Khulna University
Life Science School
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Author(s): Himaddri Shekher Mondal

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Supervisor(s): Arifa Sharmin, Professor, Forestry and Wood Technology Discipline, Khulna University

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FLORISTIC FEATURES AND ETHNO BOTANIC USE OF PLANTS AVAILABLE IN HOME GARDENS IN SHYAMNAGAR UPAZILLA OF SATKHIRA DISTRICT

HIMADDRI SHEKHER MONDAL
Student ID : MS-140507

FORESTRY AND WOOD TECHNOLOGY DISCIPLINE
SCHOOL OF LIFE SCIENCE
KHULNA UNIVERSITY
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Course Title: Project Thesis

Course No: FWT-5112

This work has been prepared and submitted to Forestry and Wood Technology Discipline, Khulna University, Khulna, Bangladesh in partial fulfillment of the requirements for the M.Sc. Degree in Forestry.

Supervisor

06.03.17

Arifa Sharmin
Professor
Forestry and Wood Technology Discipline
Khulna University
Khulna-9208
Bangladesh.

Submitted By

Himaddri Shekher Mondal
Student ID-MS-140507
Forestry and Wood Technology Discipline
Khulna University
Khulna-9208
Bangladesh.

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Dedicated

To

My Beloved Parents

ACKNOWLEDGEMENT

First of all, I undoubtedly thank to almighty God, whose mercy keeps me alive and enables to pursue my education and to complete my project thesis for the M.Sc. Degree in Forestry. I would also like to express my gratitude to all of my family members specially my parents. Without their continuous inspiration, this achievement might have been impossible.

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Abstract

Homestead garden is a traditional agro forestry practice and important component for daily curative uses in the livelihoods of rural poor of the country. This knowledge is transferred from generation to generation. Documentation of such knowledge is important and now being used in different fields of science. An ethnobotanical investigation was conducted in Shyamnagar upazilla of Satkhira district which is close to the Sundarbans mangrove forest. The study focused on plant species commonly used by local people found in and around their homegardens, and use ethnobotanic indices to determine Informant Consensus factor, Fidelity levels and Uses totaled. A total of 166 species were found belonging to 64 families and includes variety of life forms. Fabaceae contributes the highest number of species in the study area. People uses plants for their food, medicine, construction, fodder fuel and cultural purposes In this study highest Informant Consensus Factor was found for fuel and cultural use (ICF=0.96) which was followed by construction, food-medicine, fodder and food . Fidelity level was calculated for major uses. Out of 166 species 119 species were found to have single use (FL=100) and 47 species were found to have less than 100 FL. These 47 species were found to have multiple uses. The result obtained from this study about the collection behavior, ethno botany indices should be used together to produce a model for Sustainable management of plant species that might be helpful for the biodiversity conservation of the area.

DECLARATION

I declare that the work in the thesis entitled 'FLORISTIC FEATURES AND ETHNO BOTANIC USE OF PLANTS AVAILABLE IN HOME GARDENS IN SHYAMNAGAR UPAZILLA OF SATKHIRA DISTRICT' has been performed by me under direct supervision of Professor **Arifa Sharmin,** in the discipline of Forestry and Wood Technology Discipline, Khulna University, Khulna. The present work is original and has not been submitted anywhere for any other degree in any other university.

I hereby, give consent for my thesis, if accepted, to be available for any kind of photocopying and for inter library loans.

HimaddriShekherMondal
Student ID-MS-140507
Forestry and Wood Technology Discipline
Khulna University
Khulna-9208

APPROVAL

This thesis is submitted to the Forestry and Wood Technology Discipline, Khulna University, Khulna, Bangladesh in partial fulfillment of the requirements for the M.Sc. Degree in Forestry. I have approved the style and format of the thesis.

(ArifaSharmin)
Professor
Forestry and Wood Technology Discipline
Khulna University, Khulna-9208,
Bangladesh.

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CHAPTER ONE

INTRODUCTION

1.1 Background and Objective

Homestead garden is a traditional agro forestry system and an important component in the livelihoods of rural poor, and in the rural economy of the country. Composition of home gardens is dependent on demand of different commodities of the owner (Hussain *et al.*, 2006). For the last 40–50 years, the relative importance of homestead forestry has been recognized (Uddin *et al.*, 2002). Homegardens not only provides food, fodder, medicines, but also provides other intangible services. It plays crucial role in conserving local biodiversity and diversification of food (Galluzi *et al.*, 2010). Owners and managers of homegardens have extensive knowledge of plants, their uses, and ecosystem processes. This knowledge is not only cultural heritage but might be highly valuable for many purposes, for instance, to secure the sustainability of home gardens or to conserve endangered elements of agro biodiversity in homegardens (Vogl *et al.*, 2004). Ethnobotanic documentation of traditional knowledge provides important insights about the plant resource and its use (Pieroni 2000; Dutta and Dutta 2005; Pradhan and Badola 2008).

The area of home garden in Bangladesh is 0.27 million hectares, (2% of the country's total land area and 10% of the total primary forest area, FAO 2000). Although relatively small in area, homestead forests supply 70% of timber and 90% of fuel wood and bamboo (Singh 2000). Homestead forests are a major source of forest products that play an important role in the economic life of the country by supplying the bulk of wood and other forest products in the market (Motiur *et al.*, 2006). Homegardens are maintained by at least 20 million across Bangladesh (Salam *et al.* 2000) and therefore represent one possible strategy for biodiversity conservation (Kabir and Webb, 2008). Diversity of home gardens depends on number of factors. Among these factors, social response (e.g. tradition, culture, ethnicity, experience) has been considered as an important one to influence diversity of home gardens (Kabir and Webb, 2009). Thus ethnobotanic information of a home garden can become a practical tool for +conservation of species and culture of a particular region (Albuquerque *et al.*, 2009).

Shyamnagar upazilla of Satkhira, Satkhira districts is close to the Sundarbans mangrove forest and belongs to high saline zones. Livelihood of the people of this region is mostly dependent on

fishing in the mangrove forest and aquaculture. Agriculture is modified by saline environment and high soil salinity. Thus, home gardens play crucial in the subsistence living of the people. Intensive utilization of the available plant species and diversification of its use is expected in such environmental set up. Thus, traditional knowledge of use and management needs to be documented to develop sustainable strategies to manage and conserve species in this area.

