PROTECT REPORT

VEGETATION SURVEY IN DIFFERENT HABITATS TO DETERMINE A SUITABLE LOCATION FOR A BIODIVERSITY TRAIL IN THE HUIBES CONSERVANCY, HARDAP REGION, NAMIBIA.

COURSE: BACHELOR OF NATURAL RESOURCES AND MANAGEMENT (POLYTECHNIC OF NAMIBIA)

STUDENT: NAEMI.N. ANTONIUS (212079948)

TUTOR: LOUISE THERON

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Abstract

Primary producers are the most essential component in all ecosystems. We therefore need to understand the importance of plants and take into consideration the role they play in our everyday life. We can achieve this by taking care of them and improving our indigenous knowledge about the plants species within our areas. As a result, we will all know which plant species are used for which purpose and with such information we can integrate them into education and bring benefits to the entire society. NaDEET is an environmental organisation whose mission is 'to protect the natural environment of Namibia by educating its citizens to practice a sustainable lifestyle'. A biodiversity trail was proposed in one of the communities that NaDEET is currently working with, Uibes (in the Huiseb Conservancy). The community want to use trail to share knowledge about the surrounding fauna and flora with visitors, which in return will provide an income to contribute towards the development of the community and in the long-run improve their living conditions. To help towards achieving this, surveying plants to determine a suitable location for a biodiversity trail was conducted.

Key: Species richness, plant diversity, medicinal value and veld food, interview, plant identification.

Introduction

Huibes is a registered conservancy since 2009. http://www.nacso.org.na/SOC_profiles/conservancyprofile.php?ConsNum=59). Due to its location, the community is under developed and there are no external enterprises that they are venturing in to make an income to benefit themselves. The community requested NaDEET to help them come up with a biodiversity trail to share their indigenous knowledge about the surrounding fauna and flora with visitors. The community will then in return make an income from visitors to contribute towards the development of Huibes Conservancy and in the long-run improve their living conditions. Previous studies have indicated that more information about plants can be obtained by using indigenous people's knowledge (Nakashima, Prott & Bridgewater, 2000).They further stated that indigenous people have a broad knowledge about plants, and their knowledge can be integrated into education and bring in the benefit of helping to sustain indigenous knowledge and societies to live sustainably. It also encourages teachers and students to gain enhanced respect for local culture, its wisdom and ethics, and provides ways of teaching and learning locally relevant knowledge and skills (Nakashima, Prott & Bridgewater, 2000).The conservation of indigenous vegetation biodiversity consists of many challenges (Oba,2012).The challenges in finding the environmental sound and cultural acceptable natural resources management practices lead researchers to considering community-based-knowledge (Stenseth, 2012). Indigenous vegetation resources provide a range of ecosystem benefits such as food for livestock (Angassa, 2012 & Oba, 2012).

Study Area

Huibes is registered as a communal conservancy since October 2009 and is located 80 kilometres west of Mariental on the D804 off of the C19.The Conservancy has an approximately population of 750 and a variety of wild animals such as *Tragelaphus strepsiceropard, Struthio camelus, Oryx gazella, Raphicerus campestris* and *Canis mesomelasts*. Plant species such *Acacia melifera, Acacia senegal, Albizia anthelmintica, Ziziphus mucronata, Boscia albitrunca, Boscia foetida, Combretum apiculatum, Parkinsonia africana,Rhizogum, trichotomum, Lycium villosum, Dichrostachys cineria and Catophractes alexandri* dominates the area. The conservancy covers about 1327 km² of land in an arid area of dwarf savannah. Large-trees occur along river valleys with an average annual rainfall of 150-200 mm. It is the sixth area to be declared a conservancy in the southern regions of

Hardap and //Kharas. It was allocated a quota for wildlife utilisation in 2011 for own use by conservancy members. The conservancy is aimed at helping the community and its members to create employment, alleviate poverty and conserve wildlife. (http://www.nacso.org.na/SOC_profiles/conservancyprofile.php?ConsNum=59).

Aims and Objectives

The aims of the this project were to survey flora in two different habitats to determine a suitable location for a biodiversity trail and to develop a plant trail guide to contribute to educational materials in the Huibes Conservancy and for NaDEET's *Bush Telegraph* magazine.

