

**INDIGENOUS KNOWLEDGE ON NON-TIMBER FOREST PRODUCTS (NTFPs) AND
UTILIZATION OF BAMBOO (*Nigalo*) AND HIMALAYAN NETTLE (*Allo*) IN
SIKLES AREA OF KASKI DISTRICT, CENTRAL NEPAL**



Local with *Syakhu* (*Nigalo* product) & *Bhangro* (*Allo* product)

A
DISSERTATION SUBMITTED TO
CENTRAL DEPARTMENT OF BOTANY
FOR THE PARTIAL FULFILLMENT REQUIREMENTS FOR M.SC. DEGREE
IN BOTANY TRIBHUVAN UNIVERSITY, KATHMANDU, NEPAL

SUBMITTED BY
LILA JUNG GURUNG
CENTRAL DEPARTMENT OF BOTANY
TRIBHUVAN UNIVERSITY, KIRTIPUR, NEPAL
ROLL NO:56, BATCH: 059/060
T.U. REGD.No.: 5-2-48-2097-99

2007

**INDIGENOUS KNOWLEDGE ON NON-TIMBER FOREST PRODUCTS (NTFPs)
AND UTILIZATION OF BAMBOO (*NIGALO*) AND HIMALAYAN NETTLE
(*ALLO*) IN SIKLES AREA OF KASKI DISTRICT, CENTRAL NEPAL**



Photo – Sikles village

A
DISSERTATION SUBMITTED TO
CENTRAL DEPARTMENT OF BOTANY
FOR THE PARTIAL FULFILLMENT REQUIREMENTS FOR M.SC. DEGREE
IN BOTANY TRIBHUVAN UNIVERSITY, KATHMANDU, NEPAL

SUBMITTED BY
LILA JUNG GURUNG
CENTRAL DEPARTMENT OF BOTANY
TRIBHUVAN UNIVERSITY, KIRTIPUR, NEPAL
ROLL NO:56, BATCH: 059/060
T.U. REGD.No.: 5-2-48-2097-99

2007



TRIBHUVAN UNIVERSITY

INSTITUTE OF SCIENCE AND TECHNOLOGY
CENTRAL DEPARTMENT OF BOTANY
OFFICE OF THE HEAD OF DEPARTMENT

Ref. No.



Kirtipur, Kathmandu
Nepal

CERTIFICATE

This is to certify that the dissertation entitled "Indigenous knowledge on Non-Timber Forest Products (NTFPs) and Utilization of Bamboo (*Nigalo*) and Himalayan Nettle (*Allo*) in Sikles Area, Kaski District, Central Nepal" was carried out by **Mr. Lila Jung Gurung** under my supervision. This work has been accomplished on the basis of candidate's original research work and submitted here for the partial fulfillment of **M. Sc. Degree in Botany (Plant Systematic)**. To the best of my knowledge, the results of this work have not been submitted for any other degree. Therefore, I'm pleased to forward this dissertation for the final approval and acceptance.

Sangeeta Rajbhandary
Lecturer
Central Department of Botany
Tribhuvan University, Kirtipur

Date: April 12, 2007 (Chaitra 29, 2063)



TRIBHUVAN UNIVERSITY

INSTITUTE OF SCIENCE AND TECHNOLOGY
CENTRAL DEPARTMENT OF BOTANY
OFFICE OF THE HEAD OF DEPARTMENT

Ref. No.

Kirtipur, Kathmandu
Nepal



Letter of Approval

This dissertation entitled "Indigenous knowledge on Non-Timber Forest Products (NTFPs) and Utilization of Bamboo (*Nigalo*) and Himalayan Nettle (*Allo*) in Sikles Area, Kaski District, Central Nepal" submitted by Mr. Lila Jung Gurung has been accepted as partial fulfillment of the requirement of M. Sc. Degree in Botany (Plant Systematic).

Examination Committee

Prof. Pramod K. Jha
Head of Department

CENTRAL DEPT. OF BOTANY

Ms. Sangeeta Rajbhandary
Supervisor

Dr. Nirmal K. Bhattarai
External Examiner

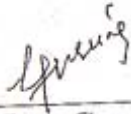
Prof. Ram P. Chaudhary
Internal Examiner

Date of Examination:

April 12, 2007 (Chaitra 29, 2063)

DECLARATION

I hereby declare that the dissertation entitled "Indigenous knowledge on Non-Timber Forest Products (NTFPs) and Utilization of Bamboo (*Nigalo*) and Himalayan Nettle (*Allo*) in Sikles Area, Kaski District, Central Nepal" submitted towards the partial fulfillment of M. Sc. Degree in Botany (Plant Systematic) is based on Ethnobotanical survey on NTFPs, survey of available literature and socio-economic study of some potential NTFPs. The work is carried out under effective guidance and constant support of Ms. Sangeeta Rajbhandary. The dissertation there of has not been submitted for the award of any degree/diploma of any other University or Institution.



Lila Jung Gurung

Date: April 12, 2007 (Chaitra 29, 2063)

ACKNOWLEDGEMENTS

I would like to express my sincere and hearty gratitude to my supervisor **Lecturer Ms. Sangeeta Rajbhandary**, Central Department of Botany for a definite direction and guidance of this work. Her effective guidance is responsible for the completion of this work successfully.

I am grateful to **Prof. Dr. P.K. Jha**, Head of Central Department of Botany, Tribhuvan University for providing necessary facilities.

I am thankful to Prof. Dr. Krishna Kumar Shrestha, Prof. Dr. Ram Prasad Chaudhary, Mr. Bhaskar Adhikari, Central Department of Botany, Tribhuvan University for their kind suggestion and encouragement.

I am extremely grateful to late **Dr. Chandra Prasad Gurung, the former Country Representative of WWF/Nepal** Program who had always mentally and financially encouraged me to accomplish my research work. I also express my sincere gratitude to Mr. Hum B. Gurung, Executive Director of Sustainable Development Action Group, Nepal and Mr. Hit Man Gurung, for their valuable suggestions and encouragement during the work.

I am really indebted to the **World Wildlife Fund (WWF) Nepal Program** for providing me the research grant to carry out my research.

Beside these I would like to thank Late Mr. Ratan Sing Gurung, Mr. Tej Bir Ghale, Mr. Lil Bahadur Gurung, Mr. Lal Bahadur Gurung, Mr. Aiman Gurung, Mrs. Kumari Gurung, Mr. Chandra B. Gurung, Mr. Thote Gurung, Mrs. Lal kumari Gurung, Mrs. Thichyo Gurung, Mr. Gopal Gurung, Mr. Sahabir Damai, Mr. Tek Bahadur Bika, Mr. Padiram Bika, and all other people of Sikles village for their sincere and kind assistance during the field data collection.

I am extremely grateful to my friend Mr. **Sailesh Rangitkar** for his constant help and valuable suggestions during the research period.

Once again I would like to thank all the above-mentioned personals, and all staff members and colleagues of Central Department of Botany without whose cooperation, help, support and guidance this work would not have been successfully completed. Finally, I would like to express deep appreciation to my parents and relatives for their encouragement and moral support throughout the research.

Lila Jung Gurung

April, 2007

Abbreviation/Acronyms

ACA	:	Annapurna Conservation Area
ACAP	:	Annapurna Conservation Area Project
CBS	:	Central Bureau of Statistics
CDB, TU	:	Central Department of Botany, Tribhuvan University
CF	:	Community Forest
CFUGs	:	Community Forest User Groups
Cm	:	Centimetre
D	:	Damai
DFO	:	District Forest Office/Officer
DPR	:	Department of Plant Resources
DVO	:	District Veterinary Office
E	:	Eastern
Eng	:	English
et al.	:	And other people
FBSSSEs	:	Forest Based Small Scale Enterprises
Fls	:	Flowering season
Frs	:	Fruiting season
FUGs	:	Forest User Groups
Gur	:	Gurung
HMG	:	His Majesty's Government
HMG/N	:	His Majesty's Government of Nepal
HMG/N	:	His Majesty Government of Nepal
ICIMOD	:	International Centre for Integrated Mountain Development
IOF	:	Institute of Forestry
IUCN	:	International Union for Conservation of Nature
K	:	Kami
KATH	:	National Herbarium and Plant Laboratory
Km	:	Kilometre
KMTNC	:	King Mahendra Trust for Nature Conservation
m	:	Meter
mm	:	Millimeter
M.Sc.	:	Master of Science
MSL	:	Mean Sea Level
N	:	Northern
Nep.	:	Nepali
NTFPs	:	Non Timber Forest Products

PRA	:	Participatory Rural Appraisal
RRA	:	Rapid Rural Appraisal
S	:	Southern
TU	:	Tribhuvan University
TUCH	:	Tribhuvan University Central Herbarium
VDC	:	Village Development Committee
W	:	Western
WWF	:	World Wildlife Fund

TABLE OF CONTENTS

Page No.

Acknowledgements

Abbreviations

Abstract

CHAPTER ONE: INTRODUCTION

1.1	Background	1
1.2	Ethnobotanical significance of NTFPs in Nepal	2
1.3	Problem statement	3
1.4	Justification of the Study	4
1.5	Limitation of the Study	4
1.6	Objectives of the Study	5

CHAPTER TWO: REVIEW OF LITERATURE

2.1	Ethno botanical studies	6
2.2	NTFPs in socio-economic Issues	11
2.3	Literatures related with <i>Nigalo</i> and <i>Allo</i>	12

CHAPTER THREE: DESCRIPTION OF STUDY AREA

3.1	Geographical location and climate	13
3.2	Vegetation and flora	14
3.3	People, Population and socio-economic status	15
3.4	Ecotourism	16

CHAPTER FOUR: METHODOLOGY

4.1	Research design	18
4.2	Selection of the research site	18
4.3	Literature Search	18
4.4	Selection of NTFPs	19
4.5	Methods of data collection	19
4.5.1	Field visit and household survey	19
4.5.2	Key informants interview	19
4.5.3	Group discussion, participatory Rural Appraisal (PRA), RRA	20
4.5.4	Plant collection, herbarium preparation	20
4.5.5	Secondary data collections	21

4.6	Data analysis	21
-----	---------------	----

CHAPTER – FIVE: RESULTS

5.1	Diversity of Ethno-botanically Useful NTFPs.	23
5.2	Ethno-botanically knowledge on NTFPs	25
5.2.1	Plant Use Categories	26
5.2.1.1	Plant sub-use categories	29
5.2.1.2	Parts use Category	36
5.3	Description of the ethno botanically Important NTFPs	37
5.4	Socio-economic importance of <i>Nigalo</i> and <i>Allo</i> based work in the Sikles area	88
5.4.1	<i>Nigalo</i>	88
5.4.1.1	Silviculture characteristics	91
5.4.1.2	Condition of <i>Nigalo</i> in the study area	91
5.4.1.3	Harvesting Practice and Management System of <i>Nigalo</i> in the study area	92
5.4.1.4	Market condition	93
5.4.1.5	Trade route for <i>Nigalo</i> product	94
5.4.1.6	Nature of problem associated with <i>Nigalo</i> based work	95
5.4.2	<i>Allo</i> or Puwa (<i>Girardinia diversifolia</i>)	95
5.4.2.1	Harvesting & Processing Technique	96
5.4.2.2	Nature of problem associated with <i>Allo</i> Based works	97

CHAPTER SIX: DISCUSSION

6.1	Ethnobotanical knowledge in study area	98
6.1.1	Plant use categories	98
6.1.1.1	Medicinal plants	98
6.1.1.2	Other use categories	101
6.2	<i>Nigalo</i> as one socio-economically important species in the study area	102
6.2.1	Socio-economic impact of <i>Nigalo</i> based work in the Sikles area	103
6.3	<i>Allo</i> as one socio-economically important species in the study area	104

CHAPTER SEVEN: CONCLUSION AND RECOMMEDATIONS

7.1	Conclusion	105
7.1.1	NTFPs use	105
7.1.2	Importance of <i>Nigalo & Allo</i> in study area and associated problems	106
7.2	Recommendations	107
	References	109

APPENDICES

Appendix-I	Questionnaire	
Appendix-II	Glossary of Technical Terms	
Appendix-III	List of Plant Species According to the use categories	
Appendix IV	Alphabetical Index of Gurung Names	
Appendix V	Comparison of medicinal uses between owns finding and other relevant literatures	
Appendix VI	Photographs	

LIST OF TABLES

Table No.	Title	Page No.
1	Average Precipitation and Temperature in Sikles 2004	14
2	Socio economic status of the studied area	15
3	Number of genera and species recorded in different families	24
4	Knowledge on NTFPs of the respondents according to age group	26
5	Number of plant species found in different plant use categories	28
6	NTFPs in different multiple use categories	29
7	Medicinal plants in different sub-use categories	30
8	Edible plants in different sub use categories	34
9	Poisonous plants in different sub-use categories	36
10	Species preferred by the respondent	92
11	Seasonal calendar for <i>Nigalo</i> work in Sikles Area	93
12	Market condition of some <i>Nigalo</i> products	93
13	The demands for different <i>Nigalo</i> products	94

LIST OF FIGURES

Fig. No.	Title	Page No.
1	Average Precipitation and Temperature in Sikles 2004	14
2	Enumerated Plant species	23
3	Plant Use Category	27
4	Number of plant species used for different diseases	33
5	Plant species used for different edible purposes	35
6	Poisonous plant species	36
7	Plant parts used	37

LIST OF FLOW CHART/MAP

No.	Title	Page No.
1	Map of Kaski District	16
2	Map of the Study area	17
3.	Flow chart one-Methodology	22
4	Flow chart two-Trade route of <i>Nigalo</i> products from Sikles	94

ABSTRACT

The present work is an assessment concerning the Ethnobotany and socio-economic importance of *Nigalo* and *Allo* works in the Sikles area, Kaski, Central Nepal.

Altogether 111 species of plants were documented along with scientific name, family, use categories, phenology, distribution, description, parts used, uses along with local name (Gurung). These species belongs to 97 genera and 64 families with 100 species of Angiosperms, four species of Gymnosperms, four species of Pteridophytes, two species of fungi and one species of Lichen. Based on the uses, 66 species had medicinal value used for the treatment of 36 diseases and disorders, along with 14 species for veterinary use, similarly 47 species were edible, 16 species were ceremonial, 15 species were poisonous plants, 10 dye yielding plants, seven used for agricultural implements, four fibre yielding plants, four handicraft making plants, four gum yielding plants, three hedge and shade plants, three broomstick plants, two detergent plants, and four miscellaneous.

The knowledge on the traditional use of NTFPs (particularly medicinal value) has been limited only to traditional healers and elderly people of the study area. Due to habit destruction, grazing and over exploitation, lack of knowledge about these important resources, lack of conservation and cultivation awareness and proper uses have resulted many plants in the verge of extinction.

Nigalo and *Allo* craft is an age-old tradition among the Gurungs of Sikles village. However, their knowledge and technology of collecting, processing, and production of various items has yet to be adequately documented, evaluated and promoted. *Nigalo* and *Allo* weaving have good potentiality to be established as a Forest Based Small Scale Enterprises (FBSSSEs). FBSSSEs are of particular important because a substantial portion of their labour force is made up of economically disadvantaged groups like women and landless people. A number of constrains like lack of raw materials, improved technological inputs, little access to markets, lack of transportation, competition with the imported commodities and insufficiency of dissemination of their products and others are hindering the institutional development of *Nigalo* and *Allo* weaving.