1.2 Objectives

The main objective of this research are-

- ✓ To list the plant species used by local people
- ✓ To find out the ethnobotanic indices using Informant Consensus factor, Fidelity levels and Uses totaled.

CHAPTER TWO

REVIEW OF LITERATURE

2.1 Ethnobotany

The term Ethnobotany was first coined by American botanist John W. Harshberger in 1895 in order to the study of systematic relationship between people and plants that used by primitive and native people ((Davis, 1995; Shengii, 1998) and was considered as the art of collection of useful plants by a group of people and the description of the uses of plants (Ford, 1978). Later Robbins *et al.*, (1916) described Ethnobotany as the study and development of the knowledge of all phases of plant life amongst primitive societies and effect of the vegetal environment upon the life (Rao and Henrey, 1996).

Ethnobotany mainly focus on how plants are used (as food, medicine, fuel wood, fodder, cosmetics, dyeing, construction, currency, clothing, rituals and social life), managed and perceived in human societies (Rahman, 2009). Ethnobotanic information of a home garden can become a practical tool for conservation of species and culture of a particular region (Albuquerque *et. al.*, 2009) and regarded as is the part of Ethnoecology which concern about plants (Albuquerque *et al.*, 2009; Martin, 1995).With growing interests of scientific communities, the Ethnobotany has become a wider discipline, which is interested in all studies about the relationship between people and plants.

2.2 Historical Development of Ethnobotany

From the pre- historic epoch, people have been using various plant resources not only food and medicine (Iqbal, 1993) but also for particular needs of their ethnic communities. The study of plants has been considered as a part of human civilization in the service of mankind since ages (Given and Harris, 1994). Information of traditional and practical uses of plants with the help of indigenous knowledge has been passed from generation to generation and either reported or unreported by the botanists of the world (Schultes and von Reis, 1995).

In AD 77, the Greek surgeon Dioscorides was published a catalog (*De Materia Medica*) of about 600 plants and also included information on how people used the plants, especially for medicinal purposes in the Mediterranean region and mainly stressed the economic potential of plants (Garcia and stein, 1966).

In 1492, several plants were classified on the basis of observation of native people and economic value (Cotton, 1996). In 1542, a renaissance artist Leonhart fuchs led the way back into the field and published a list (*De Historia Stirpium)* of about 400 plants native to Germany and Austria then In 1753 Carl Linnaeus wrote a book (*Species Plantarum)* which included information about 5,900 plants.

The 19th century saw the peak of botanical exploration. Alexander von Humboldt collected data from the new world and Charles Darwin started the collection of exotic plants from several museum and garden of London at 1831 (Cotton, 1997).

US botanist Dr. John Hershberger first published the term Ethnobtany and suggested it to be a field that explains cultural position of the tribes who are interested in the plants for food, medicine, shelter and clothing (Hershberger, 1896).

During the 19th century, knowledge of ethnobotany expanded rapidly and demanding the need to interpret ethnobotanical data within its cultural context that play important role of linguistics in ethnobotanical study (Gilmore, 1932).

In early period, Botanists and the anthropologists did not come together on their work because botanists mainly focused on identifying species and how the plants were used instead of including how plants fit into people's lives. On the other hand, anthropologists were interested in the cultural role of plants and not the scientific aspects as a result ethno botanical information generated by both botanists and anthropologists were not complementary to each other (Mewari, 2009). In the early 20th century, botanists and anthropologists finally collaborated and the collection of reliable, detailed data began. By the turn of the 20th century ethno biological practices, research and findings have had a significant impact and influence on ecology, conservation biology, development studies and political biology (Cotton, 1996).

In the later part of the 20th century, when the worlds aboriginal peoples were about to disappear, traditional societies and their knowledge attracted widespread scholarly attention, primarily as part of an anthropological rescue operation (Burch and Ellanna, 1994). Many scientists have

begun to realize the practical and academic value of ethnobotanical knowledge and data and acknowledged its contribution in mainstream science.

2.3 Present Concepts of Ethnobotany

Today,ethnobotany is widely accepted as a science of human interactions with plants and its ecosystem (Shengii,1998) in a multidisciplinary manner incorporating not only collection and documentation of indigenous uses but also ecology, forestry, agricultural, economy, medicinal science and other disciplines (Gomez-Beloz,2002).Ethnobotanists can play very useful roles in rescuing disappearing knowledge and returning it to local communities and reinforcing links between communities and environment (Alam, 1998). The potential role of ethnobotany has been become gradually more valuable in the progress of health care and conservation programs in different parts of the world (Balick, 1996).

Recent development of ethnobotany in Asian countries has been strongly oriented to traditional herbal medicine, indigenously managed plant resources, traditional agro ecosystems, cultural interpretation of plants and ethnobotany for rural development and biodiversity conservation with a strong applied approach in the field (Maheshwari, 1996). Ethnobotany by nature is a multidisciplinary science of botany and fundamental structure of ethnobotanical research that examine the dynamic relationship between human populations, cultural values and plants (Shengii, 1998). Ethnobotanical studies help to investigate and preserve knowledge of different indigenous communities (Chaudhary, 1994).

2.4 Indigenous knowledge

The term indigenous knowledge or local knowledge is used to refer to that knowledge which is generated and transmitted by communities (Alam, 1998; Rahman, 2013). It is experience of human life in a distinct natural and cultural amalgamation within a unique local and timely setting (Mewari, 2009) that given to a community and society and is adapted to the local culture and environment on the basis of peoples decision making (Mathies, 1994). Ethnobotany is an interdisciplinary science for documentation of indigenous knowledge and interactions between people and plants (Rao and Henry, 1997).