The objectives to achieve the aims were:

- Surveying two different habitats to identify the plants in each habitat.
- Determining the total species richness, abundance and species diversity of each area.
- Identify the medicinal and nutritional value of different plant species (local knowledge).
- Compile a plant trail guide for use by the community (tourism value).
- Collect and press plant specimens for community to help with description of values

Research questions

- Which species occurs in the area?
- Which species dominates the area?
- Which species is commonly used for traditional and medicinal purposes?
- Which habitat is more diverse?

Methods

1.1 Surveying different habitats to identify plants in the area.

Habitats dominated by vegetation were randomly selected in the area. Random sampling is a technique used to randomly select a sample for study from a larger group (population) and each individual is chosen entirely by chance and each member of the population has an equal

chance of being included in the sample. Every possible sample of given size has the same chance of selection (Sirmaci & Tas, 2013). Habitat one (river side) was along a river bed with a size of 30m (width) x 100m (length). Since the size of the river was too narrow to be sampled, the vegetation along the river edges were also included as part of this habitat. Two straight line transects were laid down 10m apart. Every plant that was found in every 10 meters interval of each transects was identified and recorded. Habitat two (rocky) was one kilometre away from habitat one due to the difference in the vegetation type, topography and the soil type. This habitat had a size of 100mx100m. Ten straight lines transects that were 10m apart and 100m long were laid down and every plant that was found in every 10m interval of each transect was identified and recorded. Thus ten plants per transect were identified. Plants were identified using the Trees and Shrubs of Namibia (Mannheimer & Curtis, 2007).

1.2 **To get the total number of the species richness, abundance and diversity**.

The total number of all identified plants were added together to get the species richness. Species abundance was calculated by getting the total species richness per species. The species diversity was done using Simpson's diversity index 1-D formula. The value of this index ranges between 0 and 1, the greater the value, the greater the sample diversity.

$$D = \frac{\Sigma\, n(n-1)}{N(N-1)}$$

n = the total number of organisms of a particular species
N = the total number of organisms of all species

(http://www.countrysideinfo.co.uk/simpsons.htm).

1.3. Medicinal and economic value

Two methods of interviews were carried out to find out about the indigenous knowledge of the plants surveyed. A (open-ended) questionnaire was set up which consisted of information asking about what the community people know about the common plants regarding their ecological and economic uses such as veld food and medicinal values. This questionnaire was carried out in the three European Union funded participating communities (Rietoog, Uibes and Gochas). The main purpose of using an open ended questionnaire was that it allowed the respondents to express their knowledge without any limitation. A face to face interview was also used specifically with older people who could not write and see well but had a broader knowledge on plants. Ten people per community were selected to carry out the survey. They were selected due to how long they have been lived in the area.

1.3 **Compiling a plant trail guide**.

All plants that were identified as well as the information from the questionnaires, and photos were compiled on the Microsoft Publisher. All the plant descriptions used were from the face to face interview and *Trees and Shrubs of Namibia*.

Lists of Materials used:

- Measuring tape was used for measuring transects size.
- The Chevron tape was used for marking the area.
- Geographic Position System (GPS) was used for accurate distance between the two habitats and for transects.
- Identification guides was used for identifying plants.
- Camera was used for taking pictures of the plants and the area.
- Plant press was used for drying and preserving of the plants specimens.

