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PLANT RESOURCE UTILIZATION AND CONSERVATION STRATEGIES AMONG RURAL COMMUNITIES OF GWANDUM, SHONGOM LGA OF GOMBE STATE

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ABSTRACT

In this study, we obtained an in-depth ethnobotanical studies in some selected rural communities of Shongom Local Government Area of Gombe State to close this knowledge gap. Information was obtained from 98 individuals through interviews using semi-structured questionnaire and group discussions, supplemented with field observations. A total of 34 ethnobotanically important plant species belonging to 18 families (92% indigenous and 8% exotics) mostly from the Fabaceae, Arecaceae, Anacardiaceae, Combretaceae, and Moraceae were documented. These plant species were mainly utilized for food, medicine, fodder, construction and fencing purposes. Significantly used species were *Moringa oleifera* (Linn), *Adansonia digitata, Ficus thonningii, Anogeissusleio carpus, Dioscorea Spp, Parkia biglobosa and Mangifera indica*. Only 25 (%) of the species reported had their status assessed by the International Union for Conservation of Nature (IUCN). Local social beliefs, taboos, fines as well as traditional rules and regulation are in place to aid the management of communal resources. However, a significant number (62%) of participants mentioned that they were not pleased with the rule and regulations. This study concluded that plant resources still play a crucial role in rural villages of Shongom Local Government Area. Furthermore, for utilization and effective long-term conservation of these plant species, government implemented conservation measure alongside awareness creation are highly recommended.

Keywords: Ethnobotany, Utilization, Community, Conservation

INTRODUCTION

From time immemorial plants have played key roles in sustaining cultural identities and livelihood of indigenous communities particularly in developing countries where the burden of deteriorating nature as a result of intensifying impacts of changing climate, landuse pattern, and socioeconomic stressors are immensely felt with little or no copping mechanism (Barnes, 2002; Rasethe *et al*., 2013; Koseo *et al*., 2019; Singh *et al*., 2021). Marginalized indigenous communities in diverse socio-ecological settings in Nigeria use locally adapted wild plant resources to sustain their wellbeing and cultural identity (Offiah *et al*., 2011; Shomkegh *et al.,* 2013; Shinkafi *et al*., 2015; Lawal *et al.,* 2022). This means that the interaction of local communities with plant biodiversity influenced by the communal perception and adopted management strategies ultimately shapes local conservation efforts (Ramakrishnan *et al*., 2007; Rasethe *et al*., 2013; Dunn, 2018; Mauerhofer *et al*.2018). Consequently, these wild plant resources and its associated dearth of traditional knowledge are diminishing rapidly, pointing the need to promote sustainable harvesting practice for a ceaseless supply of plant resources for sustainable societal development (Asiimwe *et al.,* 2014; Chitindingu and George, 2014).

Ethnobotanical field studies in Nigeria, have widely shown that indigenous communities hold a significant ecological knowledge of disappearing folk plants most of which have not been documented making it difficult for conservationist and

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policy makers to realize the potential traditional conservation holds for innovative techniques in wild indigenous plant resource conservation. Therefore, to conserve the plant diversity used by indigenous communities, it is fundamental to involve the indigenous communities in the process as they know how the different factors interact (Ekor, 2014; Gupta, 2008).

Gwandum has a rich history of medicinal and wild food plants, but there has never been a study on the utilization and associated traditional knowledge of these plant species that could unveil their potentials. This study documented the indigenous ethnobotanical uses of plants, conservation and management practices by rural communities of Gwandum, in Shongom local government area of Gombe State, Nigeria. Our specific objectives were (i) to acquire a comprehensive ethnobotanical knowledge of plant diversity in Gwandum and (ii) evaluate how these plant diversity could boost food security and improve local livelihood

MATERIALS AND METHODS

Study Area

The study was conducted in rural communities of Gwandum, Shongom Local Government Area of Gombe State situated between latitude 0º 22' and 0º 35'N and between longitude 32º 56'and 33º 02'E.The vegetation comprises of deciduous forest found at high elevations and woody savanna vegetation characterized by trees and shrubs at the low-flat plains. Gombe State is located Northeastern part of Nigeria. The state has an area of 20, 265 km 2 and a population of around 2,365,000 people as of 2006. It has two distinct climates, the dry season (November- March) and the raining season (April-October) with an average rainfall of 850nm. The major economic activity of the communities is subsistence agriculture and livestock farming.