Quddus *el al.*, (1998) synthesized indigenous knowledge (IK) as the common knowledge that originates from and is bound to local experiences, i.e. held by a few people who may have undergone some special training or apprenticeship in the field and they also agreed indigenous knowledge system is dynamic and changes over time. Indigenous knowledge includes not only information of local people but also the practices or technologies that are developed on the basis of their local and traditional knowledge and informal experiments (Nasser and Alam, 1998). Indigenous knowledge (IK) relates to any knowledge held collectively by a local population, including that pertaining to natural resources and is culturally relative , being informed by people's socio cultural tradition and history of which it is an integral aspect (Grimier,1998; Silitoer *el al.*, 1998).

However, there may be variation in defining indigenous knowledge but basis theme is almost same. Globally, several researchers the term indigenous knowledge have been used in several ways such as Indigenous technological knowledge (ITK) (Bose *el al.*, 1998), indigenous knowledge (IK) (Warren, 1991), indigenous knowledge system (IKS) (Rajasekaram *el al.*, 1993), traditional Knowledge (TK) (Bandyopandhy and Shah, 1998) and traditional ecological knowledge (TEK) (Berkes, 1999).

Local people have a wide knowledge of ecosystem they live in and ways to ensure that natural resources are used sustainable. Therefore, indigenous knowledge that has been accumulated over centuries has potential value for sustainable development and it can help other people learn how to live in harmony with nature and the environment in a sustainable fashion (Ulluwishewa, 1993).

Indigenous knowledge has long been undervalued. Fortunately, an increasing of research on indigenous knowledge system is now on (Fernandez, 1994). A study was conducted on the upland areas on the sustainable participatory watershed management based on the indigenous knowledge of local people by Sharma, *et al.*, 1998. He observed that several indigenous methods are prevailing in the upland areas for watershed management activity practiced by the local people.

By incorporating indigenous knowledge and use have to be analyzed to develop appropriate management measures (Ticktin and Johns, 2002) and new hypothesis for the sustainable conservation of the resource that build on both scientific and local knowledge (Henfrey, 2002). Indigenous knowledge on plant resource use is constantly diminishing due to changing perception of the local people which is embedded in intensifying influence of global commercialization and socio- economic transformation (Gadgil *et al.*, 1993; Kunwar and Adhikari, 2005).

Now a day, the rural people especially the literature generations have conscious about plantation forestry with its scientific management practices. Mass media helped to develop the since of rural people in planning trees (Hurunui, 1996). Land resources are limited in homestead and can insure the optimum use of land and maximum production from that resource. Thus indigenous knowledge of rural people about ethnobotanic information can play an important role for conservation of species and culture of a particular area (Albuquerque *et. al.*, 2009).

2.5 Homestead garden and Biodiversity

Homestead garden represent a land use system (Hussain *et al.*, 2006) that stands for a mixture of deliberately planted vegetation usually with complex multilayer systems of trees, shrubs, and animals around homestead (Kumar and Nair, 2004; Nair and Kumar, 2006, Michon and Mary, 1994; Del Angel-Pérez and Mendoza 2004; Galluzzi *et al.*, 2010).

Over the last two decades the relative importance has shifted from the traditional forestry to homestead forestry (Bishwajit *et al.*, 2013) as well as the importance of conserving genetic resources has received increasing attention (Galluzzi *et al.*, 2010). In such a situation, homestead garden play role to provide food, timber, firewood, spice, fodder, medicine, fencing, and miscellaneous uses (include brooms, handicrafts, shade, ornamental, ceremonial, environmental, and aesthetic) (Millat-E-Mustafa *et al.*,1996) and supporting ecosystem service (ES) (Galluzzi *et al.*, 2010;Mitchell and Hanstad, 2004) related to conservation of soil, water, nutrients and biodiversity (Masum *et al.*, 2008). Therefore homestead garden regarded as the ex-situ conservation sites for the wide range of plant diversity (Alam and Masum, 2005).

Biodiversity loses owing to the habitat degradation, fragmentation and exploitation around the world (Gardner *et al.*, 2009) as a result negative impact of these changes on phenology, interaction, species distribution, morphology and net primary productivity (Beaumont *et al,*. 2011) and impact has been extreme mainly in the species rich moist tropical forest vegetation of different developing countries like Bangladesh (Appanah and Ratnam, 1992). Homestead garden has been shown to conserve rich species diversity around the world (Mendez *et al.*, 2001; Hemp 2006; Borkhataria , 2012) and can be a potentially valuable conservation tool that useful for reducing land-use pressure and can help mitigate ecosystem degradation (Brandt et al. 2012) while enhancing rural livelihoods (Garrity 2004; Maroyi, 2009).

Homestead gardens has received in Bangladesh a well-established traditional agroforestry system and a stable ecosystem (Zaman *et al.*, 2010) where natural forest cover is less than 10 percent; homestead gardens, which are maintained by at least 20 million households, represent one possible policy for biodiversity conservation (Uddin *et al.*, 2001 and Zashimuddin, 2004). Homestead agroforestry system is very important in rural economy as well as national economy of Bangladesh by supplying the food, fodder, fuel wood, bulk of wood and other forest products in the market (Khalque, 1987). Homestead agroforestry is the most diversified ecosystem in Bangladesh and plays an important role for maintaining ecological balance as well as environment stabilization (Begum et *al.*, 2013) .So diversity in plant species is desirable for sound environment (Anand *et al.*, 2010).

CHAPTER THREE

METERIALS AND METHOD

3.1 Study area:

3.1.1 LocationandDemographic Structure of ShyamnagarUpazilla

The study was conducted in Shyamnagarupazilla of Satkhira, Satkhira districts is close to the Sundarbans mangrove forest.Shyamnagar is located at 19'50"N89°06'10"E/22.3306°N 89.1028°E. It has 46,592 households and a total area of 1968.24 km². As of the 2011, Bangladesh census,Shyamnagar has a population of 265004. Males constitute 50.46% of the population, and females 49.54%. This Upazila's eighteen up population is 132516. Shyamnagar has an average literacy rate of 28.2% (7+ years), and the national average of 32.4% literate. Shyamnagar has 12 Unions, 127 Mauzas and 216 villages. The unions named Vurulia (Bhurulia), Kashimari, ShyamnagarSadar, Ishwaripur, Burigowalini, Koikhali, Munsigong, Nurnagar, Podmopukur, Ramjannagor, Atulia and Gabura,Union.Three villages named Dhumghat,Ontakhali andShiltalawere selected purposively respectively Ishwaripur union. Ishwaripur is located 64 kilometres (40 mi) south of SatkhiraSadar and has an area of 1.5 square kilometres (0.58 sq mi) and is bounded by Kaliganj and Assasuniupazilas on the north, the Sundarbans on the south, Koyra and Assasuniupazilas on the east, West Bengal of India on the west. The village is situated on the bank of Ichamati River (now known as Kadamtali Canal).