Results

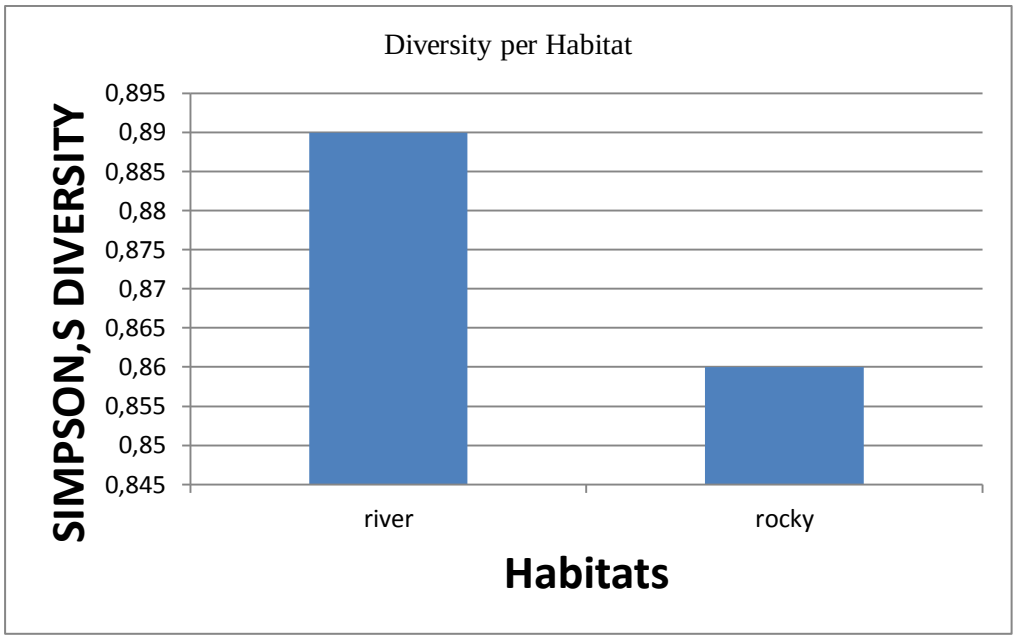

Figure.1.

The table and the figure above show how diverse each habitat was. The Simpsons index diversity ranges from 0-1.The greater the value, the greater the diversity. In this case habitat one (with a diversity value of 0.89) shows more diversity than the rocky area (with a diversity value of 0.86).

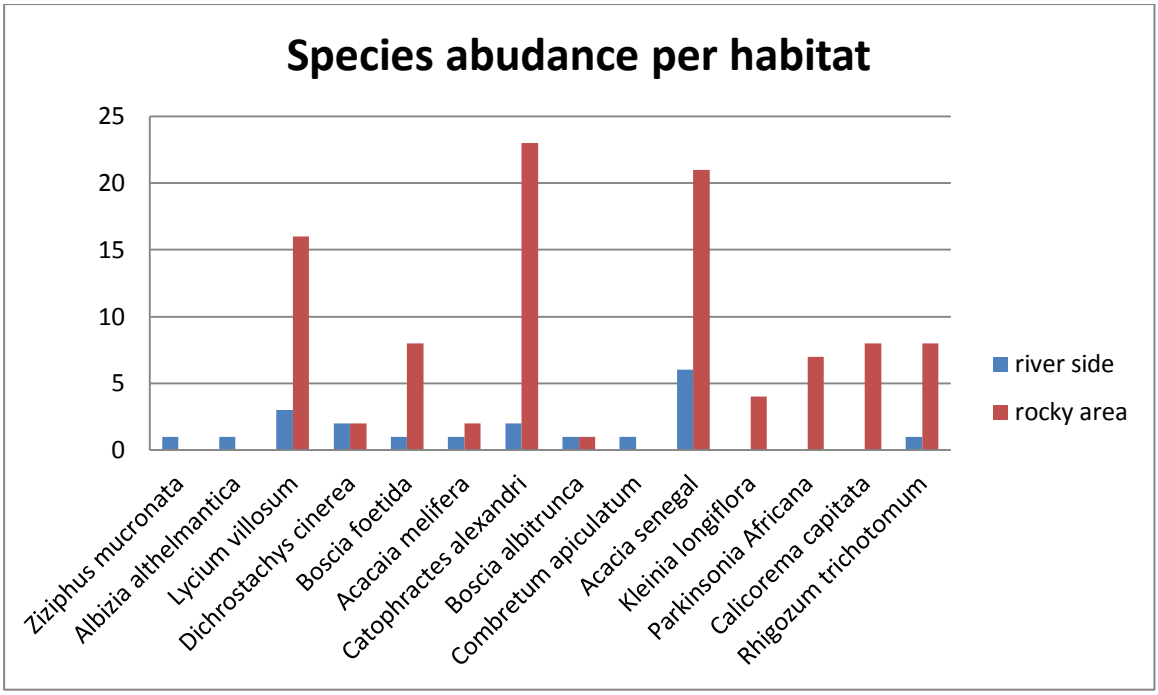

Figure.2. this table shows the total number per species. Species abundance was found higher in the rocky area in especially plants like *Catophractes alexandri*, *Acacia Senegal* and *Lycium villosum.*

Uses of different plant species
(Medicinal and nutritional value)