CHAPTER ONE

1. INTRODUCTION

1.1 Background

Forest resources constitute vegetation, wildlife, and their natural systems. They are an integral functional unit of the great eco-region. Beside its ecological function, forest vegetation is a great resource of plant and plant products including valuable Non-Timber Forest Products (NTFPs). Nepal due to its ecological and climatic diversity has become a storehouse of biodiversity and it gives a unique wealth in the form of rich vegetation. Its area of 1, 47,181 sq. km. is no more than 0.1% of the world land area. However, it claims over 2.36% of the biological wealth of the world's natural flowering plants (Saiju, 2001).

The vast biological resources of the country have offered unique opportunity to indigenous tribal people who live in inaccessible remote areas to cure different diseases and usage of different plants for domestic purposes. The essential and long standing relationships that humans have with these resources embrace cultural identity, spirituality and subsistence practices that sustain communities and frequently contribute to the maintenance of biodiversity.

A broad definition of Non-Timber Forest Products (NTFPs) includes all biological materials except timber from forestlands and associated lands. In Nepal, all forest products of plant species other than timber, fuel wood and fodder are classified as Non-Timber forest products (Malla *et al.*, 1996). The plant parts such as root, rhizome, leaf, stem-bark, seed and resin are highly contributing to the expansion of NTFPs, which are significantly useful as food, herbal medicines, spices, essential oil, resin, gum, latex, tannin, pigments, dyestuff, incense, fibre and so forth. NTFPs especially the medicinal plants are deeply associated with the lives of rural people. In Nepal, NTFPs play a crucial role in daily life and welfare of the rural population. As they are in use and trade is traditional phenomenon in Nepal and the rural poor in the hilly and mountainous regions have since the time immemorial been involved in collection of NTFPs for sale and household use. They provide opportunities for off-farm employment and income.

NTFPs are considered as the minor forest products but they have major significance from the perspectives like ecology, economy and society. Local collectors, small traders, herbal dealers, craft makers, Ayurvedic practitioners, Ayurvedic companies and essential oil producing factories use it as inputs and main income generating source in remote areas, where most of the people live below subsistence level. NTFP and its usage are not new because these resources have been used by human civilization since the ancient time. But these days such valuable NTFPs are endangered getting the rapid

loss due to over harvesting, habitat destruction, and irrational and illogical policies of government. Besides, the condition is fuelled in most part of Nepal by deteriorating law and order. Policy makers and planners of the country do not take seriousness about its present status and regard it as a minor product.

One of the important aspects of the NTFP use is a handicraft product, which is commonly a practice in the rural areas of Nepal. Handicraft making, that blends the traditional skills with wide use of the land's resources, is an important part of Nepalese society. Rural households have traditionally made many articles required by their family using locally available materials, which live in remote areas characterized by food deficiency, indebtedness, illiteracy and other barriers. Craft from forest products, including *Nigalo* and *Allo* can be an important means to support their livelihood systems as well as to preserve their traditional skills that are unique to them. Forest Based Small Scale Enterprises (FBSEs) represent the major source of the forest-based employment (FAO, 1990).

Nowadays the culture and tradition of various indigenous people is getting influenced by modern society and they are forbidden to harvest and use the forest resources with which their lives are strongly interwoven (Thapa, 2001). Hence the task of documenting indigenous knowledge of these people is of extreme urgency for the biodiversity management and promotion of economically important forest products including NTFPs along with their applications.

1.2 Ethnobotanical significance of NTFPs in Nepal.

In Nepal, all forest products of plant species other than timber, fuel wood and fodder are classified as Non-Timber forest products (Malla *et al.*, 1996). Nepal Himalayas have been known since the Vedic period as a rich source for valuable medicinal plants. Indigenous people living in rural areas of the country largely depend on the forest products NTFPs, besides meeting subsistence needs, are often the only source of income for inhabitants of hill and mountainous region. The gathering and selling of NTFPs contribute on local economy and support village level artisan and craft activity and provide raw materials to support processing enterprises such as rattan and bamboo, furniture, essential oils, resin and pharmaceuticals.

There are 1,624 plant species having medicinal and aromatic properties (Shrestha *et al.*, 2001). Over 250 of them have commercial value in Nepal and it is also estimated that over one hundred thousands of traditional healers are engaged in herbal medical practices and over 5000 hand written manuscripts are supposed to be preserved in Nepal (Aryal, 2002). Beside medicinal plants there are 651 species of wild edible and 696 other NTFPs used for a variety of other purposes (Manandhar, 2002).

Today the value of trade to Nepal's national economy is estimated to be equivalent to US\$ 8.6 million per year (Edwards, 1995), which becomes nearly six times the official value of timber export to India per year. Government revenue from the tax on traded NTFPs is about five percent out of the total forestry sector. This sum supports not only to raise the governments revenue but also a network of several hundred thousand harvesters, porters and traders who are getting benefit from the natural resources (Edwards, 1995). It has been estimated that, in certain cases, NTFPs contribute nearly 50 percent of the average annual household income (Edwards, 1995). Jayaswal (2000) studied the experience of the NTFPs based enterprises development in Nepal. According to him, the estimate of the NTFPs worth up to US\$ 26.5 million is traded annually from Nepal.

All these facts and figures ascertain a high potential of NTFPs production and farming in Nepal's forest, which is in integral part of rural life system. Therefore, any intervention aimed at positive change in the lives of rural people naturally invites better management of Nepal's forests. This appeals a greater focus on most useful plants, which people are dependent on. However, we have a very little up-to-date research data and knowledge pool to share in this regard. There exists a big gap between the field bases needs and availability of necessary NTFP knowledge and skill.

The task of documenting indigenous knowledge is of extreme urgency for biodiversity management and NTFPs conservation. The understanding of people's indigenous knowledge of biodiversity resource management is a key to sustainable development in the country. Indigenous perception and practices are helpful in the management of the forests for protection and utilization to biologically diverse resources.

1.3. Problem statement

NTFPs are being increasingly recognized for their role in livelihoods, bio-diversity and export values. The demand of NTFPs is rapidly increasing. Global markets for Nepal's NTFPs have been large and the demand trend of this product is increasing as more and more people from developed country are attracted to these products (Subedi, 1997). In rural hilly areas, non-timber is of important to the local people but its market demand is low. But the so-called minor forest products are playing major role in uplifting the economy of rural society (Malla, 1994). NTFPs do correlate with the wider socio-economic setting of the users. The NTFP products are integral parts of their tradition and religion beside these can also contribute in improving the economic status of the users. The NTFPs are essential components for human beings. Nepal is rich both in NTFPs and traditional knowledge of ethnic groups. Contrary to this, due to lack of

documentation, the gradual loss of traditional knowledge as to the application of such products incurring upon the ethnic group has become a serious problem.

Although Nepal rich in natural resources, the resources are not properly managed and used in economically beneficial way by rural inhabitants. The forests neither are in very good condition nor are they well managed scientifically. Habitat destruction due to over grazing and over exploitation, unscientific collection and storage practices, lack of conservation and cultivation awareness and proper uses, have resulted many plants in the verge of extinction. Along the declining of the natural resources the traditional knowledge on the utilization of the resources also erodes. Such traditional knowledge can be helpful in the economic development of the community. But due to lack of interest of younger generation, lack of proper transfer of knowledge, other opportunities of income generation and lack of proper documentation such knowledge has been eroding. These necessitate the proper documentation of such traditional knowledge along with its economic application.

1.4 Justification of the Study

The significance of ethno-botanical research is the exploration and documentation of the indigenous knowledge of the tribal or local people about the use of plant resources to conserve the traditional cultural practice of the society. The study of indigenous knowledge would encourage the local people to feel sense legitimacy in their knowledge and belief systems. Such introspection can contribute to the empowerment of local in shaping their future. Documentation of indigenous knowledge of NTFPs is essential for the well being of both plant and the future generation.

The study has academic as well as practical importance. The research has made an effort to investigate the relationship between Gurung community and forest resources on the basis of their knowledge and uses of economically important NTFPs. This study also attempts to explore better measures to be carried out in future planning and research of similar nature. It is assumed that the finding and recommendation will contribute in making guidelines and institution designing on the practice of sustainable use of economically important NTFP and well being of the community. Hence, the study is very much essential in the present context of Nepal.

1.5 Limitation of the study

The present study was conducted in Sikles area in Kaski District. It is a study of small geographical area, which does not represent all the villages of the district or zone. On the other hand there were many difficulties in data collection especially in terms of

time, financial and political constraints. Despite these limitations efforts are made to make the study sufficient and empirical.

1. 6 Objectives of the Study

Considering the importance of plants on human welfare and documentation of indigenous knowledge of the local people for the conservation and management of local plant resources, the present study has been under taken with the following main specific objectives.

- To explore and identify the plant species used as NTFPs by the people in the study area.
- To categorize the NTFPs according to their traditional use.
- To study the socio-economic importance of *Nigalo* and *Allo* products in the study area.

CHAPTER TWO

2. REVIEW OF LITERATURE

2.1 Ethno botanical studies

Nepal, due to its ecological and climatic diversities, has become a storehouse of varieties of plants. Many work concerning ethnobotany and medicinal plants have been carried out outside the country as well as inside the country. An attempt has been made to summarise most of the work done inside the country. Nepal includes large number of medicinal plants, which have been used for medicinal purpose since ancient time. A hand written herbal encyclopaedia "Bir Nigantu" was compiled under the instruction of Chandra Samsher and Bir Samsher then Prime Ministers of Nepal in the 19th and beginning of 20th century (Kanai, 1971). This encyclopaedia, written in eight volumes, is probably the first effort towards the compilation of medicinal plants of the country. This book includes illustrations, 750 colour plates of plants with explanation of medicinal use.

It is also believed that the use of medicinal plants was recorded in "Regveda" that was found to be written between 4500 BC and 1600 BC, which is the oldest repository of human knowledge. In "Ayurveda" the properties of various drugs have been given in details. Suruta Samita that was written not later than 1000 BC contains comprehensive chapters on their apeutics. Charak Samita written about the same period gave a remarkable description of Materio Medica as it was known to ancient Hindus (Anonymous, 1997).

First ethno-botanical work had been carried out by M. L. Banerji in 1955 in East Nepal. Similarly, the book named "Medicinal plants of Nepal" published in 1970 and 1984 by the Department of Medicinal plants (DMP) accounted 571 species of medicinal plants with their uses from Nepal.

Adhikari and Shakya (1977) listed 217 aromatic plants of Nepal and also studied pharmacological properties of some medicinal plants of Nepal having traditional use and observed a number of interesting properties such as intestinal antispasmodic, uterine stimulant, hypertensive etc.

Gurung (1979) has enumerated 30 species of ferns of Nepal belonging to 22 genera and 11 families used for various purposes.

Manandhar (1980) illustrated 37 species along with short description, diagram and therapeutic and domestic uses of each plant in his book "Medicinal plants of Nepal Himalaya".

Department of Medicinal plants (HMG/N) published the book named "Wild Edible plants of Nepal in 1982. This book accounted 133 species of edible plants with their

local names, short description, parts used, flowering and fruiting times and places of collection, from Nepal.

Malla and Shakya (1984) listed a total of 630 medicinal plant species of Nepal including the ecological distribution of the plants in different ecological zones.

Bajracharya (1985) reported a number of 45 species of wild food fruits from Kathmandu valley along with their descriptions.

Shrestha (1987) also reported 93 wild edible plant used by the local people of Pokhara valley and its northern region.

Bhattarai (1987) mentions 59 medicinal plant species with mode of preparation, method of administration doses and soon form central Nepal.

Manandhar (1987) discussed the traditional medicinal uses of 60 plants form Lamjung district.

Manandhar (1989a) discussed the uses of 102 plants used in traditional medicine among the Chepang tribes of Makawanpur district. These 102 plant species were used to treat about 27 types of diseases.

Manandhar (1989b) enumerated 53 plants used in Ethno veterinary medicinal drugs of central development region with their vernacular names and medicinal uses.

Shrestha (1989) reported 72 plant species used for medicine and other purposes by the local people along the Helambu trekking route.

Joshi and Edington (1990) describe the uses of medicinal plants used by two Village communities in the central development region of Nepal. Likewise, Malla and Shakya (1990) listed a total of 630 medicinal plant species of Nepal including the ecological distribution of the plants.

Manandhar (1990) described 101 species of plant with parts uses, Ethnobotanical uses of plants in Medico Botany of Gorkha district.

Pohle (1990) found a fairly extensive and detailed knowledge of the local people on the utility of wild plant parts form Manang. Uses of 239 wild plants have been documented together with their local names.

Tiwari and Joshi (1990) have published medicinal plants of Nepal in three volumes. In Medicinal Plants of Nepal vol. I, vol. II, and vol. III they have enumerated 73,109 and 118 medicinal plants respectively with Latin, Sanskrit and Nepali Name, family, distribution, diagnostic characteristic therapeutic uses, parts used and Ayurvedic preparation.

Manandhar (1991) discussed the food value of 81 wild plants, with very brief taxonomic descriptions.

Bhattarai (1992) described the folk use of plants in veterinary medicine in central Nepal. He described 58 plant species with traditional medicinal uses, administration etc.

Bhattarai (1993) described the medicinal ethno-botany in the Rapti zone, Nepal. He reported 83 contemporary herbal recipes involving 63 species from 63 genera and 47 families that are used to relieve most of the frequently occurring ailments including dermal, gastro-intestinal, respiratory, geneto-urinary and gynaecological complaints.

Manandhar (1993) documented 177 plant species in his Ethnobotanical studies among the Tharus of Chitwan district Nepal. He reported 61 species of edible plants, six for production of liquor and been five for narcotic purposes, 36 species for household items, three species for fish poisoning and 66 species for medicinal purposes.

Shrestha and Joshi (1993) describes 51 species of plants used by local people of Lele village with scientific name, family name, Nepali name, Newari medicinal uses of plant.

Rijal (1994) reported 345 species, among which 130 species were of medicinal values and 88 species were of edible values in his study conducted in Padampur VDC of Chitwan District, central Nepal.

Sarkar (1994) reported 85 plant species being used in traditional medicinal practices in Parsa district, central Nepal.

In the report of minor forest products of Nepal, General status and Trade, Malla *et al.* (1995) mention the findings of the study and makes a number of recommendations to improve the collection, processing, trade and revenue collection practices in minor forest products.

Manandhar (1995) recorded 40 species of wild food plants through ethno botanical study from all over Nepal. It has also brought into light 44 species of wild food plants, which were not recorded before.

Adhikari (1996) reported 49 NTFPs, among them 24 different species of medicinal plants from ACA area.

Shrestha *et al.* (1996) studied quantitative analysis of some major high altitude medicinal plants of Gyasumdo Village, Manang. They found that the local people use more than 40 species of plants for medicinal purpose.

In Non-Timber Forest Products in Nepal, Edward (1996) gave the list of 38 traded NTFPs from Nepal with their scientific name, Nepali name plant type, plant parts used.

Malla *et al.* (1996) mentioned 41 Non-Timber forest products of Nepal with their vernacular name, English name, family, part(s) used, flowering period and their colourful sketches.

Karna (1997) reported medicinal plants and traditional medicinal practice in Chapagaun VDC of Lalitpur district, central Nepal. Altogether 50 plant species are collected along with details of their use. These plants are used to treat different diseases like lack of appetite of children, boil of body, boil of eye etc.