According to the 2011 Bangladesh census, Ishwaripur had 781 households and a population of 3,323. The literacy rate (age 7 and over) was 49.2%, compared to the national average of 51.8%. The population is 94% Muslim and 6% Hindu.

3.1.2 Informant Information of study area:

Information was collected from 90 informants of three different villages of three wards underIshwaripur union.Among them, 74 were male and 16 were female. Informants were selected based on age category where the categories were 20- 35, 36- 50, 51- 65, 66- 80 and above 80. Among 90 informants, 11 were in first category, 24 were in second category, 26were

in third category, 24were in fourth category and 5 were in fifth category. Among the informants, 59% were from muslim community and 41% were from hindu community (Fig.2).

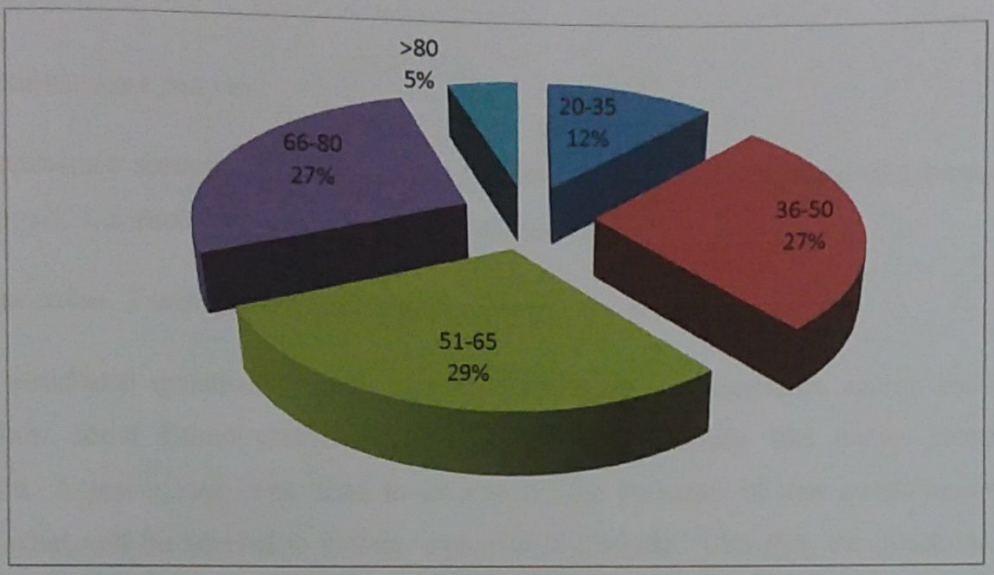

Fig. 1: Informants Based on Age Class

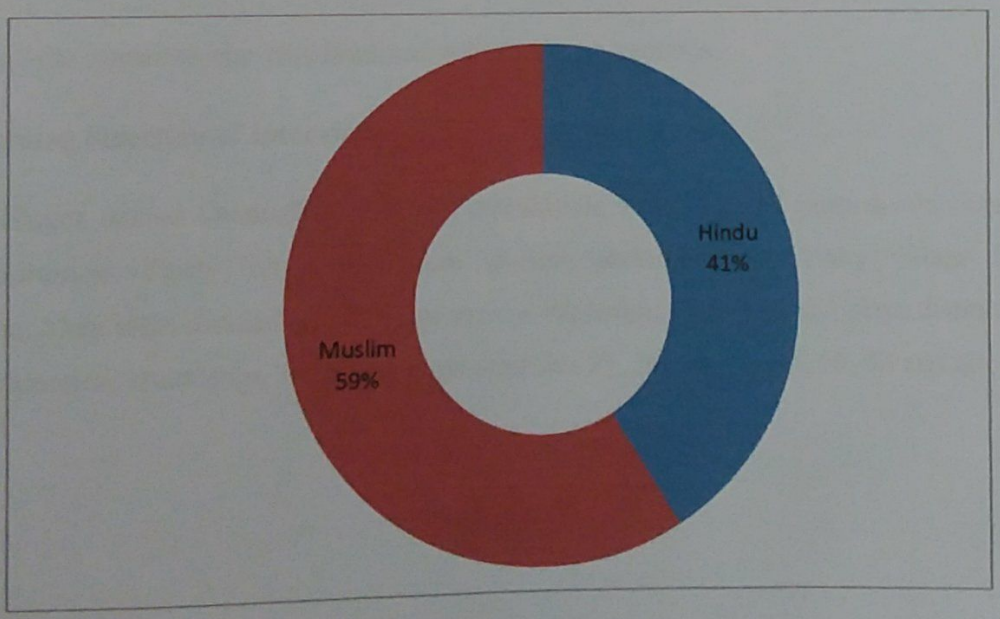

Fig. 2: Community based on Religion

3.1.4 Social Condition:

Social condition of Shyamnagarupazilla is good and peaceful. Social interaction of inhabitants is very good. Inhabitants of Shyamnagar are teacher, businessman, farmers, day labor, shopkeeper fisherman etc.

3.2 Reconnaissance Survey:

A reconnaissance survey was conducted in the study area prior to questionnaire preparation to obtain general information about the villages and the villagers.

3.3 Preparation, Testing and finalizing of Questionnaire:

A semi structured questionnaire was prepared based on reconnaissance survey and required information about Ethnobotany.It included the basic questions like name, property and profession. A test survey was done to understand the problems of that questionnaire and to identify what will be needed to include and what to exclude. After that, the questionnaire was finalized with all the corrections

A test survey was done to understand the problems of that questionnaire and to identify what would be needed to include and what to exclude.