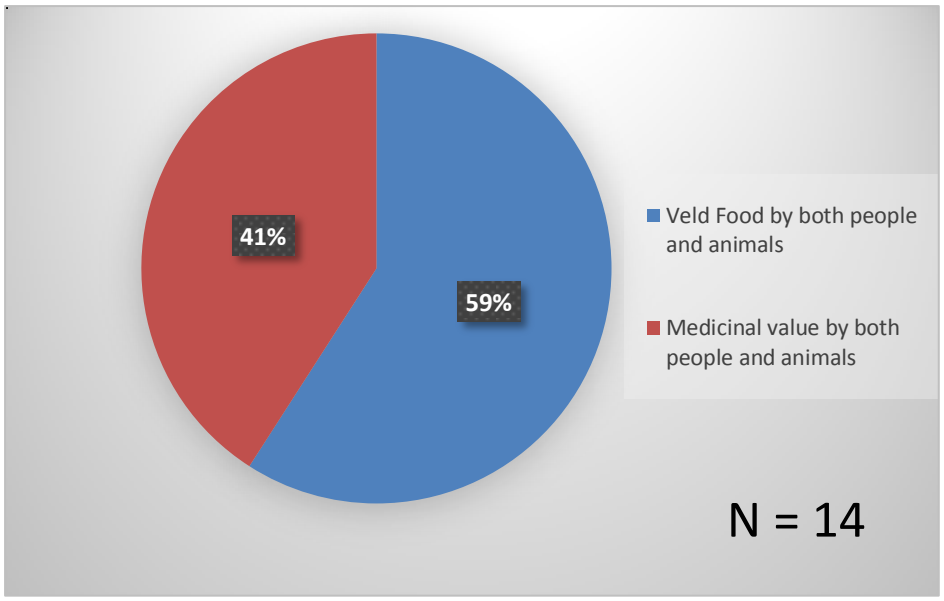

Figure.3. this table shows the total percentage of plants that were found to have both veld/nutritional and medicinal value.