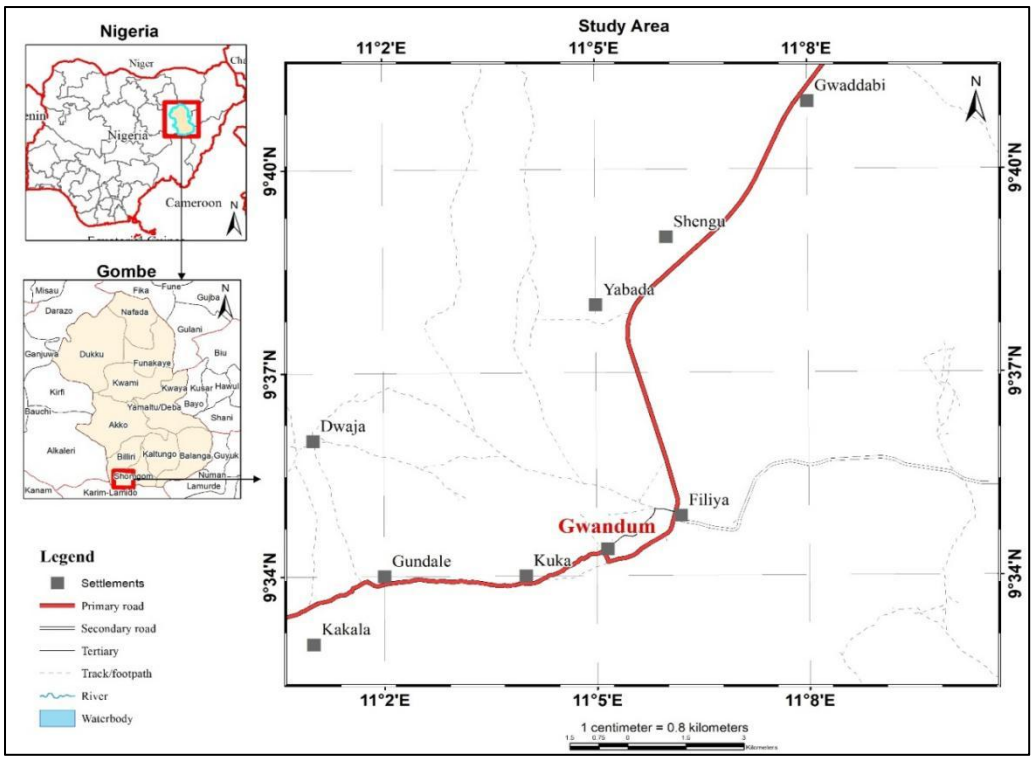

Figure 1: Map of the Study Area

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Ethnobotanical Survey

Ethnobotanical data were obtained through interviews using semi-structured questionnaires and focused group discussions between January and July, 2021. After a preliminary meeting to introduce the research, local chiefs were asked to suggest people disposed to be interview from each community who hold reputable traditional knowledge about the use of wild plants. Also, residents close to Uru hill were randomly selected for the study because they live in close proximity with the natural vegetation. With the help of local interpreters, the interviews were carried out in local languages (Pero and Hausa). Informants were first briefed about the aims of the study, and only those who gave their express informed consent were subsequently interviewed.

The interviews focused on local plant names, traditional plant uses, and used plant parts, further questions concerned sites of gathering and seasonal availability of plants or their used parts.

Field Survey and Plant Identification

Field survey were later carried out during which plant specimens were collected and subsequently prepared as herbarium specimens following standard procedures for botanical identification. The field walks for the survey and sample collection were guided by the local informants. Plant specimen were collected from different sites during the field survey and were properly tagged. Identification was done in the field by the survey team with the aid of identification keys and monographs. Plants that could not be identified in the field were taken to Gombe State University herbarium and identified with the help of taxonomist.

RESULTS

Demographic Details of Respondents

We had a total of 98 respondents, from different professional groups, gender and ages. 63% of our respondents were males while 37% were females. The respondents included farmers, traditional healers, herders, daily wage laborers and government workers. 56% of the respondents were without formal education. Older respondents hold more traditional knowledge than the younger ones as ethnic knowledge about uses of plant resources decreased among younger people of the study area possibly due to increasing literacy and lack of interest in traditional practices.