After that, the questionnaire was finalized with all the corrections.

3.4 Sampling Selection of Interviewees:

Three villages named Dhumghat,Ontakhali andShiltala were selected purposively respectively Ishwaripurunion. Thirty households were chosen randomly from every village for data collection. They were divided into five age groups depending on age as age plays distinctive role in ethnobotanical knowledge The age groups were 20- 35, 36- 50, 51- 65, 66- 80 and above 80.

3.5 Data Collection:

Data were collected through face to face conversation with the interviewees with appropriate isolation from other interviewees. They were asked questions about the local name of plants, their collection timemonths, parts of plants used and uses of them (Nawash et al., 2014). The conversation was recorded with prior permission of the interviewee and kept for future references. Plants used were checked physically, photographed and voucher specimen was collected for further identification. Photographs and voucher specimens were brought in Khulna University, and identified at species level with the help of Experts and secondary sources, viz. with Encyclopedia of flora and fauna of Bangladesh and taxonomic documents published by National herbarium Bangladesh.

3.6 Data Categorization:

After collecting data, data was organized on the basis of use. Specific use categories are Food, Medicine, Food and Medicine, Construction, Fuel, Fodder, Ornamental and Cultural value category.

3.7. Ethno botanical Indices:

After categorization, these data were used to determine informant consensus factor (ICF), Fidelity level, use value; and use totaled where the equations of them are-.

First, in order to test the homogeneity of the information was collected and the degree of overall agreement between interviewees on specific use categories for plants in the study area, an informant consensus factor (ICF) was calculated according to Gazzaneo*et al.* (2005):

Informant consensus factor (ICF) $= n_{ur} - n_t / n_{ur} - 1$

Where, $n_{ur}$is the number of use citations in each category and $n_t$is the number of species used.

The second indicator was the Fidelity Level (FL %) for each use of each plant. This index was calculated to rank the record plant species based on their claim relative effectiveness following Friedman *et al* (1986) as follows:

Fidelity Level (FL) $= (I_p / I_u) \times 100$

Where,

I_p is the number of informants who was mentioned the use of a particular species for a particular purpose and Iuis the total number of informants who was mentioned the plant for any use. Species that was mentioned by only one informant was not included in the FL% calculations.

Use totaled = $\sum$ Uses $_{Species}$

Here, a simple sum of all known uses for each species.

The uses can be categorized by utility, plant taxon or vegetation type.

3.8 Data Processing and Analysis:

After collecting the data, they were reviewed and sorted. All the plants were identified and their scientific names were assembled. Then they were input and analyzed (Hoffman and Gallaher, 2007).

CHAPTER FOUR

RESULTS AND DISCUSSION

4 .1 Species of the study area

A total of 166 species were found belonging to 64 families. Informants are traditionally using those species for construction, food, fuel, medicine, ornamental and other purposes over the ages. About 16 families were found to have more than 4 species, 4 families had 3 species, 11 families had 2 species and the rest 32 families had single species. Of them, the highest number of species was found in the Fabaceae family (26), followed by Myrtaceae (8) (Fig. 3, Table 1).

