbaceous medicinal plants such as

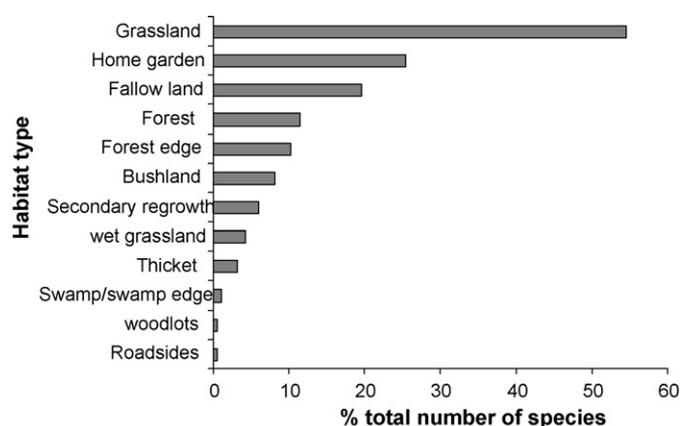


Fig. 3. Habitat types utilized for harvesting of medicinal plants. The general description of each habitat type is given in Section 3.

Dicliptera laxata C.B.Cl., *Microglossa pyrifolia* (Lam.) O. Ktze and *Ipomoea cairica* (L.) Sweet. Home gardens were dominated by *Musa sapientum* L. and *Musa paradisiaca* L. The medicinal plants which occurred in home gardens were normally weedy herbaceous plants that are sometimes preserved. These include *Hyptis pectinata* Poir. and *Ocimum gratissimum* L. Fallow lands tended to be dominated by fast growing trees such as *Mangifera indica* L., *Ficus natalensis* Hochst., and grasses such as *Imperata cylindrica* (L.) Rauschel (Poaceae) and *Brachiaria decumbens* Stapf. (Poaceae) which have no known medicinal value. Other common herbaceous plants in fallow lands included *Conyza floribunda* Poir. and *Leonotis nepetifolia* L.R.Br. Other areas were dominated by 'secondary regrowth' after recent cultivation. These were dominated by weedy herbaceous plants such as *Crassocephalum* cf. *crepidioides*, *Siegesbeckia orientalis* L. and *Commelina africana* L. Woodlots were predominantly *Eucalyptus grandis* Hill ex Maiden. stands and occasionally *Grevillea robusta* Cunn. (Proteaceae). Some of these habitats have been degraded over time by human activities such as grazing in grasslands, cultivation and over exploitation of plant resources for fuel wood and timber.

4. Discussion and conclusions

A high proportion of the vegetation of Uganda has been modified by cutting, cultivation, burning, grazing and other anthropogenic actions, and many of these vegetation types have been significantly reduced in quality and range over time (Eilu and Winterbottom, 2007). The remaining pockets of natural vegetation are primarily found in the various protected areas in Uganda. The deforestation rate in Uganda is estimated at 55,000 ha per year, based on habitat change from 1990 to 1995 (Eilu and Winterbottom, 2007). The majority of the forest loss has occurred outside protected areas. The National Biomass Study Project estimates that per capita forest area will decline from 0.3 ha in 1991 to 0.1 ha in 2025 if there is no serious investment in forestry. The reduction in the quality, quantity and connectivity of natural habitat is the greatest direct cause of biodiversity in Uganda. Habitat damage, especially the conversion of forest land into agricultural land is largely driven by a

combination of factors, including population growth, inequitable land and income distribution and development policies. Despite the high incidence of disease, including HIV/AIDS, Uganda's population is growing very fast and is over 80% rural. Human population growth rates for Uganda approach 3%, while the average world population growth rate is 1.3%. Human density estimates are also relatively high, with Uganda's national average of 102 people/km² compared to the world's average of 42 people/km². This greatly hampers the conservation of biodiversity, particularly the plant resources which include medicinal plants.

The importance of traditional knowledge for conservation and understanding ecological processes has received much attention in resource management (Berkes et al., 2000; Olsson and Folke, 2001). Local knowledge and practices have to be understood so that appropriate management practices that build on both scientific and local knowledge may be developed (Ticktin and Johns, 2002). The communities of Sango bay have a rich local knowledge of local plants they use in their day-to-day lives including knowledge on medicinal plants. However, this traditional knowledge is bound to be lost because of habitat degradation, overexploitation and failure of the older generation to interest the younger generation in traditional knowledge and associated practices. This study shows that the variability in local knowledge about the utilization of medicinal plants in the Sango bay area is important to consider in designing sustainable management practices. It suggests the need to reinforce institutional contexts (e.g. through the Collaborative Forest Management program of the National Forestry Authority) in which knowledge and sustainable practices may find appropriate conditions for their expressions. Given the importance of medicinal plants to livelihoods for the communities of the Sango bay area, developing a common view of the problems they face through consultations among themselves and general guidelines for adaptive management approaches as suggested by Cunningham (2001), is an important avenue for sustainable utilization of medicinal plants in future.