Identified Plant Species

A total of 34 plant species distributed across 18 families were identified as used. Fabaceae contributed 6 species, while 3 species were recorded for *Arecaceae, Anacardiaceae, Combretaceae,* and *Moraceae. Apocynaceae* 2 species, *Dioscoreaceae* 2 species. *Moringaceae, Myrtaceae, Rhamnaceae, Annonaceae, Cucurbitaceae, Euphorbiaceae, Malvaceae, Meliaceae, Sapotaceae, Verbanaceae,* and *Zygophyllacea*e contributed one species each.

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Table 1: Plants Species, their local and scientific names, Families, uses, and parts used

	Local Names			Scientific Names	Families	Uses	Parts used
	Pero	**Hausa**	**Common Name**				
1	Gili (P),	Kadanya(H),	Shea Tree (En)	*Vitellariaparadoxa*	*Sapotaceae*	Food, medicine, Firewood, Cosmetics	Fruits, Seeds, Leaves
2	Gangana (P),	Yadiya (H),	Saltbush (En)	*Leptadenia hastate*	*Apocynaceae*	Food, Medicine, Fodder, Income	Leaves
3	Kulabit (P),	Dínyáá (H),	Black Plum (En)	*Vitexdoniana*	*Verbanaceae*	Firewood, Food, Medicine, Income	Stem, Fruits
4		Marke (H),	African birch (En)	*Anogeissusleiocarpus*	*Combretaceae*	Firewood, Medicine, Tool, Timber, Income	Bark, Stem
5		Magarya (H),	Indian plum (En)	*Zizipusmauritiana*	*Rhamnaceae*	Food, Medicine, Firewood, Income	Fruit, Leave, Stem
6	Bogum (P),	Taura (H),	Detar (En)	*Detariumsenegalensis*	*Fabaceae*	Food, Medicine, Firewood, Income	Fruit, Seed, Leave, Bark, Stem
7	Bougwo (P),	JininKafuri (H),	Blood plum (En)	*HeamatostaphisBarteri*	*Anacardiaceae*	Food, Firewood, Medicine, Fodder, Income	Fruit, Stem, Leaves
8	Daddi (P),	Giginya (H),	Palmyra palm (En)	*Borassusaethiopum*	*Arecaceae*	Food, Spice, Timber, Firewood, Income	Fruit, Seed, Leaves, Stem
9	Dududu (P),	GwandanJeji (H),	Wild Custard Apple (En)	*Annona senegalensis*	*Annonaceae*	Food, Fodder, Rope	Fruit, Leaves, Bark
10	Anbakum (P),	Aduwa (H),	Desert palm (En)	*Balanitesaegyptiaca*	*Zygophyllaceae*	Food, Firewood, Fencing, Timber, Income	Fruit, Leaves, Spikes, Stem
11	Meshe (P),	Doruwa (H),	African locus beans (En)	*Parkiabiglobosa*	*Fabaceae*	Food, Spice, Timber, Firewood, Fodder	Fruit, Leaves, Stem, Flower
12	Falwire (P),	Madai (H),	Mahogamy (En)	*Khayasenegalensis*	*Meliaceae*	Timber, Food (birds)	Trunk, Fruits
13	Shakajak (P),	Kirya (H),	African mesquite (En)	*Prosopis Africana*	*Fabaceae*	Firewood, Spice (Maggi)	Bark, Stem
14	Wariyan (P),	Tsamiya (H),	Tamarin (En)	*Tamarindusindica*	*Fabaceae*	Food, Spice, Fodder, Timber, Income	Fruit, Leaves, Seed, Stem
15		Goruba (H),	Doum palm (En)	*Hyphaenethebaica*	*Arecaceae*	Food, Timber, Firewood	Fruit, Leaves, Stem