Basnet (1998) discussed the use of 102 medicinal plants found in Sindhuli District.

Parajuli *et al.* (1998) discussed 70 species of Non-Timber forest products with their scientific name, local name, description, flowering/fruiting period, uses, etc.

Paudel *et al.* (1998) categorized NTFPs into seven groups according to their utilization. General information is presented for each category with description of the plant, religious significance, harvesting methods, processing techniques, etc.

Thapa (1998) reported 113 plant species having medicinal and food value from Shivapuri watershed and wildlife Reserve Area.

Dangol and Gurung (1999) in their ethno botanical study of Darai tribes of Chitwan, reported 181 plant species used as medicines in different forms for different purposes, 30 plant species as vegetable/pickles, 15 species as wild fruits, six species as pesticides, 14 species as fodder plants. They also mentioned the plant resources used to make brooms, mats, spices, and condiments.

Mahara (1999) reported altogether 110 wild edible plant species of the Royal Chitwan National Park (RCNP) and the dependency of the total people on the forest resources. The edible plants included three species of mushrooms, seven pteridophytes, two gymnosperms and 98 angiosperms (80 dicots and 18 monocots).

Bhandary and Shrestha (1999) studied poisonous plants of Kathmandu valley and reported 25, 21, 9 and 6 species of plants which are poisonous to man, livestock, fishes and insects respectively, and listed three plants which cause dermatitis along with their scientific name, English name, local name and family.

Majpuria (1999) mentioned the list of 56 religious and useful plant species of Nepal.

Regmi (1999) documented the list of fibre yielding plants with botanical name, common name, local name and family.

Shakya *et al.* (2000) enumerated 155 species of flowering plants with their scientific name, family and common name in floristic composition of Butwal area and its surrounding hills.

Joshi and Joshi (2001) provided information of 268 widely used medicinal and aromatic plant species of the Nepal Himalayas along with their local names, families, chromosome number, morphological descriptions, distributions, parts used, important biochemical constituents and uses.

Rajbhandari (2001) reviewed ethnobotanical studies conducted so far in Nepal and enumerated 562 species of wild flowering plant and ferns (538 species of angiosperms, 12 species of gymnosperms and 12 species of pteridophytes) along with their families, different local names, hit, taxonomic characters, occurrence and uses.

Saiju (2001) documented the list of 26 potential species of medicinal and aromatic plants that are collected in large scale (i.e. 2-1000 metric ton) in Nepal.

Manandhar (2002) described the relationship between plants and people of Nepal. He recorded more than 900 species of medicinal plants in Nepal and among which about 70 are exported. He beautifully described the unique relationship between most of the ethnic groups of Nepal and the plants they used.

Gurung (2002) reported 83 medicinal plant species belonging to 51 families along with their uses, parts used, forms of medication and dosage from Chitre VDC and Tamagi VDC, Central Nepal.

Shakya *et al.* (2002) reported the information on traditional uses of 154 species of higher plants in Annapurna Conservation Area, central Nepal, Modikhola valley and lower part of Mustang in particular. These species are enumerated in five broad categories as per their utilization viz. edible plants (52 spp), medicinal plants (63 spp), incense (8 spp), fodder (28 spp), and others (18 spp).

Shrestha *et al.* (2003) enlisted about 269 plants species as the NTFPs of the two bottlenecks and two corridors of Terai Arc Landscape Nepal with its local name, scientific name and families.

Sigdel (2004) reported 224 plant species from two-community forest of Makawanpur District with their local names, families and their uses. Altogether 132 plant species and its group comprising 65 families and 119 genera were indigenously used for various purposes.

K.C (2005) reported 192 ethnobotanical plant species belonging to 73 families 161 genera along with their local names, description, phenology and their uses from Resunga, Gulmi District.

Ranjitkar (2005) documented 245 medicinal plants from Kathmandu valley along with monographs of 22 commercially important medicinal plants.

Rajbhandary and Ranjitkar (2006) describe 30 commercially important medicinal plants of Nepal with their detail monograph.

2.2. NTFPs in socio-economic Issues

Nepal is famous for a wide variety of non-timber forest products. These products are important source of income and an integral part of the socio-cultural and subsistence life of the local people. These products are known as *jadibuti* in Nepali language, which has come from two Sanskrit words *jadi* meaning roots and *buti* meaning doses (Gurung *et al.*, 2001). This term narrows down the meaning of the NTFPs because it includes medicinal and aromatic plants only as it does not include other socially and culturally valuable plants.

NTFPs can be categorized into four groups (Edwards, 1993) as follows:

1. Subsistence- Medicinal, foodstuffs, construction materials.
2. Village based enterprises: *Bans-Nigalo, Allo, Lokta*, etc.
3. Raw materials for industries within Nepal.
4. *Jaributi*- raw material for Indian Ayurvedic Industries.

In Nepal every year between 10,000 and 15,000 tons of non-timber forest products are harvested and traded to India (Edwards, 1995). About 90% of the total value of medicinal and aromatic plants is exported in the crude form and only about 10% of the total volume of trade is processed in the country in the form of extracts, essential oils, resins etc. (Rawal, 1995).

Edwards (1996) estimated that the trade in Nepal is worth 422 millions rupees, representing 2.4 percent of the total contribution of forestry to the national economy.

Upadhaya *et al.* (1997) studied the marketing of NTFPs in Nepal and stated that 17,964.68 tons of crude herbs have been commercially harvested from the different physiographic zones of Nepal during 1989/90 to 1993/94 (five years plan period) from which NRs. 42,517,787.00 was earned as royalty by government.

Jayaswal (2000) studied the experiences of the NTFPs based enterprises development in Nepal. According to him, the estimates of the NTFPs worth up to US \$ 26.5 million are traded annually from Nepal. The Environment and forest Enterprises Activity (EFEA) supports the rural community in NTFPs-based small enterprises development in a region of Nepal from where the trade of NTFPs is worth US \$ 4.08 million.

Parajuli (2000) has mentioned that at least 2.9 million people depend on NTFPs for subsistence income. The exploitation of NTFPs, especially MAPs are very high in areas of poor economic conditions to buffer periods of food scarcity. Detail information of an inventory of the NTFPs resources in Nepal is lacking. Sustainable management of

NTFPs is important because of their values as a perennial source of subsistence income to the society.

2.3 Literatures related with *Nigalo* and *Allo*

Dunsmore (1985) described traditional methods of *Allo* harvesting, processing and weaving. Interesting patterns for articles of market values are designed and well illustrated.

Canning and Green (1986) described the chemical methods of *Allo* yarns and cloths. They have also described the softening method for the fibre.

Stapleton (1987) described five species of *Bambusa* species, 11 species of *Dendrocalamus* species, six species of *Drepanostachyum* species, two species of *Arundinaria* and several species of *Thamnocalamus* along with their silviculture characteristics, method of propagation, importance and uses of the species from the Eastern Nepal.

Rajbhandari (1991) studied the grassland ecology and preliminary studies of *Bamboo* in the Apsuwa valley from Eastern Nepal.

Rai (1996) described the indigenous knowledge of the Kulung Rais on the use of *Allo* from Tamku VDC, Sankhuwasabha, Koshi Zone.

Singh and Shrestha (1998) gave the general information of *Allo* with description, uses, harvesting period, processing techniques, etc.

Shrestha (1999) studied the ecological, ethnobotanical and sociological aspects of Himalayan nettle in Nepal.

Paudyal (2000) mentioned a short note on Bamboo for soil stabilization and other usage in Nepal.

CHAPTER THREE

3. DESCRIPTION OF STUDY AREA

3.1 Geographical location and climate

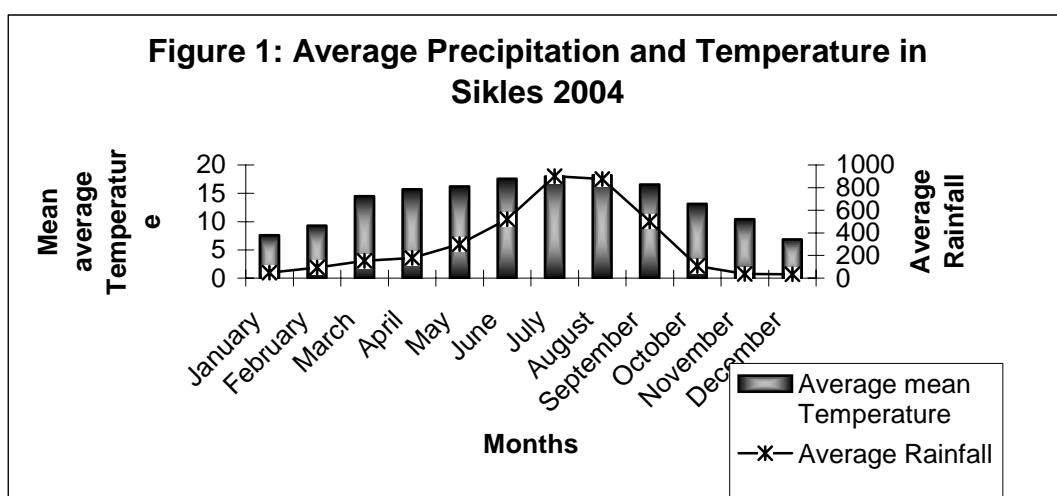
This study was carried out in Sikles area of Kaski district. The Kaski district is located in Gandaki zone of the western development region of Nepal. Geographically it extends from 28° 6' to 28° 38' N latitude and 83° 40' E to 84° 12' E longitude. The district is bounded on the west by Myagdi district on the east by Lamjung and Tanahu districts, the north by Manang District and the south by Syangja and Tanahu District. This district covers an area of 2017 sq. km. The climate of this district is sub – tropical, temperate and alpine (Tundra). The temperature varies from an average minimum of 15.9°C in the winter and to an average maximum of 26.1°C in the summer with an annual rainfall of 388.3 ml (District profile 1997).

Sikles belongs to Parche, which is one of the largest VDC of Kaski district situated in the North Eastern corner of the district at the mountainside. Geographically it is located 28° 19' to 28° 29' north latitude and 84° 03' to 84° 08' east longitude. Namarjung VDC and Madi River are situated to the east, Machhapuchhre, Sardikhola VDCs to the west, and Sildujure and Namarjung VDCs to the South West, and Sildujure and Namarjung VDCs to the South of the Parche VDC respectively. There are three villages in this VDC known as Khilang, Parche and Sikles.

Among these villages, Sikles village is located in the North Eastern corner of Pokhara at mountainside perched on a hillock at an elevation of about 2000 m and is one of the largest and most beautiful of Gurung villages in the district with almost 60% of the total population of the VDC. The study area is about 32 km. away from Pokhara valley. The study area is located at an elevation of 1200 m to 6100m from the mean sea level on the southern slopes of Annapurna Himalayan range. The climate of this area is sub tropical to alpine and remains rather cool throughout the year with heavy snowfall once or twice in a year in the winter season with mean monthly precipitation ranges from only 34.25mm in December to 899.63mm in July. The mean annual precipitation in the area is a 3752mm. Mean monthly precipitation recorded in Sikles and estimated temperature data based on recorded data at Pokhara are presented in Table 1

Table 1:
Average Precipitation and Temperature in Sikles 2004

Months	Rainfall (mm)	Temperature
January	49.28	7.62
February	93.85	9.31
March	152.7	14.52
April	178.18	15.69
May	300.16	16.19
June	521.96	17.58
July	899.63	17.96
August	875.62	18.19
September	502.52	16.55
October	107.33	13.16
November	36.97	10.42
December	34.25	6.86



Source:-Department of Hydrology and Metrology, Pokhara, HMG/Nepal

3.2 Vegetation and flora

Sikles area consists of vegetation types ranging from subtropical to alpine. There are mainly three specific forest areas, i.e. Ban Pala (Community owned forest areas) Nasa ban (Whole village owned forest or natural forest) and Nizi ban (Private forest areas). The distribution of forest areas also varies into different places. According to the altitudinal zone and climatic variations, mixed forests, both evergreens coniferous as well as bushes and shrubs are found in the study area. The main flora include *Schima-*

Castanopsis, *Alnus nepalensis*, Lower temperate mixed broadleaved, Oak, Upper temperate mixed broadleaved, *Rhododendron*, *Betula utilis*, *Pinus wallichiana* and *Juniper* forest types and arid bushes.

In the high Himalaya the predominant vegetation comprises mostly grasses and valuable medicinal plants i.e. *Dactylorhiza hatagirea* (Pancha awale), *Nardostachys grandiflora* (Jatamansi), *Cordyceps sinensis* (Yarshagumba), *Neopicrorhiza scrophulariifolia* (Kudki), *Aconitum* sp. etc.

Sufficient wild nettle and bamboo (*Nigalo*) are also available in both high hill forest areas and low altitude forest areas, which has been widely used by the villagers to prepare many local handicrafts. The predominant vegetation of the study area comprises *Alnus nepalensis* (Utis), *Rhododendron* species, *Arundinaria* sp., *Schima wallichii* (Chilauni), *Berberis aristata* (Chutro), *Betula utilis* (Bhoj Patra), etc.

3.4 People, Population and socio-economic status

In the study area there are three major ethnics and caste groups i.e. Gurung, Kami and Damai. The majority of population of the study area is occupied by Gurungs on the contrary Kamis and Damais are included in occupational caste group and are least in number (Table – 2).

Table 2: Socio- economic status of the studied area

S.N	Features		
1	Demographic features	No. of Household	337
		Average House Hold size	6.12
		Total Population	2064
2	Literacy		59%
3	Ethnicity		Gurung (84.78%), Kami (11%), Damai (3.59%)
4	Occupation		Agriculture (60.80%), foreign Service (13.08), Business (0.73%), Government Service (0.54%), Others (24.85%)

Source: Gurung H.M. (1999) and field survey 2005

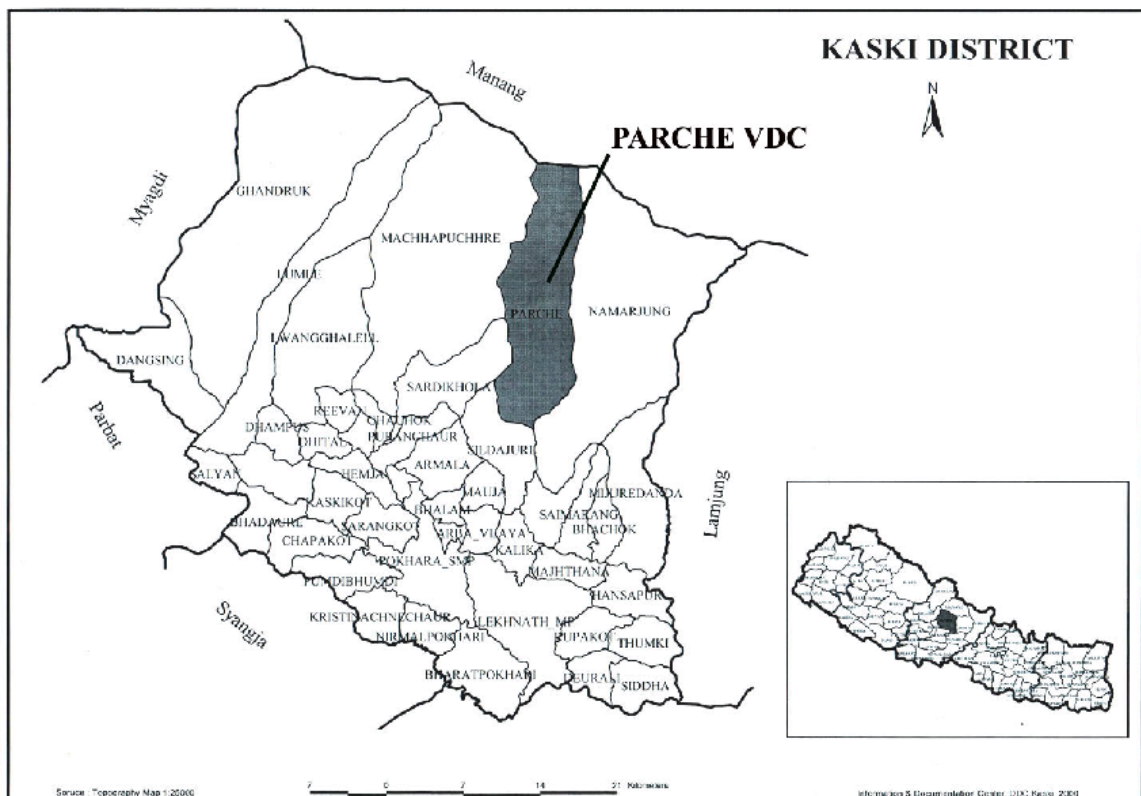
It is regarded as the biggest and most beautiful Gurung settlement in Nepal. The people of this village have been utilizing and managing forest resources in their own way for many generations. Apart from this, it has reasonably undepleted forests that contain different medicinal plants and other NTFPs.