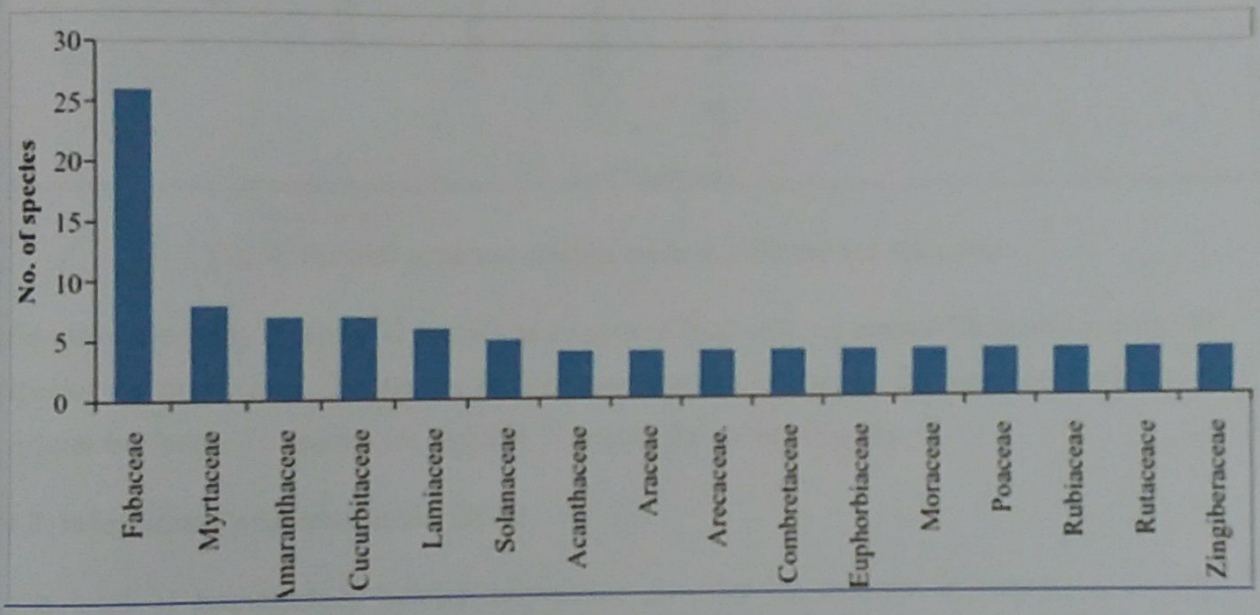

Fig. 3: Families having more than four species

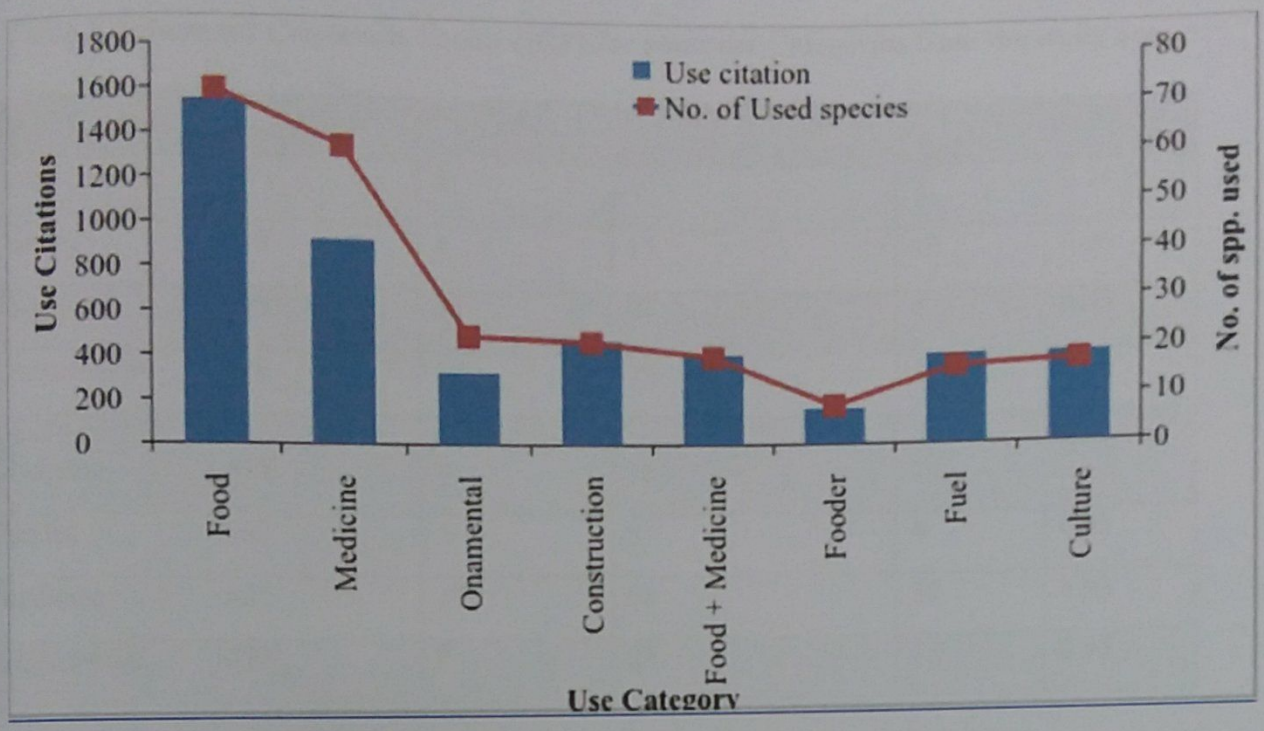

Fig. 4: Species used and citation made in different use categories.

People of the study area use 72 species as sources of food only, 60 species for medicine only, 22 species for ornamental, 21 species for light construction,18 species for food and medicine, 8 species for fodder,16 species for fuel and 17 species for culture (Fig. 4).

4.2. Informant Consensus factor (ICF)

The level of homogeneity among information provided by different informants is usually expressed by ICF. All most all the use categories had the value above 0.9, which indicates wide use of the species by the most informants. The species used for fuel and cultural purposes are unique to all (ICF=0.96) which was followed by construction, food-medicine, fodder and food (Table 2). High ICF values of the study area indicate active use of species by most of the informants and deep knowledge of the species use.

Table 2. Informant Consensus Factor (ICF) for plant use Categories from the study area.

Use category	Use citation	% of use	No. of Used species	% of all	ICF
Fuel	414	8	16	9	0.96
Culture	418	8	17	10	0.96
Food	1551	33	71	42	0.95
Construction	478	10	21	12	0.95
Food + Medicine	415	8	18	10	0.95
Fodder	167	3	8	4	0.95
Medicine	927	19	60	35	0.93
Ornamental	329	7	22	13	0.93

4.3. Fidelity level

Fiedelity level expresses the percentage of informants claiming the use of a certain plant species for the same major purpose (Fouad et al., 2015). Out of 166 species 119 species were found to have single use (FL=100) and 47 species were found to have less than 100 FL. These 47 species were found to have multiple uses (Fig. 5, Table 1)

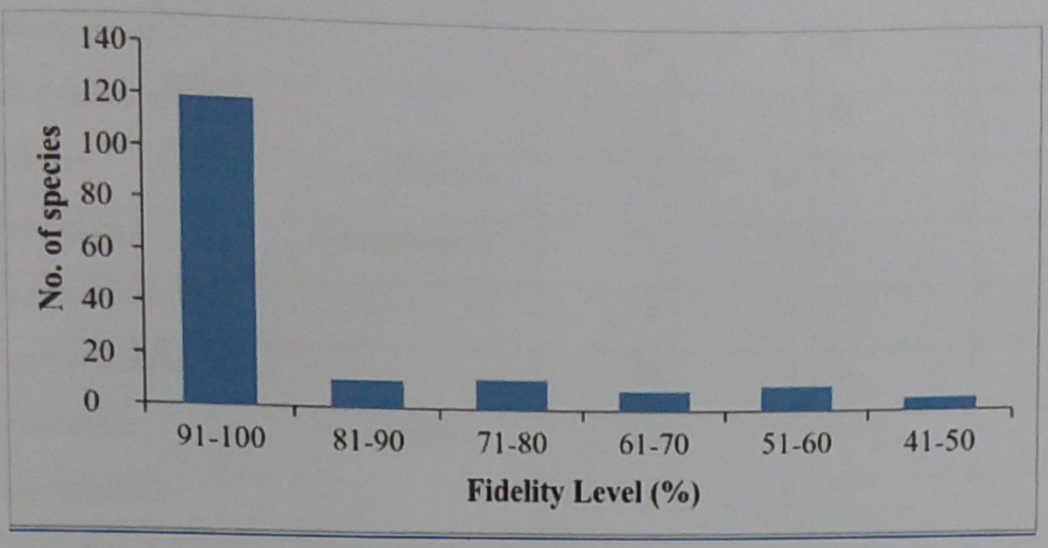

Fig. 5: Fidelity level of different plant species

Table 1. Plant species found in the study area

Species	Family	Total citation	Uses Totaled	Main Use	Fidelity Level
Andrographis pariculata	*Acanthaceae*	10	10	M	100
Justicia adhatoda		8	8	F+M	62.5
Justicia gendarussa Burm. f.		4	4	M	100
Hygrophilla schulli		3	3	M	100
Amaranthus tricolor	Amaranthaceae	44	44	F	100
Amaranthus gangeticus		33	33	F	100
Amaranthus lividus		19	19	F	100
Achyranthes Paniculata		10	10	F+M	100
Alternanthera philoxeroides		10	10	F+M	100