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16		Zogale (H),	Drumstick Tree (En)	*Moringaoleifera*	*Moringaceae*	Food, Medicine, Windbreak, Fodder	Fruits, leaves, Stem
17		Gwaiba (H),	Guava (En)	*Psidiumguajava*	*Myrtaceae*	Food, Medicine, Fodder	Fruits, leaves, Stem
18		Mangoro (H),	Mango (En)	*Mangiferaindica*	*Anacardiaceae*	Food, Medicine, Fodder, Income	Fruits, Leaves, Stem
19		Kashu (H),	Cashew (En)	*Anacardiumoccidentalis*	*Anacardiaceae*	Food, Medicine, Income, Fodder	Fruits, Leaves, Stem
20		Dibino (H),	Date palm (En)	*Phoenix dactylifera*	*Arecaceae*	Food, Medicine, Firewood, Income	Fruits, Leaves, Stem
21		Kuka (H),	Baobab (En)	*Adansoniadigitata.*	*Malvaceae*	Food, Medicine, Income	Fruits, Leaves, Bark
22	Danban (P),	Giginya (H),	Wild fig (En)	*Ficusthonningii*	*Moraceae*	Firewood, Shade, Medicine	Leaves, Stem, Bark, Fruit
23	Shanden (P),	DoyanDaji (H),	Wild Yam (En)	*Dioscorea Spp*	*Dioscoreaceae*	Food, Fodder, medicine	Tuber, Leaves
24	Baccimagandi (P),	Marke (H),	African Birch (En)	*Anogeissusleiocarpus*	*Combretaceae*	Firewood, Medicine	Stem, Bark
25		Gawo (H),	Acacia (En)	*Acacia albida*	*Fabaceae (Mimosaceae)*	Medicine, Fodder, Fencing	Fruits, Leaves, Spikes
26		Farar kaya (H),	African laburnum (En)	*Acacia sieberiana*	*Fabaceae*	Medicine, Fodder, Fencing	Fruits, Leaves, Spikes
27	Bacciargbodi (P),	Ararrabi (H),	Frankincense tree (En)	*Boswelliadalzielii*	*Burseraceae*	Medicine, Firewood	Bark, Stem
28	Baccigagfidi (P),	Gamji (H),	Broadleaf fig (En)	*FicusPlatyphylla*	*Moraceae*	Fodder, Firewood	Leaves, Fruits, Stem
29	Danban (P),	Chediya (H),	Sycamore fig (En)	*FicusSycomorus*	*Moraceae*	Medicine, Firewood, Timber	Leaves, Stem, Bark, Root
30	Bini da zugu (H),		Purging nut (En)	*Jatropha curcas*	*Euphorbiaceae*	Medicine, Soap, Fodder	Leaves, Fruits, Latex
31	Baccisaggudi (P),	Sabara (H),	Moshi medicine (En)	*Guierasenegalensis*	*Combretaceae*	Medicine	Leaves
32	Baccigagmodi (P), (En)	Garahunu (H),	African cucumber	*Momordicacharantia*	*Cucurbitaceae*	Medicine, Food	Leaves, Flowers
33	Baccitugcadi (P),	Tumfafiya (H),	Sodom apple (En)	*Calotropisprocera*	*Apocynaceae*	Medicine	Leaves, Fruits

Key: P=Pero; H= Hausa and Eng= English

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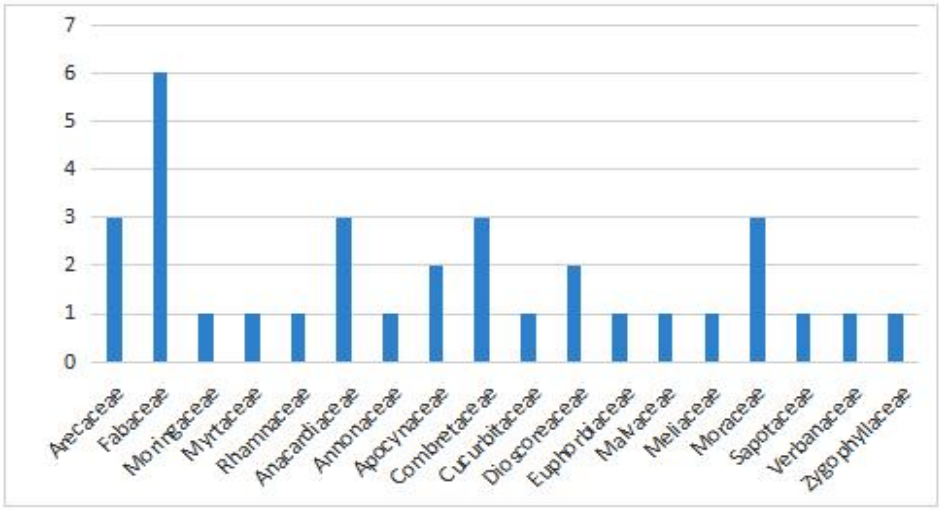

Figure 2: Families of Identified Plant Parts

Growth Forms of the Identified Plants and Parts Used:

Trees were the most common plant life forms used followed by shrubs then herbs and runners. Harvesting of trees that are deciduous is an indication that the communities depend significantly on the landscape for their livelihood and if the harvesting method is not sustainable, that could be a big threat to its conservation (Tugume*et al.,* 2016). These trees are drought resistant, maintaining them in good numbers can mitigate climate impact.