3.5 Ecotourism

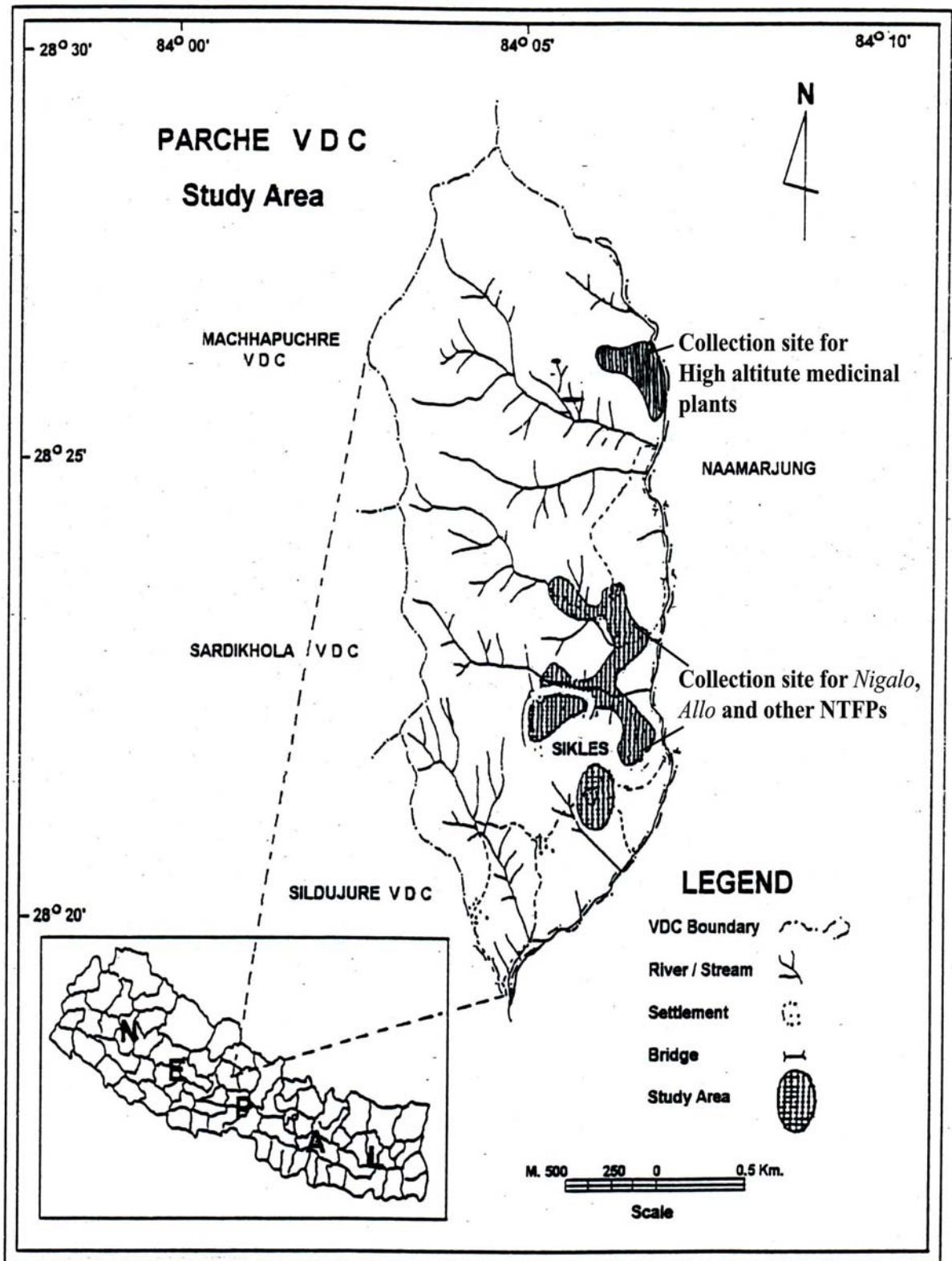
The study area lies within the famous conservation area i.e. Annapurna Conservation Area. It is rich in culturally as well as naturally. It is the largest conservation area in Nepal and covers an area of 7,629 sq. km including recently added Upper Mustang area. Most of the inhabitants are subsistence farmers, dependent on the natural resources of the area and utilizing traditional management system.

The village conceptually represents a body of indigenous knowledge rooted in traditional society, which can be observed in the practice of their culture and ritual. It is rich in biodiversity. There are many useful NTFPs and other forest products. Apart from these, there can be found varieties of wild animals and many insects especially different coloured of butterflies.

MAP 1. KASKI DISTRICT



MAP 2. STUDY AREA



Source: Nepal Map House, Kathmandu 1999.

CHAPTER FOUR

4. METHODOLOGY

This research has been carried out in order to document the traditional knowledge of non-timber forest products and to study the socio-economic importance of *Nigalo* and *Allo* being used by the people of the study area. The following are brief discussion of the research methods employed to obtain relevant data and to analyze them.

4.1 Research design

The main objective of the present study is to explore and document the indigenous knowledge on NTFPs in the study area. Therefore, exploratory as well as descriptive qualitative research designs were employed to make the present study more considerable and intensive. No hypothesis was used in the research since it is a qualitative study that seeks to explore, identify and document the indigenous knowledge of NTFPs in the study area.

4.2. Selection of the research site

For this research the suitable study area was chosen. Before data collection, the study site was selected on the basis of available information. Reconnaissance survey of the study area was undertaken in May 2004. The site was selected based on the information of local people about accessibility, rate of exploitation and availability of plant resources.

The indigenous knowledge practiced by Gurung and other caste groups in terms of utilization and management of NTFPs has the great potentialities to give them sustainability. On the basis of richness of plant diversity, extension the utilization by residing community research site has been chosen.

4.3. Literature Search

The study was initiated by reviewing existing literatures about utilization pattern of plant resources. Available information was obtained by the study before and after field visit. A discrete framework for the study was designed with the help of various publications especially that of Martin (1995) and previous researches in Ethnobotany. All the Ethnobotanical studies were reviewed in detail.

4.4. Selection of NTFPs

Most available bamboo species and *Girardinia diversifolia* were selected to study the socio-economic importance of bamboo and *Allo* based work in the study area. Selection of these NTFPs was based on the preferences of local people for substances use, household use or for market economy.

4.5 Methods of data collection

The primary information regarding the uses, values of plants towards the utilization pattern of plant resources were documented during empirical fieldwork in the study area. The fieldwork comprises two approaches i.e. survey technique and inventory technique (Martin, 1995, Cunningham, 2001). The survey technique included individual and in depth interviews and focus group discussion among the local plant users, community members and traditional faith healers, school teachers, villager heads. The inventory technique comprises the collection of different plant specimens from the study area and identification of their local names, part(s) used purpose of use, etc. with the participation of knowledgeable key interviewees/people as well as by transect walk (survey) with local people.

For the collection of Ethnobotanical information, following methods were followed.

4.5.1 Field visit and household survey

The field was visited three times during the month of July-October 2004, May- August 2005, and October-December 2005. During the course of field visit household survey was conducted on random basis selecting 10-15% households. Rapid Rural Appraisal (RRA) method was used to collect information, which includes the local name, use category, parts used, method of use of these plants etc.

4.5.2 Key informants interview

Key informant interviews were used to collect data during the field study. Few local NTFPs collectors, traditional healers, Cattle herdsman, local lama and Jhakri and elderly people of the study area were selected as key informants from Gurung, Kami, and Damai of the village. Structural and semi-structural questions with the help of some selected checklist during the less busy time with them mostly in the evening in the house. Beside key informants, the researcher also took interviews with many other people to collect the information related to NTFPs.

4.5.3 Group discussion, Participatory Rural Appraisal (PRA) and Rapid Rural Appraisal (RRA)

Focus group discussion was carried out by following Participatory Rural Appraisal (PRA) technique given by Martin (1995). This method was employed to get information from local people having knowledge on the different uses of plant species, location, seasonally growing condition, and place of availability, state of collection, use category, marketing, and cultivation. PRA was conducted in different wards in close participation and cooperation of the local people.

Rapid Rural Appraisal (RRA) is a process of learning about rural conditions in an intensive, interactive, and expeditious manner. RRA methodologies are designed for interdisciplinary investigation of socio-culturally and biophysically complex rural systems, which facilitates rapid and progressive learning (Vityakon *et al.*, 1995). Six helpers, i.e. 'what, when, where, how, who and while' were used as a tool to formulate questions in the study.

Key informants were the important source of primary data. They were interviewed first to access the local situations and to identify respondents. Rapid rural appraisal was applied to collect data from the local people with the help of a standard questionnaire. Selective interviews with the key informants were taken and interviews with the local faith healers and elder people yielded information on the use, vernacular name, plant parts used, purpose of use, mode of preparation and modes of administration etc for medicinal and other purpose. Efficiency of data collection was evaluated according to the 'law of diminishing returns' (Martin, 1995).

In such gathering people of different age groups, people of different community and peoples of both sexes were included. A good intimacy was created with them for the documentation of their knowledge.

4.5.4 Plant specimen collection, herbarium preparation and identification

Collections of voucher specimens are important because they serve as permanent records of the plants from certain community and function as specimens for determination (Shrestha, 1998). The plant specimens were collected from the study area as well as field notes. Specimens' collection and herbarium preparation followed the standard technique of Lawrence (1967) and Martin (1995). Specimens were collected so as to represent as well as possible the morphological features of the species. Plant measurements, locality of collection, environmental aspects of collection site were noted in the field note. The specimens were identified in the field with the help of Stainton (1997). Almost all the plant specimens were collected for herbarium

preparation as voucher specimens. The dried specimens were mounted in standard sized herbarium paper and labelled with the information's from field notebook.

The collected plants were identified using standard literatures (Hooker 1872 – 1897, Anonymous 1948-1976, Stainton 1972, Hara *et al.* 1978, 1979, 1982, Gurung 1997, Anonymous 1986, Stainton 1988, Anonymous 1993). Further the specimens were confirmed by making a cross check with the authentic specimens located at Tribhuvan University Central Herbarium (TUCH) and at National Herbarium and Plant Laboratory, Godawari (KATH). Nomenclature of identified specimens followed Press *et al.* (2000). All the herbarium specimens are deposited in Tribhuvan University Central Herbarium (TUCH).

A concise and diagnostic description of each species has been given on the basis of exomorphic characters of stem, leaf, inflorescence, flower, fruit and seed. Distribution and field notes along with their use collected from the local inhabitants follow the description of plant. The flora is documented in alphabetical order.

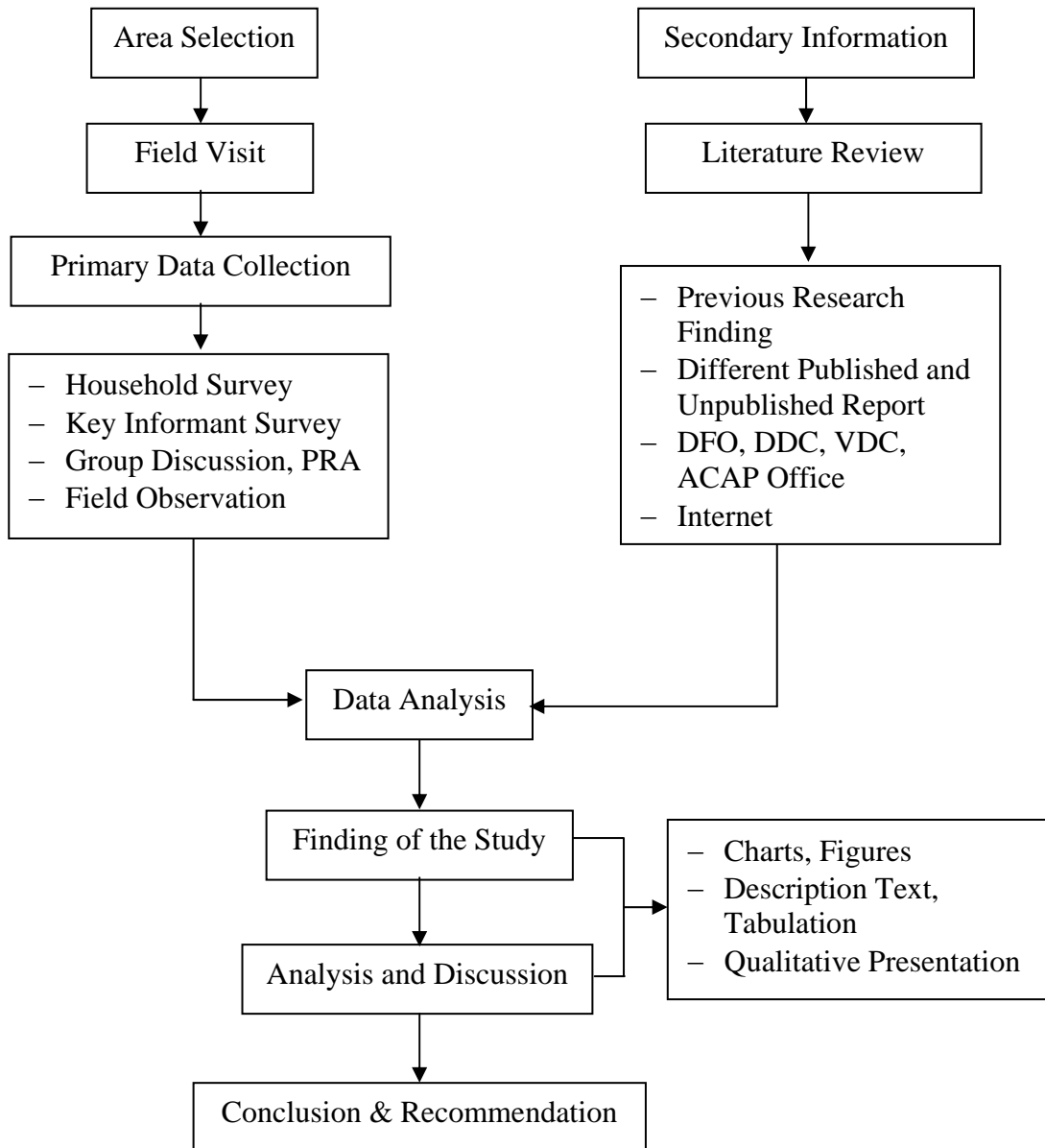
4.5.5 Secondary data collections

Various secondary information were collected from numerous published and unpublished research reports, papers, documents and articles available in different libraries. Secondary information regarding the area of Sikles and other data were collected from ACAP, VDC office, Central Bureau of Statistics, Department of Meteorology, World wildlife fund (WWF), Tribhuvan University Central Library (TUCH), District Forest Office (DFO) etc. Besides, all the available literature on ethnobotany, *Nigalo* and *Allo* was reviewed.