The plant trial guide

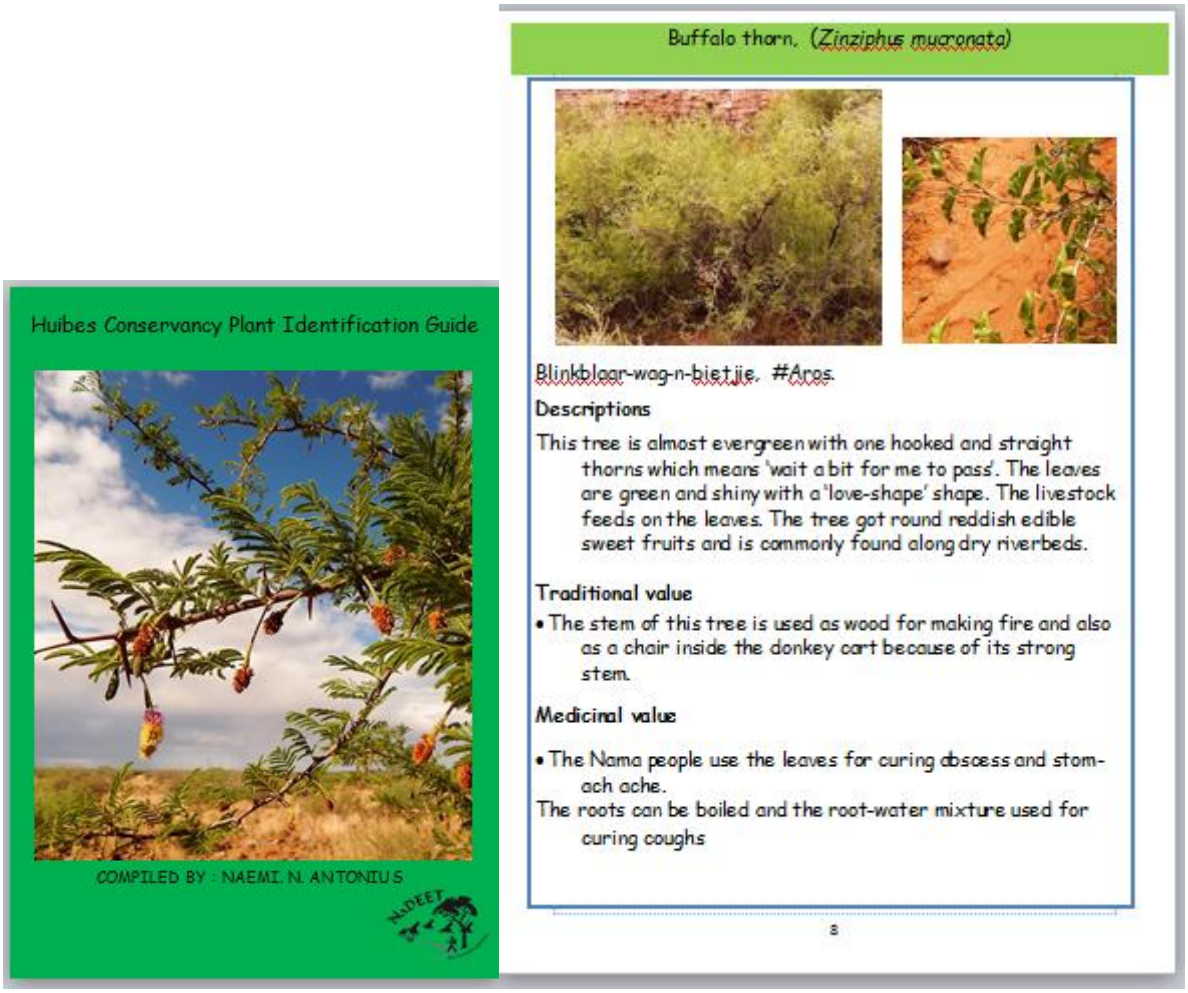

Figure.4. shows the cove page as well as the inside of the plant guide and all the other plant species were described in the same format.

Discussions

During this project fourteen different plant species were found in the two areas. Species richness for both habitats was 120 plants. Habitat one (river side) had more diversity with a value of 0.89.This habitat was more diverse because it is along the river and there is fountain which has permanently standing water that plants use to make use grow easily in the area. In habitat two (rocky area) the diversity was less because it was away from the river side and only plants like *Acacia senegal* and *Catophractes alexandri* that prefer rocky areas are dominating this habitat. Out of the 14 total plant species, 41% plants species found to have different medicinal value for treating 8 types of different diseases such as chest pain,

cancer??, toothache, chicken pox, and abscesses, stomach ache, cough, flu and 59% was found to have nutritional value to both human and animals. Apart from being having medicinal values, they all have different traditional uses. According to Cheikhyoussef (2011) an Ethnobotanical study of indigenous knowledge on medicinal plant use was undertaken in the Oshikoto Region 2008 and 61 medicinal plants that are used to treat 43 types of ailments and several common diseases such as leg pains, back pains, chicken pox, ear infection, gonorrhoea, syphilis, stroke, diarrhoea in both human and animal were reported .

Conclusion

During this study the total species richness in the two habitats was 120. Species diversity was more in habitat one (river side) than habitat two (Rocky area). However, species abundance was higher in habitat two. Some of the plants were found to have medicinal and nutritional value for both human and animals. A draft booklet which consists of plant descriptions will be finalized to be used by the Huibes Conservancy for tourism purposes.

Recommendations

- The conservancy residents should improve the road to the! Nadap area (beginning of trail) so that tourists can drive to the area rather than having to walk a long distance, even before starting the actual trail.
- Guides should be well informed/trained to give tourist correct information to add value to their visit.
- Samples trees from each species should be clearly marked and identified along the trail for easier identification for the tourists. These marks will also be included in the plant guide.
- Trail should be well maintained so that it remains forever and to be useful for the future generations.

Acknowledgement

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http://www.countrysideinfo.co.uk/simpsons.htm

Appendix 1

Table 1**.(shows the calculation of diversity of habitat 1)**

Species	Number (n)	n(n-1)
Ziziphus mucronata	1	0
Albizia anthelmintica	1	0
Lycium villosum	3	6
Dichrostachys cinerea	2	2
Boscia foetida	1	0
Acacaia melifera	1	0
Catophractes alexandri	2	2
Boscia albitrunca	1	0
Combretum apiculatum	1	0
Acacia Senegal	6	30
Total(N)	**20**	**40**

Simpson's diversity index 1-D

$$D = \frac{\Sigma\, n(n-1)}{N(N-1)}$$

n = the total number of organisms of a particular species

N = the total number of organisms of all species.

$$D = \frac{\Sigma\, n(n-1)}{N(N-1)}$$

$$D = \frac{40}{20(20-1)}$$

$$D = \frac{40}{380}$$

D= 0.11 (Simpson's diversity)

D= 1-0.11

=0.89 Simpson's index of diversity

Table.2. (**Shows the calculation of diversity of habitat 2)**

Species	Number (n)	n(n-1)
Dichrostachys cineria	16	240
Boscia foetida	2	2
Acacaia melifera	8	56
Catophractes alexandri	2	2
Boscia albitrunca	23	506
Acacia Senegal	1	0
Kleina longiflora	21	420
Parkinsonia Africana	4	12
Lycium villosum	7	42
Calicorema capitata	8	56
Rhigozun trichotomum	8	56
Total (N)	**100**	**1392**