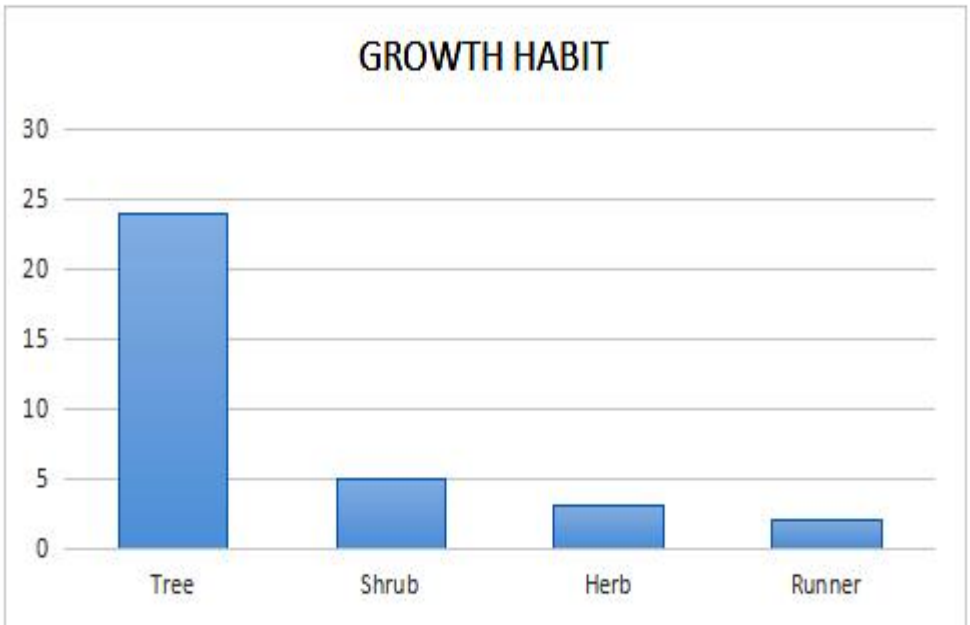

Figure 3: Growth Forms

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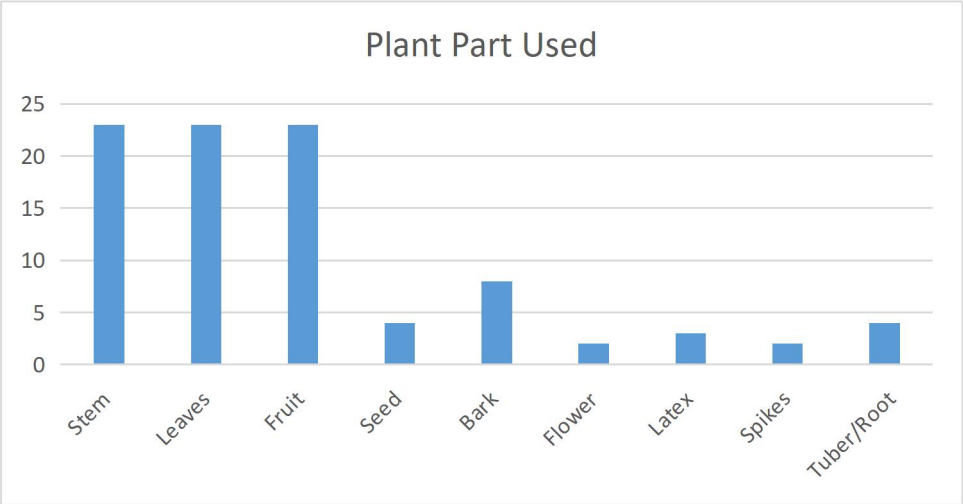

Figure 4: Plant Parts Used

Purpose of Utilization:

Different plant parts were used for different purposes. The significant reason for collection of plant species was for medicine, followed by food. This shows the level of their dependence on the landscape for nutrition and medicine. Other uses which are also significant include animal fodder, timber for construction, firewood, hand crafting of tools, spices, cosmetics and lots more.