4.6 Data analysis

The information collected from local people of different wards was compiled and a single set of ethnobotanical information had been prepared. Further, the field data was analyzed to assess use categories; parts use categories and use values on different purposes. Basic statistical tools such as tabulation, pie chart, bar graph, figures and maps had been employed to make the findings comprehensible at a glance.

Flow Chart 1 - Methodology



CHAPTER – FIVE

5. RESULTS

5.1 Diversity of Ethnobotanically Useful NTFPs

Plant resources in and around habitations and beyond the forests and other natural areas fulfil many of the basic and secondary needs of rural and urban communities. The indigenous people have traditional beliefs, taboos or avoidances, which are practiced by them for conservation and preservation of the biological resources with their sustainable use. The people live in close vicinity of forests and have several beliefs and myths related to their ambient vegetation. Many beliefs associated with the plants have a significant influence on the management of plant resources. Since the communities are mainly the traditional type of community depending on agriculture and forest resources for their livelihood, people of these communities used to obtain their daily needs from their environment. They are trained in utilizing plants in many disciplines such as medicines, timber, fodder, poison, thatching, dying, etc.

Based on the present study it was found that the peoples of this locality utilizes 111 plant species as medicine, food, fibre, ceremonies, dye, for fish poisoning etc. The species belongs to 64 families and 97 genera. These represent 100 species of angiosperm (79 species of dicot and 21 species of monocot) four species of gymnosperm, four species of pteridophytes, two species of fungi and one species of lichen. On the basis of their habit these plant species can be grouped into tree (26 species), herb (70 species), shrub (15 species) and climber (7 species). Among 64 families, the Compositae, Gramineae, Polygonaceae, Rosaceae and Moraceae are the dominant families having highest number of species (Table 3).

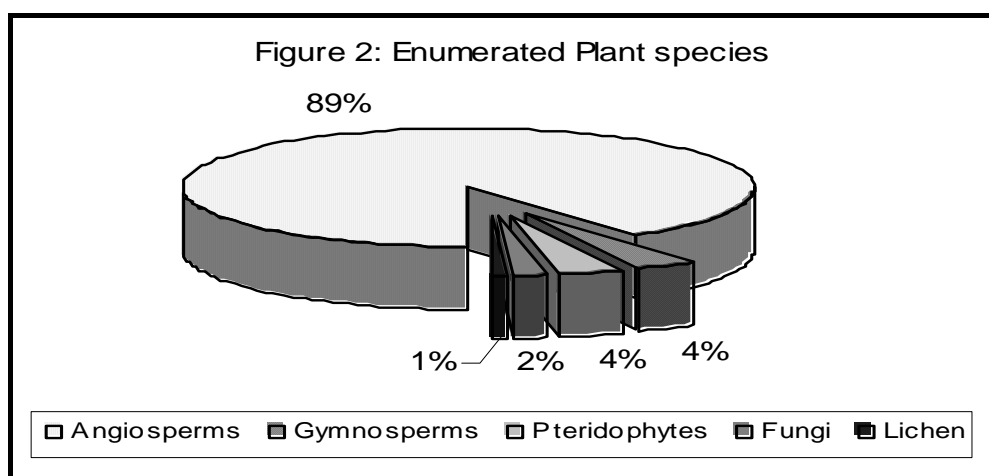


Table 3: Number of genera and species recorded in different families

Sn.	Families	No. of genera	Percentage	No.of species	Percentage
1.	Compositae	6	6.25	6	5.4
2.	Gramineae	6	6.25	6	5.4
3.	Polygonaceae	4	4.16	5	4.5
4.	Rosaceae	3	3.12	5	4.5
5.	Moraceae	1	1.04	4	3.6
6.	Araceae	2	2.08	3	2.7
7.	Anacardiaceae	2	2.08	3	2.7
8.	Ericaceae	2	2.08	3	2.7
9.	Labiatae	2	2.08	3	2.7
10.	Liliaceae	3	3.12	3	2.7
11.	Orchidaceae	3	3.12	3	2.7
12.	Ranunculaceae	2	2.08	3	2.7
13.	Scrophulariaceae	2	2.08	3	2.7
14.	Solanaceae	1	1.04	3	2.7
15.	Urticaceae	3	3.12	3	2.7
16.	Berberidaceae	1	1.04	2	1.8
17.	Betulaceae	2	2.08	2	1.8
18.	Juglandaceae	2	2.08	2	1.8
19.	Lauraceae	2	2.08	2	1.8
20.	Umbelliferae	2	2.08	2	1.8
21.	Zingiberaceae	2	2.08	2	1.8
22.	Agavaceae	1	1.04	1	0.9
23.	Amaryllidaceae	1	1.04	1	0.9
24.	Begoniaceae	1	1.04	1	0.9
25.	Bombacaceae	1	1.04	1	0.9
26.	Boraginaceae	1	1.04	1	0.9
27.	Bromelaceae	1	1.04	1	0.9
28.	Cannabaceae	1	1.04	1	0.9
29.	Caryophyllaceae	1	1.04	1	0.9
30.	Chenopodiaceae	1	1.04	1	0.9
31.	Cruciferae	1	1.04	1	0.9
32.	Dioscoreaceae	1	1.04	1	1.9
33.	Elaeagnaceae	1	1.04	1	0.9
34.	Equisetaceae	1	1.04	1	0.9
35.	Euphorbiaceae	1	1.04	1	0.9
36.	Fagaceae	1	1.04	1	0.9
37.	Gentianaceae	1	1.04	1	0.9
38.	Hippoastanaceae	1	1.04	1	0.9
39.	Hypocreaceae	1	1.04	1	0.9
40.	Lardizabalaceae	1	1.04	1	0.9
41.	Loranthaceae	1	1.04	1	0.9
42.	Lycopodiaceae	1	1.04	1	0.9

43.	Meliaceae	1	1.04	1	0.9
44.	Menispermaceae	1	1.04	1	0.9
45.	Morchellaceae	1	1.04	1	0.9
46.	Myricaceae	1	1.04	1	0.9
47.	Myrsinaceae	1	1.04	1	0.9
48.	Myrtaceae	1	1.04	1	0.9
49.	Phytolacaceae	1	1.04	1	0.9
50.	Piperaceae	1	1.04	1	0.9
51.	Pteridaceae	1	1.04	1	0.9
52.	Rubiaceae	1	1.04	1	0.9
53.	Rutaceae	1	1.04	1	0.9
54.	Sambucaceae	1	1.04	1	0.9
55.	Saurauiaceae	1	1.04	1	0.9
56.	Saururaceae	1	1.04	1	0.9
57.	Saxifragaceae	1	1.04	1	0.9
58.	Taxaceae	1	1.04	1	0.9
59.	Theaceae	1	1.04	1	0.9
60.	Thymelaceae	1	1.04	1	0.9
61.	Usneaceae	1	1.04	1	0.9
62.	Valerianaceae	1	1.04	1	0.9
63.	Violaceae	1	1.04	1	0.9
64.	Woodsiaceae	1	1.04	1	0.9
	Total	97	100%	111	100%

5.2 Ethno botanical knowledge on NTFPs

There are three major ethnic groups i.e. *Gurung, Kami and Damai*. Gurung occupies the number of majority and have their own tradition, belief and culture. They follow their cultural norms and value while celebrating every function in the society. There is close relationship between their culture and plants.

Elder respondents and persons engaged in agriculture possess sufficient knowledge on NTFPs utilization. They have been utilizing NTFPs as traditional medicine, fibre plants, cultural purpose, etc. People from young generation have little knowledge on NTFPs. Both elder male and female are more familiar to identify the NTFPs than the young people (Table 4) mainly regarding the medicinal uses.

People from the low economic status pay more interest on practices and utilization of NTFPs, as they are easily available and affordable. Some of the NTFPs have been using by local people for income generation, which mainly include plants for handicraft and medicinal plants.

Table 4: Knowledge on NTFPs of the respondents according to age group

15 - 25 years Respondents: 30 (Including male & female)		25 - 45 years Respondents: 30 (Including male & female)		Above 45 years Respondents: 30 (Including male & female)	
Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)
16.5	83.5	50	50	70	30

Source: Field survey 2005

Practitioners hesitate to give all information regarding the knowledge and practice. The wealth of information about plants, especially the plants used medicinally, hidden among these community groups has developed through age-long efforts of trial and error. Because of illiteracy and some beliefs and superstitions to keep the knowledge secret, the information is unwritten and hidden. They think if they transfer all knowledge, their popularity in society will be lost. It indicates that indigenous knowledge and use practices of local medical practitioners are not properly transferred to the new generation. This is a consequential drawback of the knowledge transfer in the society, which might be creating difficulty in documentation and sustainable management of important NTFPs.

Nigalo and *Allo* work is of great importance to the people of Sikles area and there still exists high level of traditional skill. The local people derive considerable amount of benefit, including cash income from it. However, lack of easy access, destruction of natural forest, lack of cultivation practice, and lack of proper market leads to decline in the interest toward this occupation.

5.2.1 Plant Use Categories

Based on the uses, the plant species are grouped into 14 different plant use categories. Total number of plant species found in each plant use category is given in table 6. Result showed that 66 plant species (33% of the total) are used for medicinal purposes, followed by edible plants 49 species (24.5%), ceremonial 16 species (8%), poisonous (fish poison, insecticides) 15 species (7.5%), veterinary used plants 14 species (7%), dye 8 species (4%), handicrafts three species (1.5%), agricultural implement seven species (3.5%), fibre four species (2%), gum five species (2.5%), hedge and shade three species (1.5%), broomstick three species (1.5%), detergent two species (1.5%) and miscellaneous four species (2%) (Table 5 and Fig. 3).

There are large numbers of species having multiple uses, i.e. the species representing more than one use category. A total of 70 species (63.06%) of angiospermic plants are

found representing more than one-use categories (Table 6). Due to such multiple uses of different species there is repetition of species number in different use categories.

For example root of Halalo (*Rumex nepalensis*) is used for medicine as well as for dye. The fruit, leaf and stem of loth salla (*Taxus wallichiana*) are used as edible fruit, medicine, agricultural implements and household construction materials respectively. Root, Bark and fruit of Chutro (*Berberis aristata*) are used as medicine, dye and edible fruit.

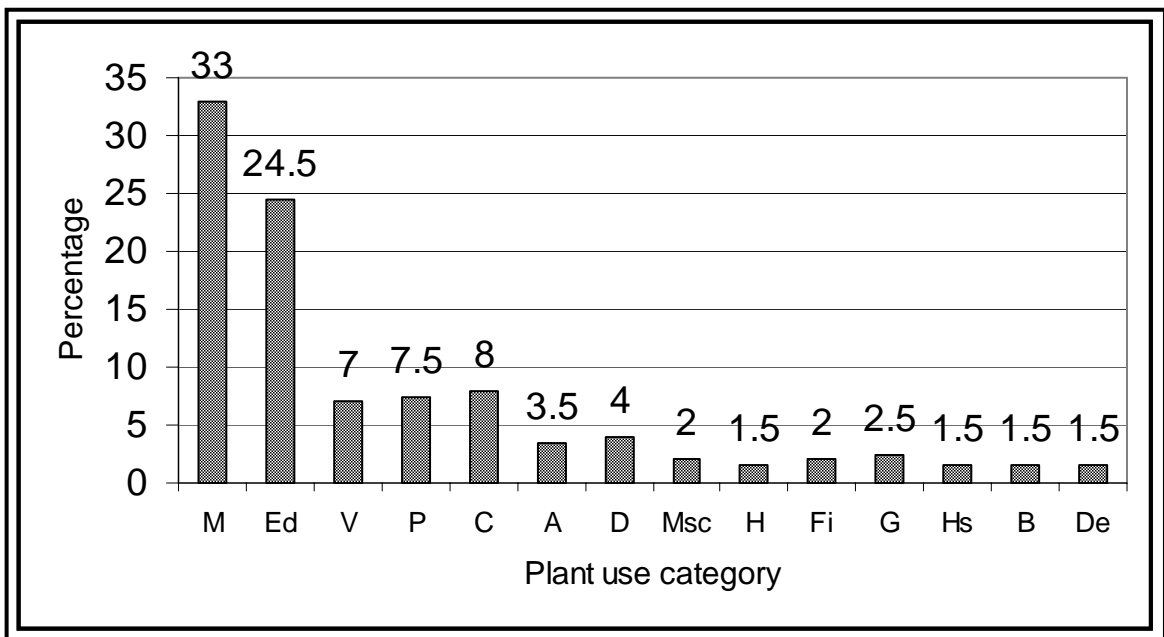


Fig. 3. Plant used for various purposes (M=Medicinal, Ed= Edible, V= Veterinary, P= Poisonous, C= Ceremonial, A= Agricultural implements D= Dye , Msc= Miscellaneous, H= Handicraft, Fi= fibre, G= Gum, Hs= Hedge and shade, B= Broomstick, De=Detergent)

Table 5: Number of plant species found in different plant use categories

Sn	Use category	Lichen	Fungi	Pteridophytes	Gymno sperm	Angiosperms				Total angiosperms	Total species	%
						T	S	H	C			
1	Agricultural implements	-	-	-	1	6	-	-	-	6	7	3.5
2	Broomstick Plants	-	-	-	-	-	-	3	-	3	3	1.5
3	Ceremonial plants	-	-	1	-	4	1	9	1	15	16	8
4	Detergent plants	-	-	-	-	1	-	1	1	3	3	1.5
5	Dyeing plants	-	-	-	1	5	2	1	1	9	8	4
6	Edible plants	-	1	1	1	18	6	18	6	48	49	24.5
7	Fibre yielding plants	-	-	-	-	-	1	3	-	4	4	2
8	Gum	-	-	-	-	2	-	2	-	4	5	2.5
9	Handicraft plants	-	-	-	-	-	4	-	-	4	3	1.5
10	Hedge and shed plants	-	-	-	-	1	1	1	-	3	3	1.5
11	Medicinal plants	1	1	3	1	15	7	34	5	60	66	33
12	Poisonous plants	-	-	-	-	4	3	8	-	15	15	7.5
13	Veterinary plants	-	-	-	-	2	3	7	2	14	14	7
14	Miscellaneous	-	-	-	-						4	2
Total		1	2	5	4	58	28	85	15	188	200	100

Note:(**T=Tree,S=shrub,H=Herb,C=Climber**)

Table 6: NTFPs in different multiple use categories.