Alternanthera sessilis		24	6	FU	100
Amaranthus spinosus		5	4	M	100
Allium sativum	Amaryllidaceae	14	14	F	100
Mangifera indica L.	Anacardiaceae	71	71	F	100
Spondias pinnata Kurz		35	35	F	100
Lannea coromandelica		18	18	O	100
Annona reticulata	Annonaceae	22	28	F	78.5
Polyalthia longifolia		6	6	O	100
Centella asiatica (L.)	Apiaceae	72	72	F+M	77.77
Coriandrum sativum		15	15	F+M	53.33
Rauvolfia serpentine	Apocynaceae	7	7	M	100
Vinca rosea(Linn)		6	6	O	100
Carissa carandas		4	5	M	100
Alocasia indica (Lour) Koch	Araceae	23	23	M	60.86
Amorphophallus campanulatus		7	13	O	100
Colocasia esculanta Schott.		23	7	C	100
Typhonium trilobatum		5	5	F	100
Borassus flabellifer L	Arecaceae.		4	F	100
Cocos nucifera		46	46	F	78.26
Areca catechu		18	18	F	100
Phoenix sylvestris		26	35	F	74.28
Aristolochia indica	Aristolochiaceae	6	6	M	100
Calotropis procera	Asclepiadaceae	16	16	M	87.5

Hemidesmus indicus		8	8	M	100
Leptadenia Reticulata		3	8	C	62.5
Sansevieria trifasciata	Asparagaceae	20	20	M	100
Polianthes tuberosa		10	10	O	100
Cichorium intybus	Asteraceae	5	5	FOD	60
Mikania scandens		29	29	M	100
Eclipta Prostrata		5	5	F+M	100
Basella alba	Basellacease	47	47	F	100
Ananas comosus	Bromeliaceae	21	21	F	100
Aporocactus Flagelliformis	Cactaceae	2	2	M	100
Mesua ferrea	Calophyllaceae	10	10	M	60
Nardostachys jatamansi	Caprifoliaceae	5	5	F+M	100
Carica papaya L.	Caricaceae	10	5	M	100
Casuarina equisetifolia	Casuarinaceae	2	2	M	100
Terminalia arjuna	Combretaceae	29	30	M	76.66
Terminalia belerica		29	29	F+M	75.86
Terminalia chebula		10	10	F+M	60
Terminalia catappa		4	2	M	100
Commelina benghalensis	Commelinaceae	13	13	M	100
Ipomoea aquatica	Convolvualceae	15	5	F	100
Ipomoea paniculatum		12	12	F	100
Bryophyllum pinnatum	Crassulaceae	12	12	M	100
Raphamus sativus	Cruciferae	12	12	F	100

Coccinia grandis	Cucurbitaceae	30	30	F+M	100
Benincasa hispida		29	29	F	100
Luffa cylindrica		16	21	CON	76.19
Trichosanthes cucumerina		21	21	F	100
Cucurbita moschata		19	19	F	100
Cucumis sativus		12	19	F	63.15
Luffa acutagula			13	F	100
Dioscorea alata	Dioscoreaceae	11	11	F	100
Sansevieria hyacinthoides (L.) Druce	Dracaenaceae	5	5	M	100
Diospyros peregrira	Ebenaceae	13	21	C	42.85
Phyllanthus emblica	Euphorbiaceae	31	31	F+M	74.19
Codiaeum spp		6	6	O	100
Euphorbia royleana		5	5	M	100
Croton bonplandianus		4	4	M	100
Tamarindus indica L.	Fabaceae	42	48	F	87.5
Leucaena leucocephala(Lam) de Wit		42	42	CON	100
Albizia saman(Jaq.)Merr.		37	37	F	45.94
Acacia nilotica		35	35	FU	100
Lablab niger		34	34	F	100
Sesbania bispinosa		31	31	FU	83.87
Casica papaya		29	29	F	100
Vigna umbellata		26	26	F	100
Cassia fistula		24	24	CON	100

Dalbergia sissoo Roxb		24	24	CON	100
Desmodium trifolium		8	21	F+M	100
Samanea saman (Jacq.) Merr		17	17	FU	70.58
Acacia auricoliformis Willd		14	14	CO	100
Erythrina indica		10	13	CON	76.92
Albizia richardiana		13	13	FU	100
Glycyrrhiza glabra		12	12	F+M	100
Albizia procera		12	12	CON	50
Sesbania grandiflora		8	8	M	100
Pithecellobium dulce		7	7	FU	57.14
Caesalpinia pulcherrima sweet		6	6	O	100
Acacia catechu		6	6	CON	100
Delonix regia		5	5	CON	100
Cassia occidentalis		3	3	F+M	100
Acacia farnesiana			3	F	100
Cassia alata		2	2	M	100
Clitoria ternatea		1	1	C	0
Swerita chirata	Gentianaceae	5	5	M	100
Ocimum sanstum	Lamiaceae	81	129	F+M	57.36
Vitex negundo		24	24	M	100
Ocimum tenuiflorum		16	9	O	66.66
Ocimum gratissimum		22	6	M	100