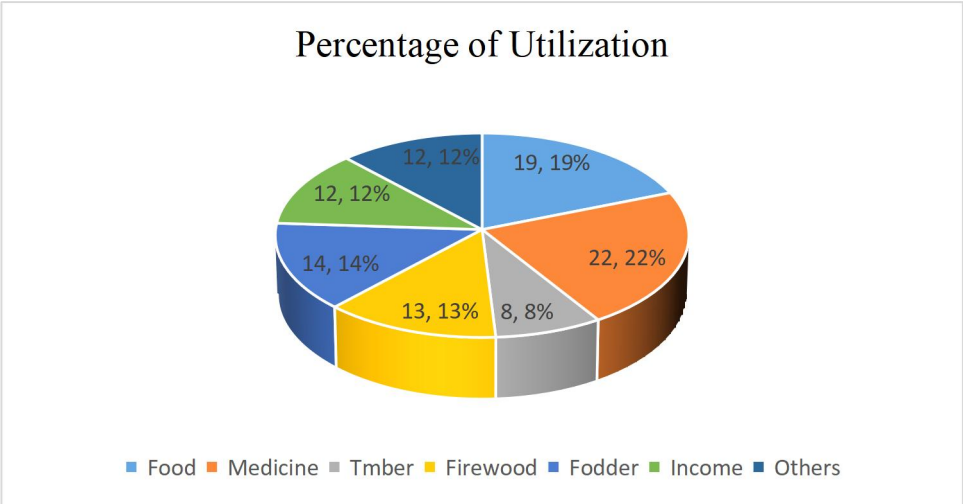

Figure 5: Purpose of Utilization

Sources of Plant Resources

Eighty percent (80%) of the respondents, source plant resources from Uru hills, sixteen percent (16%) from communal farms and the remaining four percent (4%) from home gardens. The preference for Uru hills is majorly due to unrestricted access to the plants, particularly those used for firewood. Ninety nine (99%) of the population use firewood as alternative biogas energy source for cooking. However, there is recorded increase in distance to collection sites, reduction in availability of certain species and disappearance of primate species that depend on those species as compared to the past.

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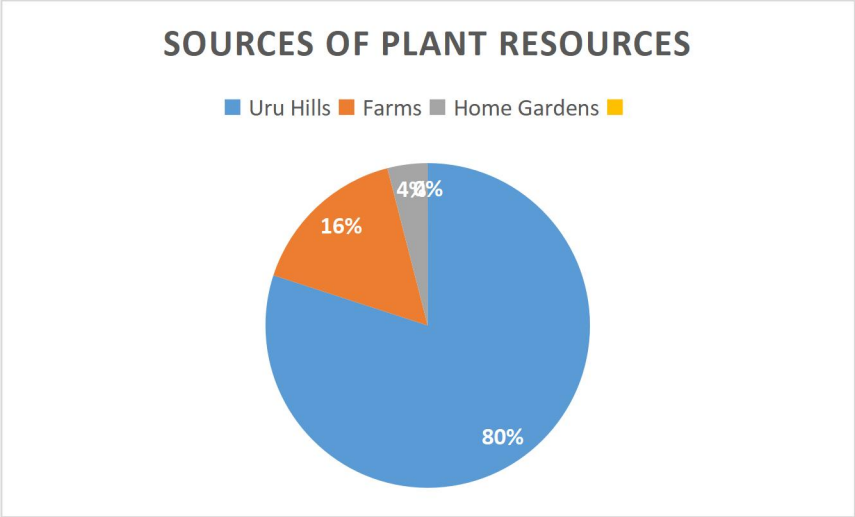

Figure 6: Sources of Plant Resources

Harvesting Frequency

Findings from this study shows that no set out standard protocol for the collection of wild plants. Collections for all plant parts were made throughout the year except for fruits and seeds where seasonality played a role. Fifty two percent (52%) of the participants harvest plant resources on a daily basis, Forty three (43%) weekly and five (5%) occasionally. This might be due to travelling distance and level of dependency on the plant resources for the provision of family needs on a daily basis.