Multiple use categories	Number of species	%
One use category	40	36
Two	47	42
Three	22	19
Four	1	0.9
More than four	1	0.9
Total	111	100

5.2.1.1 Plant sub-use categories

In each major plant use category different sub- use categories are determined. Following sections describe the number of plant species in different sub-use categories.

i. Medicinal plants

The medicinal plants are grouped into 36 sub-use categories according to specific diseases or disorders. List of these medicinal plant species is gives in Appendix 3, total number of species in each sub-use category is given in table 8.

Analysis of the data showed altogether 36 types of human diseases and disorders treated by plants. Altogether 66 plant species (60 angiosperms, three pteridophytes, one lichen, one gymnosperm and one fungi), belonging to the 65 genera and 50 families are used for curing diseases and disorders.

Compositae, Liliaceae, Polygonaceae, Solanaceae are the largest family containing three species used for different diseases, which are followed by Anacardaceae, Ericaceae, Labiatae, Lauraceae, Orchidaceae, Rosaceae, Urticaceae and Zingiberaceae representing each having two plant species used for different disease. Rest of 50 families has only one species to treat disease and disorder (Table 7).

Highest numbers (17 species) of plants are found to be used in the treatment of abdominal disease. Similarly, 15 species are used for cut and wounds, 11 species (15.06%) for fever, eight species (10.95%) for gastric disorders, seven species (9.58%) for cough and cold, dysentery; four species (5.47%) for sprains, stomachic; three species (4.10%) each for body itching, boils, bone fracture, burns, dental diseases, diarrhoea, headache, snake bite, urinary problem, intestinal worm, menstrual disorder; two species (2.73%) each for blood purification, chest burn, water brash and one species (1.36%) each was used for other 16 diseases.

Table 7: Medicinal plants in different sub-use categories

S.N	Disease/Disorders	Scientific Name	Family	Parts Used	Form of Medication
1	Abdominal Pain (Pet dukheko, Gano, Bikar Pareko)	<i>Aconitum gammiei</i>	Ranunculaceae	Root	Watery extract
		<i>Asparagus racemosus</i>	Liliaceae	Root	Juice
		<i>Cannabis sativa</i>	Cannabaceae	Leaf, seed	Powder
		<i>Chenopodium album</i>	Chenopodiaceae	Seed, Young Short	Powder, Cooked
		<i>Cirsium verutum</i>	Compositae	Root	Juice
		<i>Curcuma angustifolia</i>	Zingiberaceae	Rhizome	Juice
		<i>Duchesnea indica</i>	Rosaceae	Root	Juice
		<i>Drymaria diandra</i>	Caryophyllaceae	Whole Plant	Powder
		<i>Equisetum debile</i>	Equisetaceae	Whole plant	Paste
		<i>Neopicrorhiza scrophulariifolia</i>	Scrophulariaceae	Rhizome	Powder
		<i>Paris polyphylla</i>	Liliaceae	Rhizome	Juice
		<i>Rheum australe</i>	Polygonaceae	Root stock	Decoction
		<i>Rubus ellipticus</i>	Rosaceae	Root	Watery extract
		<i>Rumex nepalensis</i>	Polygonaceae	Root	Juice
		<i>Swertia chirayita</i>	Gentianaceae	Whole Plant	Juice
<i>Urtica dioica</i>	Urticaceae	Root	Decoction		
<i>Zanthoxylum armatum</i>	Rutaceae	Fruit	Paste/ powder		
2.	Anti-lice	<i>Melia azedarach</i>	Meliaceae	Fruits & leaf	Paste
3.	Aphrodisiac	<i>Cordyceps sinensis</i>	Hypocreaceae	Whole plant	Powder
4.	Arthritis, Joints pain	<i>Juglans regia</i>	Juglandaceae	Bark	Paste
5.	Asthma	<i>Piper mullesua</i>	Piperaceae	Fruit	Powder
6.	Blood Purification	<i>Acorus calamus</i>	Araceae	Rhizome	Juice
		<i>Cinnamomum tamala</i>	Lauraceae	Bark	Juice
8.	Blood pressure	<i>Allium sativum</i>	Amaryllidaceae	Bulb	Raw
9.	Boils (pilo)	<i>Aconitum gammiei</i>	Ranunculaceae	Tuberous root	Paste
		<i>Euphorbia royleana</i>	Euphorbiaceae	Latex	Raw
		<i>Viola pilosa</i>	Violaceae	Leaf	Paste
10.	Bone fracture	<i>Dendrobium nobile</i>	Orchidaceae	Stem	Paste
		<i>Rheum australe</i>	Polygonaceae	Root stock	Decoction
		<i>Rumex nepalensis</i>	Polygonaceae	Root	Paste
11.	Brain tonic	<i>Centella asiatica</i>	Umbelliferae	Leaf	Raw
12.	Burns	<i>Dactylorhiza hatagirea</i>	Orchidaceae	Root tuber	Powder
		<i>Equisetum debile</i>	Equisetaceae	Whole plant	Ash
		<i>Lycopodium Clavatum</i>	Lycopodiaceae	Spore powder	Powder
13.	Cancer	<i>Taxus wallichiana</i>	Taxaceae	Leaf, stem bark	Powder
14.	Chest burn	<i>Girardinia diversifolia</i>	Urticaceae	Root	Juice
15.	Cold and Cough	<i>Acorus calamus</i>	Araceae	Rhizome	Raw
		<i>Curcuma angustifolia</i>	Zingiberaceae	Rhizome	Decoction
		<i>Drymaria diandra</i>	Caryophyllaceae	Whole plant	Raw
		<i>Neopicrorhiza scrophulariifolia</i>	Scrophulariaceae	Rhizome	Powder

		<i>Piper mullesua</i>	Piperaceae	Fruit	Powder
		<i>Rubus ellipticus</i>	Rosaceae	Young shoot	Raw / cooked
		<i>Swertia chirayita</i>	Gentianaceae	Whole plant	Powder
16.	Cut and wounds	<i>Ageratum conyzoids</i>	Compositae	Leaf	Paste
		<i>Bombax ceiba</i>	Bombacaceae	Root	Paste
		<i>Cannabis sativa</i>	Cannabaceae	Leaf	Paste
		<i>Centella asiatica</i>	Umbelliferae	Whole Plant	Paste
		<i>Cheilanthes albomarginata</i>	Pteridaceae	Whole plant	Juice
		<i>Cynoglossum zeylanicum</i>	Boraginaceae	Leaf	Paste
		<i>Dactylorhiza hatagirea</i>	Orchidaceae	Root tuber	Powder, Paste
		<i>Eupatorium adenophorum</i>	Compositae	Leaf	Juice
		<i>Ficus auriculata</i>	Moraceae	Latex	Raw
		<i>Houttunia cordata</i>	Saururaceae	Leaf	Paste
		<i>Neopicrorhiza scrophulariifolia</i>	Scrophulariaceae	Rhizome	Paste
		<i>Paris polyhylla</i>	Liliaceae	Rhizome	Paste
		<i>Rheum australe</i>	Polygonaceae	Root	Decoction
		<i>Rhododendron arboretum</i>	Ericaceae	Bark	Paste
		<i>Rumex nepalensis</i>	Polygonaceae	Leaf	Juice
		<i>Solanum nigrum</i>	Solanaceae	Leaf	Paste
		<i>Usnea sp</i>	Usneaceae	Whole plant	Paste
17.	Dental diseases	<i>Acorus calamus</i>	Araceae	Rhizome	Juice
		<i>Juglans regia</i>	Juglandaceae	Stem	Juice
		<i>Solanum aculeatissimum</i>	Solanaceae	Fruit	Juice
18.	Diarrhoea	<i>Aconitum gammiei</i>	Ranunculaceae	Tuberous root	Juice
		<i>Rheum australe</i>	Polygonaceae	Root stock	Decoction
		<i>Rhus javanica</i>	Anacardiaceae	Fruit	Decoction
		<i>Phytolacca acinosa</i>	Phytolaccaceae	Leaf, stem	Cooked
		<i>Polygonum molle</i>	Polygonaceae	Juvenile shoot	Raw
19.	Dysentery (Ragatmase)	<i>Aconitum gammiei</i>	Ranunculaceae	Tuberous root	Juice
		<i>Bombax ceiba</i>	Bombacaceae	Bark	Powder
		<i>Cheilanthes albomarginata</i>	Pteridaceae	Whole plant	Juice
		<i>Choerospondias axillaries</i>	Anacardiaceae	Bark	Powder
		<i>Polygonum molle</i>	Polygonaceae	Juvenile shoot	raw
		<i>Psidium guajava</i>	Myrtaceae	Leaf	Powder
		<i>Rheum australe</i>	Polygonaceae	Root stock	Decoction
		<i>Rhus javanica</i>	Anacardiaceae	Fruit	Decoction
20.	Fever (Jaro)	<i>Cheilanthes albomarginata</i>	Pteridaceae	Whole plant	Powder
		<i>Cinnamom,um tamala</i>	Lauraceae	Leaf, Bark	Decoction
		<i>Sollena heterophylla</i>	Cucurbitaceae	Root	Juice
		<i>Eupatorium adenophorum</i>	Compositae	Root, leaf	Juice
		<i>Litsea cubeba</i>	Lauraceae	Fruit	Liquid
		<i>Neopicrorhiza scrophulariifolia</i>	Scrophulariaceae	Rhizome	Powder
		<i>Piper mullesua</i>	Piperaceae	Fruit	Powder
		<i>Solanum nigrum</i>	Solanaceae	Root	Paste
		<i>Urtica dioica</i>	Urticaceae	Root	Decoction

21.	Fish bone into the neck	<i>Rhododendron arboretum</i>	Ericaceae	Flower	Raw
22.	Gastric disorder	<i>Asparagus racemosus</i> <i>Bombax ceiba</i> <i>Cynodon dactylon</i> <i>Girardinia diversifolia</i> <i>Litchi sinensis</i> <i>Litsea cubeba</i> <i>Mangifera indica</i> <i>Rubus ellipticus</i>	Liliaceae Bombacaceae Gramineae Urticaceae Sapindaceae Lauraceae Anacardiaceae Rosaceae	Root Bark Whole plant Root Bark Fruit Bark Root	Powder Powder Juice Juice Powder Liquid Powder Powder
23.	Headache	<i>Lycopodium clavatum</i> <i>Nardostachys grandiflora</i>	Lycopodiaceae Valerianaceae	Spore Rhizome	Powder Juice
24	Intestinal worm	<i>Berberis aristata</i> <i>Cirsium verutum</i>	Berberidaceae Compositae	Root Root	Decoction Liquid
25	Menstrual disorder	<i>Bergenia ciliata</i> <i>Choerospondias axillaries</i> <i>Nardostachys grandiflora</i>	Saxifragaceae Anacardiaceae Valerianaceae	Rhizome Fruit Root	Decoction Raw Decoction
26	Mental disorder	<i>Urtica dioica</i>	Urticaceae	Root	Decoction
27.	Nose bleeding	<i>Cynodon dactylon</i>	Gramineae	Whole plant	Juice
28.	Pain I. Chest pain II. Ear Pain	<i>Cirsium verutum</i> <i>Euphorbia royleana</i> <i>Nicotiana tabacum</i>	Compositae Euphorbiaceae Solanaceae	Root Leaf Leaf	Juice Juice Juice
29	Smallpox (Befer)	<i>Artemisia dubia</i>	Compositae	Leaf	Paste
30.	Snake- bite	<i>Centella asiatica</i> <i>Paris polyphylla</i>	Umbelliferae Liliaceae	Whole plant Rhizome	Paste Paste
31.	Sprains	<i>Dendrobium amoenum.</i> <i>Euphorbia royleana</i> <i>Rheum australe</i> <i>Rumex nepalensis</i>	Orchidaceae Euphorbiaceae Polygonaceae Polygonaceae	Stem Latex Root stock Root	Paste Raw Decoction Paste
32	Stomachic (Bhok Badauna)	<i>Amomum subulatum</i> <i>Mentha spicate</i> <i>Zanthoxylum armatum</i>	Zingiberaceae Labiatae Rucaceae	Seed Leaf Fruit	Cooked Crushed Crushed
33	Tonic	<i>Cordyceps sinensis</i> <i>Nardostachys grandiflora</i> <i>Rheum australe</i>	Hypocreaceae Valerianaceae Polygonaceae	Whole plant Root Stem	Powder Decoction Cooked
34.	Urinary problem (pisab polnu, pisab rokinu)	<i>Ananas comosus</i> <i>Bergenia ciliate</i> <i>Cynodon dactylon</i> <i>Nardostachys grandiflora</i>	Bromeliaceae Saxifragaceae Gramineae Valerianaceae	Fruit Rhizome Whole plant Root	Raw Decoction Juice Decoction
35.	Water brash	<i>Cirsium verutum</i>	Compositae	Root	Juice
36.	White leprosy	<i>Rumex nepalensis</i>	Polygonaceae	Root	Paste