According to the Health Sector Strategic Plan (2003/2004), provision of adequate and quality health care is the key to enhancing the quality of life of Ugandans. However, Uganda's health care system does not adequately address the various concerns of the people. The Uganda National Health Policy (2000) recognizes the role of traditional medicine in the primary health care delivery system and calls for collaboration between government and the traditional and complimentary medicine sub-sector. Furthermore, the government of Uganda is in the process of formulating a Traditional and Complimentary Medicine Policy. The integration of traditional and complimentary medicine into the national health care system has the potential to augment, strengthen and promote better health care for all, in line with the national vision. However, there is limited public awareness on the potential opportunities that could be tapped from traditional and complimentary medicine for the health sector. Furthermore, there is lack of information on the nature and scope of traditional and complimentary medicine. The perceived negative aspects of traditional and complimentary medicine have often tended to obscure the real benefits.

There is need for government to work with all stakeholders to create more public awareness.

Forests and other habitat types provide wide range medicinal plant resources for primary health care especially in rural areas (Kakudidi et al., 2000; Tabuti et al., 2003; Adriaens, 2005). The present study gives a fairly big number of plants used to treat various ailments especially among the rural communities. This number is comparable to studies carried out in eastern Uganda (Tabuti et al., 2003), central Uganda (Oryem-Origa et al., 2001, 2003) and western Uganda (Kakudidi et al., 2000; Kamatenesi-Mugisha and Oryem-Origa, 2005). The high species diversity reported to be used for medicinal purposes may be indicative of the dependency on plants in the treatment of ailments and the existence of an immense amount of local knowledge on herbal medicines among the rural communities. Some of the most important medicinal plant families including Asteraceae and Labiatae are reportedly also important in Native American traditions and their medicinal values may be attributed to the evolutionary ecological adaptations that influence their phytochemistry, and hence use by humans (Moerman and Estabrook, 2003). The majority of the most cited species are used in the prevention and management of malaria and related symptoms. These include *Vernonia amygdalina*, *Vernonia lasiocopus*, *Entada abyssinica*, *Pseuderthria hookeri* and *Hoslundia opposita* (Table 1). They are also widely used in the treatment of related ailments in other regions in the country where they occur. *Psorospermum febrifugum* is being used in the manufacture of medicated cosmetics by a local firm because of its highly valued medicinal properties. However, its populations in the wild are reportedly dwindling at a very fast rate due to overexploitation. Despite the widespread usage of these plants, no pharmacological studies have been carried out to determine the efficacy and safety in the use of these plants.

In many regions in Uganda, the medicinal plants used for particular ailments are similar although many other plants are used for different ailments in different regions. This is well illustrated in the research work done by Bukenya-Ziraba et al. (1997), Ogwal-Okeng (1998), Kakudidi et al. (2000), Oryem-Origa et al. (1997, 2001, 2003), Tabuti et al. (2003), Adriaens (2005), Kamatenesi-Mugisha and Oryem-Origa (2005), Tabuti (2007), and Katuura et al. (2007) in different parts of the country. About 20% of the total number of species was used for similar purposes either in other parts of the country or in other countries. These identical claims are of significance because identical use of a plant by different people from different areas may be reliable indication of curative properties (Milliken and Albert, 1996; Shrestha and Dhillion, 2003). There is need to substantiate the observations of this study with pharmacological studies in order to evaluate their effectiveness.

Several medicinal plant species were collected from forests and adjacent grasslands. This was because medical effectiveness may be higher in plants collected from the wild. This was also reported to be a common practice in Ghana where most of the medicinal plants are gathered from the wild (Abbiw, 1990) and by Tabuti et al. (2003) findings where 77.3% of the medicinal plant species recorded were growing under wild conditions in savanna grasslands. Medicinal plants have traditionally been

collected from forests, fallow lands and gardens. Sometimes people have to travel long distances in search of particular medicinal plants. In rare situations, plants are protected in gardens or fallow lands for medicinal purposes. However, plants species, especially trees, are also used for other purposes, e.g. fruits. This sometimes, makes it difficult to determine exactly why the plant is protected or even planted in the garden (Okafor and Fernandes, 1987). However, many medicinal plants are herbaceous as was observed in the present study. This is probably because they are more abundant in the forests, grasslands and home gardens, in many instances, as weeds. The ease with which they are collected and transported may also contribute to the preference of herbs (Shrestha and Dhillion, 2003).

Various plant parts are used in the treatment of ailments. The use of perennial parts (such as roots, bulbs and bark) and reproductive parts (flowers, fruits and seed) especially for woody and slow-growing species threaten plant populations and species viability (Dhillion and Amundsen, 2000; Shrestha and Dhillion, 2003; Tabuti et al., 2003; Dhillion and Gustad, 2004). Species such as *Hallea rubrostipulata* and *Warburgia ugandensis* are threatened because of the poor harvesting techniques and unsustainable harvesting intensities employed. In order to be able to determine the effects of exploiting plants for medicine, there is need to carry out quantitative studies on amounts of plants harvested and also assess quantitatively the distribution and abundance of the most important medicinal plant species (Tabuti et al., 2003; Shrestha and Dhillion, 2003).