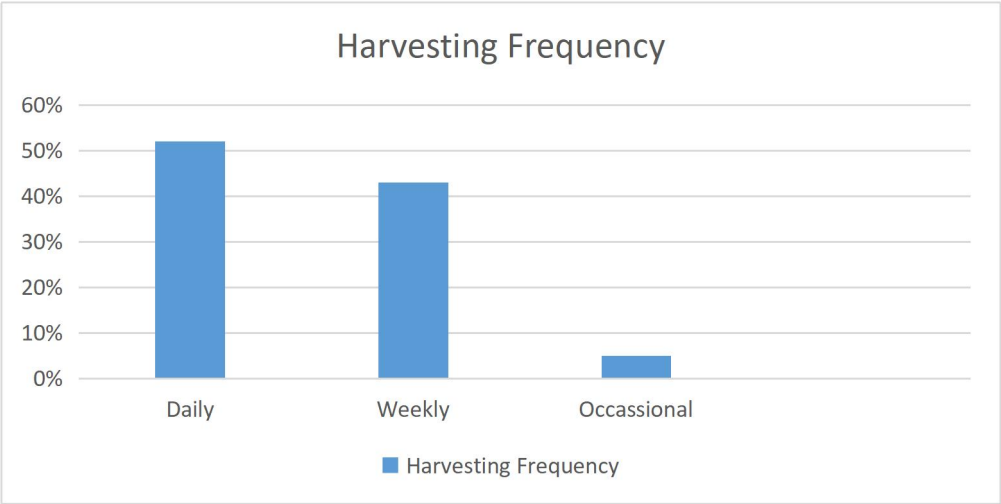

Figure 7: Harvesting Frequency

DISCUSSION

In this study, the result showed the number of species documented indicates that the study area has a diverse flora and the local community have a rich traditional knowledge of these important plants. This makes Gwandum landscape an important source of livelihood for the rural communities. The wide spread use of the species from families, *Fabaceae*, *Arecaceae, Anacardiaceae, Combretaceae,* and *Moraceae,* could be due to their multi ethnobotanical functions. Leaves, stems and fruits are the most used plant parts,

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followed by bark, tuber/root, seed, latex, flower and spikes. The preference of leaves, stems and fruits could be due to the presence of active ingredients in them (Asiinwe *et al.,* 2014), their ability to serve as food, medicine and as well as traded for cash to supplement sources of family income. However, the collection method especially for the stem has impact on the harvested plant. Collection of the bark and root is damaging and makes species vulnerable to overexploitation. Harvesting the bark in large quantities can destroy the plant because the protective role of the bark to the plant will be curtailed. On the other hand uprooting plants especially in case of herbs and shrubs causes total destruction of the plant. Debarking and uprooting of medicinal plant species negatively affects the sustainability of the species in use.

The use of leaves is less destructive if small quantities are collected but not so if large quantities are harvested. Due to the economic potentials of some species leaves, like *Adansonia digitata, Balanites aegyptiaca* over harvesting of its leaves can lead to deterioration of plant species since removal of leaves limits the transformation of vegetative to reproductive development such as flower production and seed/fruit development which in turn limits the natural regeneration of plants. Native plant species were more in the wild (Site B) than within settlements (Site A) where more exotic plant species abundant. There is a general trend that plant species richness is higher along transects in Site A than Site B This may due to the pre-existing biodiversity hotspots in Site B more human settlement in Site A led to clearing of natural sites and introduction of exotic plant species.

This also indicates how vulnerable the vegetation is. If the communities are not enlightened overtime, these vital plant species will be lost.

CONCLUSION

This documentation contributes to safeguarding the indigenous knowledge of plant species used in the study area, which might be useful for the future conservation of such plants in the area. The study shows that Gwandum harbors a wide diversity of plant species used for various purposes by the local communities. Such plants are very useful especially to people who cannot afford their daily needs especially for food and medicine. Knowledge and use of plant species among the local people is still part of their life and culture, this calls for preservation of the integrity of the plant resources and indigenous knowledge of their uses. The methods of collection may endanger the species unless mechanisms for sustainable utilization are put in place. The documented plants have potential of being used in drug development, nutritional security and beauty industries. These findings could provide insights for restoration planning and plant biodiversity conservation in this rural area. However, the underlying mechanisms that relates human settlement and plant diversity need further study.

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