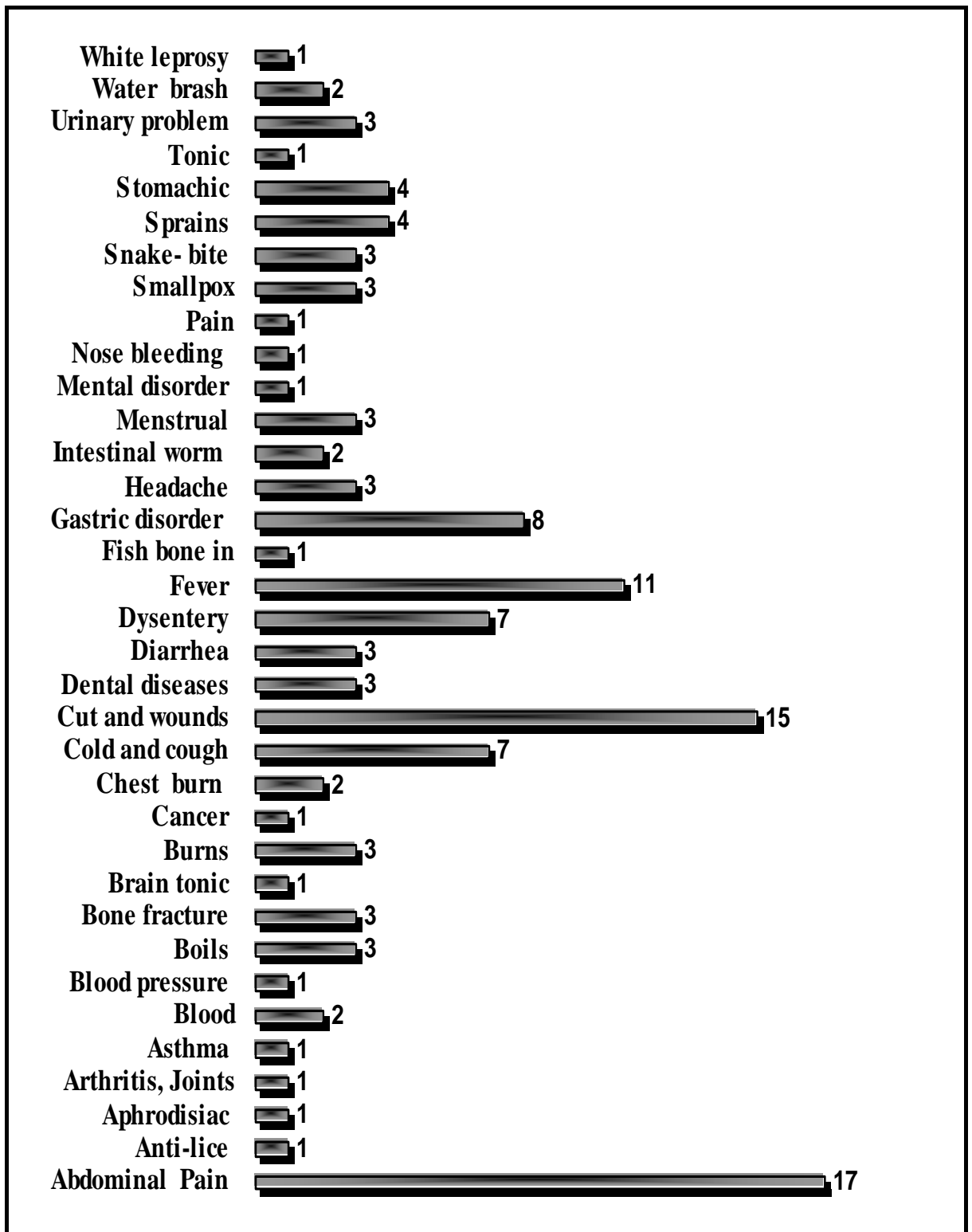


Figure 4: Number of Plant species used in different diseases

ii. Edible Plants

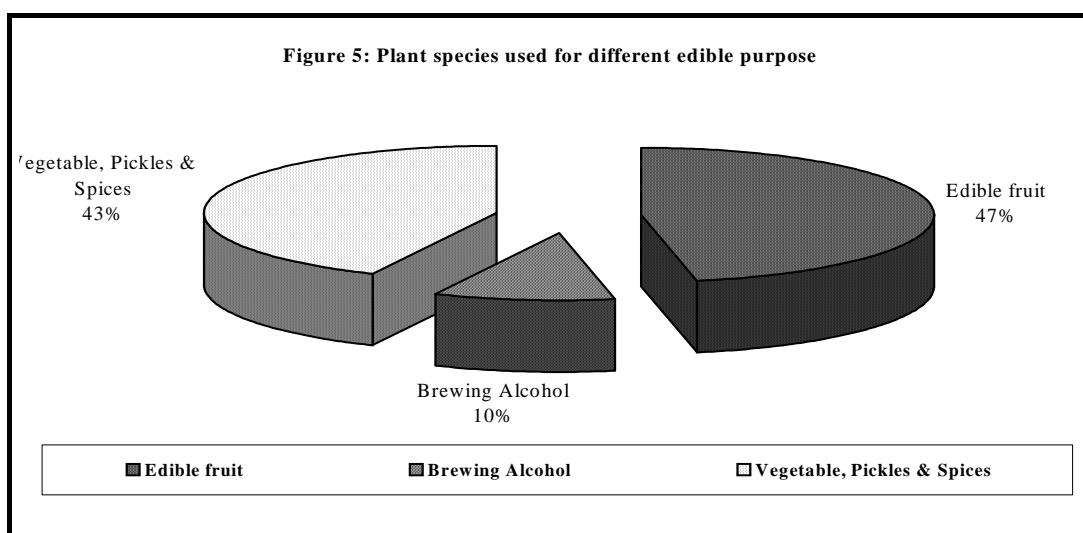
There are altogether 49 plant species belonging to the 37 genera and 30 families used for food by the local people, out of these, one species belong to pteridophyte, six species to monocotyledon and rest 40 species belong to the dicotyledon.

Edible plants are categorized into three sub-use categories depending on the nature of uses (table 8). Out of 49 edible plant species 24 species are found to be used as edible fruit. Similarly, 21 species for vegetable, pickle and spices and five species used for brewing alcohol.

Table 8: Edible plants in different sub use categories.

Sn	Sub-use category	Scientific Name	Family	Parts Use	Total Species	%
1.	Plants for brewing alcohol	<i>Asparagus racemosus</i>	Liliaceae	Root	5	9.8
		<i>Colebrookea oppositifolia</i>	Labiatae	Flower		
		<i>Inula cappa</i>	Compositae	Leaf, Flower		
		<i>Eleusine coracana</i>	Gramineae	Seed		
		<i>Rubus ellipticus</i>	Rosaceae	Root		
2.	Plants for vegetable, pickle and spices	<i>Arundinaria maling</i>	Gramineae	Young stem	21	43.13
		<i>Allium sativum</i>	Amaryllidaceae	Bulb, Leaf		
		<i>Asparagus racemosus</i>	Liliaceae	Young stem		
		<i>Bauhinia variegata</i>	Leguminosae	Flower buds		
		<i>Begonia picta</i>	Begoniaceae	Petiole		
		<i>Chenopodium album</i>	Chenopodiaceae	Young shoot		
		<i>Cinnamomum tamala</i>	Lauraceae	Leaf		
		<i>Cirsium verutum</i>	Compositae	young shoot		
		<i>Curcuma angostifolia</i>	Zingiberaceae	Rhizome Young		
		<i>Dioscorea bulbifera</i>	Dioscoreaceae	Tubers		
		<i>Diplazium maximum</i>	Woodsiaceae	Young shoot		
		<i>Litsea cubeba</i>	Lauraceae	Fruit		
		<i>Mentha spicata</i>	Labiatae	Leaf		
		<i>Piper mullesua</i>	Piperaceae	fruit		
		<i>Rheum australe</i>	Polygonaceae	Stem		
		<i>Rhus javanica</i>	Anacardaceae	Fruit		
		<i>Rumex nepalensis</i>	Polygonaceae	young shoot		
		<i>Urtica dioca</i>	Urticaceae	Young shoot		
<i>Zanthoxylum armatum</i>	Rutaceae	fruit				
3.	Edible fruits	<i>Ananus comosus</i>	Bromeliaceae	fruit	24	47
		<i>Berberis aristata</i>	Berberidaceae	Fruit		
		<i>Berberis asiatica</i>	Berberidaceae	fruit		
		<i>Choerospondias axillaries</i>	Anacardiaceae	fruit		
		<i>Duchesnea indica</i>	Rosaceae	fruit		
		<i>Elaeagnus latifolia</i>	Elaeagnaceae	fruit		
		<i>Ficus auriculata</i>	Moraceae	fruit		
		<i>Ficus semicordata</i>	Moraceae	fruit		

	<i>Holboellia latifolia</i>	Lardizabalaceae	Fruit
	<i>Jaglans regia</i>	Juglandaceae	fruit
	<i>Leucocephtrum canum</i>	Labiatae	Fruit
	<i>Litsea cubeba</i>	Lauraceae	Fruit
	<i>Myrica esculenta</i>	Myricaceae	Fruit
	<i>Paris polyphylla</i>	Liliaceae	fruit
	<i>Prunus cerasoides</i>	Rosaceae	fruit
	<i>Prunus domestica</i>	Rosaceae	fruit
	<i>Prunus persica</i>	Rosaceae	fruit
	<i>Psidium guajava</i>	Myrtaceae	fruit
	<i>Rhus javanica</i>	Anacardiaceae	fruit
	<i>Rubus ellipticus</i>	Rosaceae	fruit
	<i>Saurauia nepaulensis</i>	Sauraiaceae	fruit
	<i>Scurrulla parasitica</i>	Loranthaceae	Fruit
	<i>Solena heterophylla</i>	Cucubitaceae	Fruit



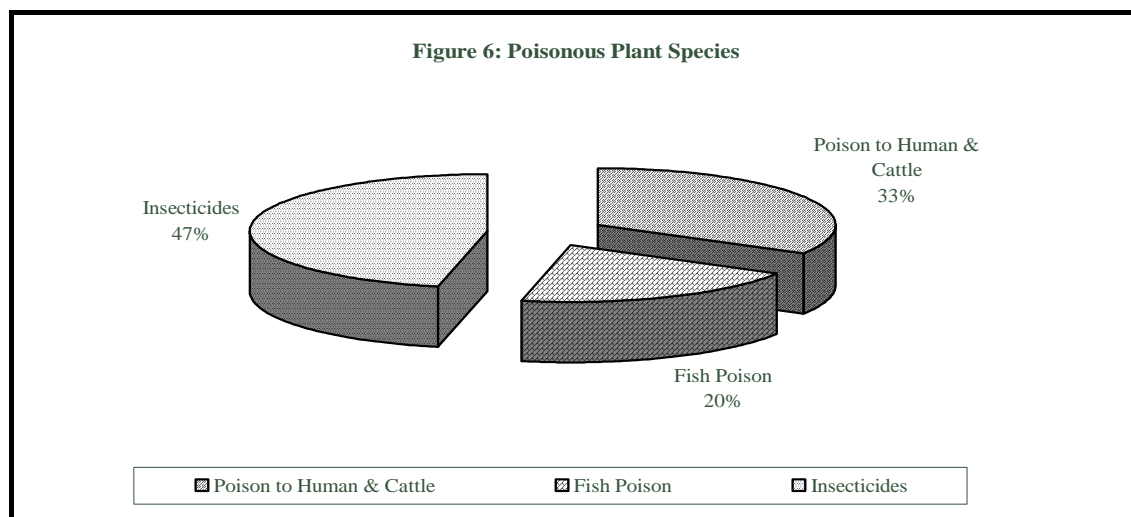
iii. Poisonous Plants

Altogether, 15 different poisonous plant species belonging to 10 families have been recorded in the study area. Out of these, three species belong to the monocotyledon and 12 species to dicotyledonous.

The poisonous plants are further grouped into three sub-use categories according to their action for specific organisms (Table 9). Highest numbers of poisonous plants are used for killing insects (46.6%). Similarly, 33.3% are poisonous to human and cattle and 20% are poisonous to fish.

Table 9: Poisonous plants in different sub-use categories

Sub use category	Scientific name	Family	Parts use	Total	%
Poisonous to human being and cattle	<i>Aconitum ferox</i>	Ranunculaceae	wholepalnt	5	8.57
	<i>Arisaema costatum</i>	Araceae	Whole plant		
	<i>Arisaema tortuosum</i>	Araceae	wholepalnt		
	<i>Aconitum ferox</i>	Ranunculaceae	wholepalnt		
	<i>Lyonia ovalifolia</i>	Ericaceae	wholepalnt		
Poisonous to fish	<i>Engelhardia spicata</i>	Juglandaceae	Leaf, Bark	3	21.42
	<i>Euphorbia royleana</i>	Euphorbiaceae	Latex		
	<i>Lyonia ovalifolia</i>	Ericaceae	Bark, leaf		
Poisonous to insects	<i>Acorus calamus</i>	Araceae	Rhizome	7	50
	<i>Aconitum ferox</i>	Ranunculaceae	Root		
	<i>Artemesia dubia</i>	Compositae	Leaf, stem		
	<i>Melia azedarach</i>	Meliaceae	Fruit, leaf		
	<i>Maesa chisia</i>	Myrsinaceae	Bark		
	<i>Urtica dioca</i>	Urticaceae	Leaf		
	<i>Zanthoxylum armatum</i>	Rutaceae	Fruit		



5.2.1.2 Parts use Category

Different parts of plants are used for different purposes. Some plant part may be used for a number of purposes and various parts of plants may also be used for a single purpose. Among all the collected plant species, maximum utilized plant parts are underground parts (32 species), followed by fruit (25 species), leaf (18 species), stem (12 species), young leaf/short (nine species), seed (four species), flower (four species) and latex (three species) Fig. 7.

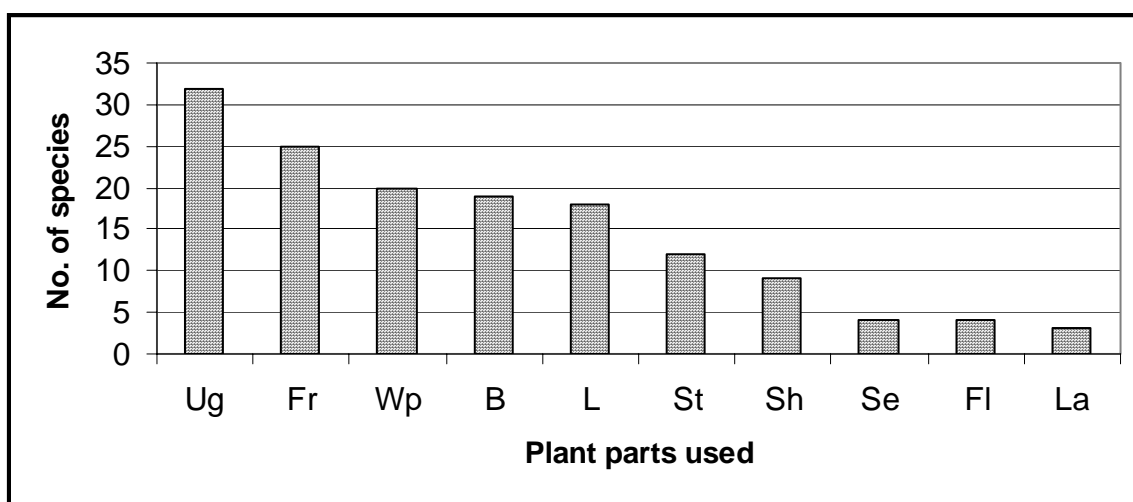


Fig. 7. Plant parts used (Ug = Underground parts, Fr = fruit, Wp= Whole plant, B= Bark, L= leaf, St = stem, Sh= Young leaf/ shoot, se= seed, fl= flower and La= latex)

5.3. Description of the ethno botanically important NTFPs

Aconitum ferox Wall. ex Ser.

- Family : Ranunculaceae
- Common name (s): Bikh (Nep.), Aconite (Eng.)
- Local name : मेगै, Megai (Gur.)
- Distribution : CE Nepal, alt. 2100-3800m. Himalayas (Nepal Bhutan)
- Flowering/fruiting: June-July
- Description : A perennial herb 1-2m tall with tuberous roots. Leaves with round or oval blade 8-15 cm across, deeply lobed. Flowers dull blue in a terminal spike-like cluster, hood 2-3cm broader than long, with a short acute beak. Follicle 5, usually finely hairy.
- Part (s) used : Tuberous root
- Uses : Medicinal uses: The plant is poisonous and used in many preparation of traditional medicine.
- Other uses : It is also used as insecticides. It has ritual value in the study area.
- Representative collection: Kaski, Sikles, Phulu, 3500m. August 5 2004. L.J Gurung, 320 (TUCH)

***Aconitum gammiei* Stapf.**

- Family : Ranunculaceae
- Common name (s): Nirmashi (Nep.)
- Local name : नरमासी, Narmashi (Gur.)
- Distribution : CE Nepal, alt. 3300-4300m. Himalayas (Nepal, Sikkim), China
- Flowering/fruited: June-July.
- Description : A herb to 1m tall. Leaves 4-5 cm across, deeply lobed, lobules narrow, acute. Flowers white or greenish yellow in a loose few-flowered inflorescence.
- Part (s) used : Tuberos root
- Uses : Medicinal uses: - Paste of tuberos root is used in wound, boils. Watery extract is taken to cure diarrhea and dysentery, swelling of stomach, stomach pain, and pain of lower back. It makes good to animals as well as human beings if they take poison.