Clerodendrum fragrans		3	3	O	100
Mentha arvensis		25	29	F+M	72.41
Cinnamomum tamala	Lauraceae		5	F	100
Cinnamonun zeylanicum		3	3	F	100
Asparagus racemosus	Liliaceae	24	24	M	100
Aloe indica		9	12	M	75
Lawsonia inermis L.	Lythraceae	28	28	C	64.28
Hibiscus rosa-sinensis Linn.	Malvaceae	45	57	O	54.38
Abelmoschus esculentus		17	17	F	100
Bombax ceiba		4	4	FU	100
Azadiracta indicaA. Juss	Meliaceae	53	53	M	60.37
Swietenia mahagoni(L.) Jacq		23	23	CON	100
Stephania japonica (Thunb.) Miers	Menispermaceae	29	29	M	100
Ficus hispida	Moraceae	10	10	F	100
Ficus racemosa		6	6	C	100
Artocarpus lacucha		5	5	F	100
Ficus benghalensis		2	2	M	100
Moringa oleifera Lamk	Moringaceae	13	13	F	100
Syzygium cumini(L.)Skee.	Myrtaceae	55	55	F	83.63
Musa spp.		52	52	F	100
Psidium guajava		44	44	F	100
Syzygium samarangense(BL). Merr		35	35	F	100

Eucalıptus camadulensis		27	27	CON	100
Artocarpus heterophyllus Lamk		17	17	F	100
Cinnamomum tamala		4	4	F	100
Eugenia caryophyllus		2	2	F	100
Boerhaavia diffusa	Nyctaginaceae	13	13	F	100
Nymphaea nouchalı	Nymphaeaceae	4	4	F	100
Jasminum sambac	Oleaceae	35	35	O	54 28
Nyctanthes arbor tristis(Linn)		11	11	M	54 54
Oxalis europaea Jord	Oxalidaceae	12	12	F	83 33
Piper betle	Piperaceae	4	4	F	100
Peperomia pellucida		1	1	M	100
Bacopa monnieri	Plantaginaceae	50	50	F	100
Scoparia dulcis			19	F	100
Cynodon dactylon	Poaceae	45	45	FOD	84 44
Bambusa vulgaris		16	16	CON	100
Saccharum officinarum L.		5	5	F	100
Vetiveria zezanioides		5	5	C	100
Dryopteris filix-mas	Polypodiaceae	20	20	F	90
Acrostichum aureum	Pteridaceae	3	3	M	100
Punica granatum	Punicaceae	36	36	F	80 55
Ziziphus mauritiana Lamk.	Rhamnaceae	31	31	F	100
Rosa centifolia	Rosaceae	10	10	O	100

Neolamarckia cadamba	Rubiaceae	13	13	F	46.15
Gardenia jasminoides Ellis		7	8	F	100
Anthocephalus chinensis		2	2	O	100
Paedaria foetida		6	7	M	57.14
Aegle marmelos	Rutaceace	62	62	F	85.48
Citrus aurantifolia		29	29	F	100
Citrus grandis		24	24	F	70.83
Limonia acidissima		20	23	F	82.6
Santalum album	Santalaceae	11	22	M & C	50
Litchi chinensis	Sapindaceae	22	22	F	100
Manikara achras	Sapotaceae	11	26	F	100
Hydrangea arborescons	Hydrangeaceae	12	12	M	100
Smilax macrophylla Roxb	Smilacaceae	4	6	F	66.66
Datura metal	Solanaceac	12	12	M	100
Solanum melongena		38	38	F	100
Lycopersicon lycopersicum		13	13	F	100
Cestrum fruteseens		3	3	O	100
Solanum xanthocarpum		2	2	M	100
Abroma augusta	Sterculiaceae	6	6	M	100
Curcuma longa	Zingiberaceae	50	50	F	90
Curcuma amada		6	6	M	100
Zingiber officinale		5	5	F	100
Amomum subulatum		2	2	M	100

4.4 Plants uses and ICF

Table 2. Shows that there is relatively agreement among interviews. ICFs were calculated for the recorded plants and ranged from 0.93 to 0.96. Higher ICF value suggests that the informants are in agreement on the use of a certain species for the fuel and cultural purposes. Although the ICF for food (0.95) was less compared to some other categories, the maximum number of plant uses (71 species) was recorded under this category. The ICF value followed by plants used as Construction and Food + Medicine (F+M) and plants used solely for medicinal and Ornamental purposes (0.93).

CHAPTER FIVE

CONCLUTION

Conclusion:

The people of the study area have deep dependency on the plant species found in and around their home gardens. People use plant species for food, construction, medicine, food and medicine, fuel, fodder, ornamental and culture. These varieties of use and high consensus factor indicate their knowledge about species and their specific use. The result obtained from this study about the collection behavior, ethno botany indices should be used together to produce a model for Sustainable management of plant species that might be helpful for the biodiversity conservation of the area.

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Questionnaire

On

Floristic Features and Ethno botanic use of plants data available in HomeGardens at ShyamnagarUpazila in Satkhira districts.

Questionnaire:

Informants' consent for the participation in the study:

I..... (Name of informant) hereby give my full consent and conscious to participate in this study and declare that to the best of my knowledge the information that I have provided are true, accurate and complete.

Date..... (Signature/Thumb impression of Informant)

Location:

Village	Union	Upazila	Zila

Informants' details:

Name.....

Gender.....

Age.....

Occupation.....

Education.....

Contract No.....

1) Family Structure (put tick):
   - o Joint
   - o Nuclear

2) Household Size (Number):

Total	Male	Female

3) Total landholding: ……(Satak/Bega/ha/acre)

4) Landholding Pattern:
   - Own land
   - Landless

5) Is the species grown in your household land? If yes, what are the Species?

6) Do you use this plant? If yes, how do you use it?

7) Plant mainly used for what purposes?

8) Which parts of plant are mainly used?

9)Collection period of plant?

	Plant Names		#.Of main use informants	Uses			
SL No	Local Names	Scientific Names		Parts of the Plants	Main	Totaled	Collection Period (Month name)

Code/ Instruction for

Main uses:

F: Food, M: Medicine, CON: Construction, F+M: Food&Medicine, FUL: Fuel wood, C: Cultural and Other

Remarks:

Plant identified as …… (Botanical name and family)

Signature of Researcher