The majority of preparations of medicines were administered by oral absorption and this largely agrees with information from other studies (Kakudidi et al., 2000; Oryem-Origa et al., 2003; Tabuti et al., 2003; Kamatenesi-Mugisha and Oryem-Origa, 2005; Adriaens, 2005). However, the treatment of spiritual conditions and illnesses was unique because it involved washing with or sprinkling of concoctions onto patients, recitation of incantations. Treatment of spiritual conditions and illnesses in this manner was also observed by Tabuti et al. (2003) in Bulamogi County, Eastern Uganda.

Many other herbal medicine plants in the Sango bay area such as *Cannabis sativa* L. have other uses in the community and are used in ethnoveterinary purposes. The repetitive use of plants, albeit, in different contexts by people, emphasizes their value within the consciousness of communities and people take care to protect such plants (Etkin, 1998, 2002; Tabuti et al., 2003).

In conclusion, the present study indicates that the Sango bay area has a high diversity of medicinal plants. Despite the slow process of socio-cultural change that comes along with improvements in economy and well being of the people, local communities are still heavily dependent on traditional medicine for primary health care. The communities have an immense amount of traditional knowledge of plants and their uses. The reliance on traditional medicine is to some extent associated with poverty and traditional belief in its usefulness. However, since there is complete lack of phytotherapeutic evidence for many of the species, we recommend that phytochemical and pharmacological studies need to be carried out in order to confirm the validity of properties attributed to these species (Diallo and Paulsen, 2000; Shrestha and Dhillion, 2003; Tabuti et al., 2003). Conser-

vation efforts should be geared towards ecosystem protection and sustainable utilization to ensure the continued supply of the medicinal plants for use. Community-based conservation strategies including development of home medicinal plants gardens for priority species should also be explored to ensure that there is less pressure on the medicinal plants in the wild. This would also help the communities to easily access and availability.

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Appendix A. Questionnaire used in the study and documentation of the medicinal plants used in the Sango bay area, Southern Uganda

Section A: Identification

- | | |
|----------------------------------|--------------------------------------|
| 1.1 Date of interview:..... | 1.2 Respondent's No:..... |
| 1.3 County:..... | 1.4 Sub county/Local Council 3:..... |
| 1.5 Parish/Local Council 2:..... | 1.6 Village/Local Council 1:..... |

Section B: Social economic characteristics

2.1 Sex:

- 2.1.1 Male.....1
- 2.1.2 Female.....2

2.2 Age:

- 2.2.1: 18 – 27 yrs.....1
- 2.2.2: 28 – 37 yrs.....2
- 2.2.3: 38 – 47 yrs.....3
- 2.2.4: 48 – 57 yrs.....4
- 2.2.5: Over 57 yrs.....5

2.3 Educational level:

- 2.3.1 No formal education.....0
- 2.3.2 Primary level.....1
- 2.3.3 Secondary level:.....2
- 2.3.4 College:.....3
- 2.3.5 University:.....4

2.4 Marital status:

- 2.4.1 Single:.....1
- 2.4.2 Married:.....2
- 2.4.3 Widowed:.....3
- 2.4.4 Divorced/Separated.....4

2.5 Primary occupation:

- 2.5.1 Farmer:.....1
- 2.5.2 Trader:.....2
- 2.5.3 Housewife:.....3
- 2.5.4 Teacher:.....4
- 2.5.5 Other (Specify).....5

2.6 Type of dwelling:

- 2.6.1 Temporary (grass thatched mud house).....1
- 2.6.2 Semi-permanent (mud house thatched with iron sheets).....2
- 2.6.3 Permanent (brick house thatched with iron sheets).....3

2.7 Household wealth:

- 2.7.1 Rich (earns more than USD 200 per month).....1
- 2.7.2 Well-off (earns between USD 150 – 200 per month).....2
- 2.7.3 Comfortable (earns between USD 100 – 150 per month).....3
- 2.7.4 Poor (earns between USD 50 – 100 per month).....4
- 2.7.5 Very poor (earns less than USD 50 per month).....5

Section C: Medicinal plants use

- 3.1 Do you use herbal medicine to treat diseases? Yes.....1
No.....2

3.2 If so, list the species you use in order of preference in the table below:

Rank	Local name of species ^a	Species ^b	Voucher specimen number (if collected)	Harvesting method	Part used, methods of preparation & administration	Disease/Condition treated	Habitat type where species grows
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							

^a Verification and validation of species and diseases treated by focus group discussions, traditional healers and knowledgeable people was done based on what was reported in the table above and what was observed in the various habitat types as we collected the species for confirmation of identifications, local names and assignment of voucher numbers.

^b The botanical names for those species that are widely known were written; otherwise this section was filled after confirmation of identifications at the Makerere University Herbarium.

Section D: Local management for the three most important medicinal plant species

4.1 Cultivated (How, where, why, much, little)?.....

.....

4.2 Actively protected by local people? How?.....

.....

4.3 Weediness: Bad weed..... 1 Not a weed..... 2

4.4 Have you planted or preserved medicinal plants in your home garden?

Yes..... 1 No..... 2

4.5 Any other remarks:.....

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