$D=\frac{\Sigma\, n(n-1)}{N(N-1)}$

$D=\frac{1392}{100(100-9)}$

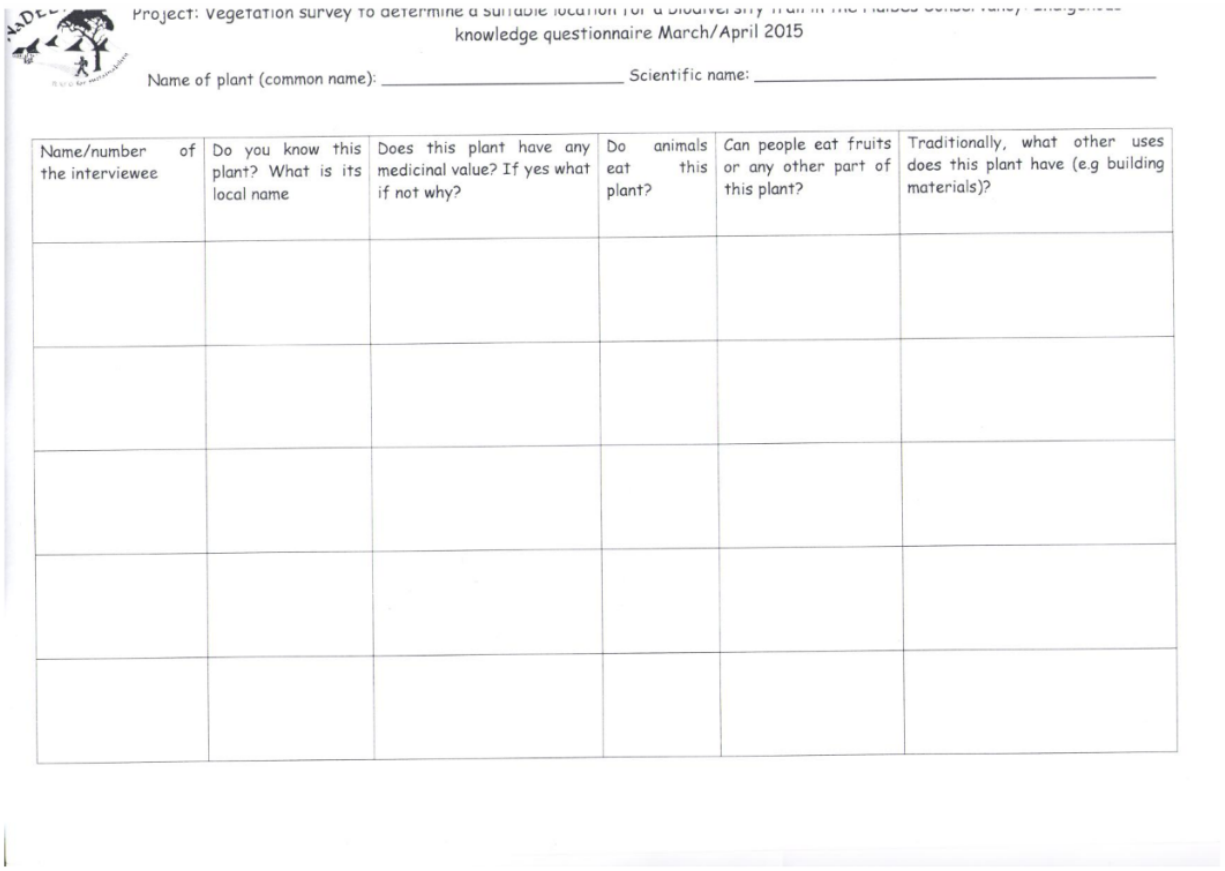
$D=\frac{1392}{9900}$

= 0.14

D= 1-0.14

=0.86 Simpson's index of diversity

Questionnaire used to interview people for the project



Project: Vegetation survey to determine a suitable location for a Biodiversity Trail in the Nabdam District: Indigenous knowledge questionnaire March/April 2015

Name of plant (common name): _____ Scientific name: _____

Name/number of the interviewee	Do you know this plant? What is its local name	Does this plant have any medicinal value? If yes what if not why?	Do animals eat this plant?	Can people eat fruits or any other part of this plant?	Traditionally, what other uses does this plant have (e.g building materials)?