Representative collection: Kaski, Sikles, Phulu, 4500m. August 5 2004. L.J Gurung, 319 (Photo plate no. 1.1)

***Acorus calamus* L.**

- Family : Araceae
- Common name(s) : Bojho (Nep.), Sweet flag Calamus root (Eng.)
- Local name : छयोदो मई, Chhyodomai (Gur.)
- Flowering/fruited: April – June / July – August
- Description : An aromatic erect perennial herb, root stock thick, creeping. 5-5.4 cm long, 0.6-2 cm wide, leaves distichous, nerves parallel, spathe leaf like, spadix 4-8 cm, tapering covered with small-yellow green bisexual flowers.
- Part(s) used : Rhizome, root
- Uses: Medicinal uses: -Rhizomes are chewed to obtain relief from cough, colds, and toothache. They are also used to treat diarrhoea and purify the blood. Paste made from rootstock is considered antiseptic to wounds in cattle. Other uses: -Power of rhizome is used as pesticides and insecticides.

Representative collection: Kaski, Sikles, Saba Dada, 2000m. July 10 2005. L.J. Gurung, 428.

Aesculus indica (Colebr. ex Cambess.) Hook.

- Family : Hippocastanaceae
Common name (s): Pangra (Nep.). Horse chest-nut (Eng.)
Local: name : चिमल, Chimal (Gur)
Flowering/fruiting: Apr.-Jun./Jun.-Oct.
Distribution : Afghanistan to C. Nepal 1800-3000m
Description : A tree nearly 12m tall. Leaves long-stalked, opposite, palmately compound, leaflets 5-9, generally unequal, oblanceolate, sharply serrate. Flowers terminal pyramidal panicles, white, tinged with pink.
Part(s) used : Fruit
Uses : Fruit is used to make soap.
Representative collection: Kaski, Sikles, 2000m. November 2 2004. L.J. Gurung, 355.

Agave cantula Roxb.

- Family : Agavaceae
Common name(s) : Ketuki (Nep., Gur)
Distribution : WE. Nepal alt. 2000m. Planted and naturalized in tropical Asia.
Flowering/fruiting: July – August (Fl).
Description : Large scapose shrub. Leaves borne next the ground in a massive rosette, thick and fleshy smooth, prickly on the edges, Flowers green. Panicked on large pole like scape, bracts small.
Part(s) used : Whole plant
Uses : Medicinal uses: - Leaf juice and root pastes are used in cut and wounds.
Other uses : Fibre extracted from the leaf is used for making ropes. This is used as hedge plant.

Representative collection: Kaski, Sikles, Maphu, 2000m. July 10 2005. L.J. Gurung, 429.

Ageratum conyzoides L.

- Family : Compositae
Common name(s) : Ganne (Nep.) Goat weeds (Eng.)
Local name : थानाउँ न्चो, Thanau nho (Gur.)

Flowering/Fruiting: July-Aug.

Distribution : Nepal (WCE, 200-2000m), Pantropical.

Description : Herb. Stem branched, terete, softly hairy. Petiole 1-2cm, leaves, ovate, 1-5x1-2cm, acute or obtuse, base truncate or rounded, margin crenate-serrate. Heads small, arranged in dense terminal corymbs. Involucres 3-5mm in diameter, bracts *ca.* 3.5 mm. Corolla tubular, *ca.* 2.5 mm, pale blue or white. Achenes angled, black, pappus scales 5, slightly longer than corolla, awned and minutely barbed.

Part(s) used : Leaf

Uses : Medicinal uses: - Leaf paste and juice is used in cut and wound.

Representative collection: Kaski, Sikles, 2000m. July 10 2005. L.J. Gurung, 424.

***Allium wallichii* Kunth**

Family : Amaryllidaceae

Common name(s) : Lasun (Nep.), Garlic (Eng.)

Local name : नू, Noo (Gur.)

Description : Hardy, perennial herb with narrow flat leaves, bears small white flowers and bulbils. The bulb consists of several smaller bulbs 'cloves' and is surrounded by white or pinky sheaths.

Part (s) used : Bulb, leaf

Uses : Medicinal uses: -High blood pressure patient takes raw bulb. It is also used for high altitudinal sickness.

Other uses : Stem is taken as vegetable, pickle & spice

Representative collection: Kaski, Sikles village, 2000m. July 10 2005. L.J. Gurung, 430. (Photo plate no. 1.2)

***Alnus nepalensis* D. Don**

Family : Betulaceae

Common name(s) : Uttis (Nep.), Alder, Nepal black Ceder (Eng)

Local Name : घ्योसी, Ghyosi (Gur.)

Flowering/fruiting: May / September – October

Distribution: WCE Nepal 500 – 2600m, Himalayas, NE India.

Description : Tree, branchlets glabrous, leaves shortly pointed, elliptic-lanceolate, petiolate, entire, male catkins in terminal drooping

panicles, female catkins cone like, fruit numerous, ellipsoid or sub-cylindric.

- Part (s) used : Bark
Uses : Medicinal uses: -Bark powder is used to cure cuts and wounds.
Other uses : The powder is also used as dye.
Representative collection: Kaski, Sikles, 2000m. September 10 2004. L.J Gurung, 345.

***Amomum subulatum* Roxb.**

- Family : Zingiberaceae
Common name(s) : Alainchi (Nep.), Greater cardamom (Eng.)
Local Name : अलाइची, Alainchi (Gur.)
Flowering/fruiting: September –November
Distribution : CE Nepal 1000-2000m. E. Himalayas (Nepal to Sikkim), N. India. Cultivated on shade slopes.
Description : Leafy shoots to 2m. Leaves lanceolate, acuminate, sessile or very shortly petiolate, 30-60x6-10cm, glabrous, ligule emarginated, lanceolate acuminate. Inflorescence subglobose to ovoid, 6-7x4-5 cm, peduncle 5-7cm, bracts reddish brown, ovate-obtuse with a 3-5mm subulate tip, 2.5-3x1.5-2cm,± glabrous, bracteoles tubular, 3cm. Calyx pinkish-white, corolla tube white, shorter than calyx, petals yellow. Capsule reddish, subglobose, 2-2.5cm, echinate.
Part (s) used : Seeds.
Uses : Medicinal uses: -Seeds stomachic, aromatic appetizer.
Other uses : Fruits give a strongly flavoured spice.
Representative collection: Kaski, Sikles, *Maphu*, 2000m. September 10 2004. L.J. Gurung, 346.

***Ananas comosus* (L.) Merr.**

- Family : Bromoliaceae
Common name(s) : Bhuikatar (Nep.), Pineapple (Eng.)
Local name : भूइकटर, Bhuikatar (Gur)
Distribution : E. Cultivated in warm countries.
Part(s) used : Fruit
Uses : Medicinal uses: Fruit is taken for urinary problem.

Other uses : Fruit edible.

Representative collection: Kaski, Sikles, Teene, 1250m. September 10. L.J.Gurung, 347.

Anaphalis busua (Buch. Ham. ex D. Don) DC.

Family : Compositae

Common name(s) : Seto ekle ghans (Nep.), Pearly everlasting (Eng.)

Local name : तोबु, Tobu (Gur.)

Flowering/fruiting: July – October (F1).

Distribution : Nepal (WEC, 1500-2900m) Himalaya (Kashmir to Bhutan), NE India (Meghalaya), Mynmar.

Description : Erect herb. Stem cottony, sometimes winged by the decurrent leaf bases. Leaves sessile, linear to narrow lanceolate, 2.5-8x0.3-1cm, acute, cottony above densely cottony beneath. Heads sub-globosa ca. 0.5 cm in diameter, fragrant, clustered in large number in corymbs. Involucral bracts elliptic, white. Achenes small linear.

Parts (s) Used : Shoot

Uses : Shoot is used to make partition walls in livestock sheds, which insulates the walls, retaining warmth inside. Friction of iron and stone creates the sparkling, which is absorbed by dried leaves of it to create fire. Hence it is used as a matchstick.

Representative collection: Kaski, Sikles, Siya cho, 2300m. July 10 2005. L.J.Gurung, 427.

Arisaema costatum (wall.) Mart.

Family : Araceae

Local name : त्वाब्यो, Tabyo (Gur.)

Distribution : CE, Nepal (1900-2800)

Description : A tuberous, glabrous herb, upto 1m tall. Leaf solitary, 3-foliolate, leaflets sessile, lateral oblique and median ovate, acuminate, blades strongly marked with very close set of parallel nerves, margin thickened and well-defined. Spathe brown with white stripes, limb oblong – lanceolate, narrowed into a filiform tip, appendage narrowed into a long tail.

Uses : Plant poison to human as well as cattle.

Representative collection: Kaski, Sikles, Paima chha, 2000m. September 10 2004. L.J. Gurung, 348.

Arisaema tortuosum (Wall). Schott.

- Family : Araceae
- Common name(s) : Sarpo ko makai (Nep.), Cobra Lilly (Eng.)
- Local name : तिज्या, Tijya (Gur.)
- Distribution : WCE Nepal 1300- 2900m. Himalaya (Punjab to Bhutan), NE India (Meghalaya, Manipur)
- Flowering/fruiting: July-August/August – October
- Description : A perennial herb monoecious or male with spheroidal tubers. Leaves 2, leaflets oblong to lanceolate. Acuminate, peduncle longer than the leaf. Tube of spathe green, cylindrical. Spadix unisexual, anthers 2-3.
- Part (s) used : Whole plant
- Uses : Whole plant is poisonous to human and animals. Fruit is used as bait for birds.

Representative collection: Kaski, Sikles, Paima chha, 2000m. September 10 2004. L.J. Gurung, 349. (Photo plate no.1.3)

Artemisia dubia (Wall.) Schott. Wall. ex Besser

- Family : Compositae
- Common name(s) : Tite pati (Nep.), Mug-wort (Eng.)
- Local name : चेउरी घुँ, Cheori dhu (Gur.)
- Flowering/fruiting: September – December (Fl. /Fr)
- Distribution : WCE. Nepal 1200-3400m. Himalaya, china, Korea, Japan.
- Description : Perennial herb, aromatic, 0.6-2.4m high, stem leafy, paniculate branched, lower leaves larger and upper leaves smaller, lanceolate, heads 3-4mm long.
- Part (s) used : Leaf, stem
- Uses : Medicinal uses: -Fresh leaves are crushed and extracted juice is applied to treat cut and smallpox. Plant paste is applied, massaged strongly and washed to treat skin diseases.
- Other uses : Flower, leaf and stem are used in worship, marriage and funeral ceremony. Leaf powder is used in pesticides and insecticides.

Representative collection: Kaski, Sikles, 2000m. September 10 2004. L.J Gurung, 344.

***Asparagus racemosus* Willd**

- Family : Liliaceae
Common name(s) : Kurilo (Nep.), Asparagus (Eng.)
Local name : पुचु तोरु, Puchu toru (Gur.)
Flowering/ fruiting: June-August/ December – February
Distribution : CE Nepal, alt. 600 – 2100 m, Himalayas, India, Malaysia, Australia, Africa.
Description : A straggling, much branched and spinous herb or shrub, root tuberous, cladodes 0.6-1.2 cm long, linear, flowers small white and in racemes, fruits 0.8 cm in diameter, berry, globose.
Part (s) used : Root, Young leaf
Uses : Medicinal uses: -Root juice is taken as remedy for stomach pain, colic in cattle. Root paste is mixed with cattle feed to increase lactation.
Other uses : Root paste was used as soap in the past time. Young leaves are cooked and eaten as vegetable. The plant is used to make gate during wedding ceremony. Root is used for brewing alcohol.

Representative collection: Kaski, Sikles, Leula 2010m. September 10 2004. L.J. Gurung, 346. (Photo plate no. 1.4)

***Begonia picta* Sm.**

- Family : Begoniaceae
Common name (s): Magar Kaanche (Nep.), Begonia (Eng.)
Local name : प्रुग्यो, Prugyu (Gur.)
Flowering/ fruiting: September- October
Distribution : WCE. Nepal 600-2800m Himalaya (Punjab to Bhutan), NE India.
Description : A small, pilose herb, 10-32 cm, high. Leaves ovate, cordate, acuminate, doubly finely serrate. Flower pink.
Part (s) Used : Petiole, Root
Uses : Medicinal uses: - Root infusion is taken orally to cure constipation.
Other uses : Raw and boiled petioles are made into pickles and eaten.

Reprentative collection: Kaski, Sikles, Heura 2087m. September 10 2004. L.J. Gurung, 341.

***Berberis aristata* DC.**

- Family : Berberidaceae
Common name (s): Chutro (Nep.), Nepal barberry (Eng.)
Local name : तिस्या , Tishya (Gur.)
Flowering/fruiting: April-June/July-November
Distribution : WC Nepal, alt. 1800-3000m. India, Himalayas (Nepal)
Description : A shrub, bark 2mm thick, external surface longitudinally as well as transversely striated yellowish grey, leaves simple, spiny-toothed, sessile, broadly lanceolate, flowered in corymbs or cymes, yellow, fruit berry yellow.
Part (s) used : Root, Bark, and Fruit
Uses : Medicinal uses: -Decoction of root is taken to kill intestinal worms of human as well as cattle.
Other uses : Ripe fruits are eaten. Bark is used for dying.
Representative collection: Kaski, Sikles, Leula, 2010m. June 8 2005. L.J. Gurung, 419.

***Berberis asiatica* Roxb. ex Dc.**

- Family : Berberidaceae
Common name (s): Chutro (Nep.), Common barberry (Eng.)
Local name : चुत्रु, Chutru (Gur.)
Flowering/ Fruiting: Feb. - Mar/ April – June
Distribution : WCE Nepal, alt. 1200-20500m Bhutan, India, China.
Description : A branched shrub with yellow wood. Stem with spines. Leaves thick rigid, evergreen with 2-5 spiny teeth, shining dark green above and greyish beneath, ovate to elliptic. Flowers small, yellow. Fruit a berry.
Part (s) used : Bark, Fruit
Uses : Ripe fruits are edible, bark is used for dying.
Representative collection: Kaski, Sikles, 1600m. June 8 2005. L.J. Gurung, 420.

***Bergenia ciliata* (Haw) Sternb.**

- Family : Saxifragaceae
Common name (s): Pakhanved (Nep.), Rockfoil (Eng.)
Local Name : घुर बासन ,Ghur Basana (Gur.)

Flowering/fruiting: March-May/June-July

Distribution : WC. Nepal alt. 1600-3200m. Afghanistan, Bhutan, India, China.

Description : Rootstock very stout, creeping. Leaves with ovate or rounded blade. Flower white, pink, purple, in a spreading, or dense cluster, borne on a stout leafless stem.

Part (s) used : Rhizome, flower

Uses : Medicinal uses: -Rhizome power is given to get relief from roundworm. Rhizome is pounded and given to treat swollen stomach in both humans as well as in animal. Decoction of 50-100ml of Rhizome 2-3 times per day is taken for urinary trouble, gal stone, and menstrual disorder.

Other uses : Flower is used as ornamental plant.

Representative collection: Kaski, Sikles village, 2000m. July 11 2005. L.J. Gurung, 446. (Photo plate no. 1.5)

Betula utilis D. Don

Family : Betulaceae

Common name (s): Bhojpatra (Nep.), Himalayan silver birch (Eng.)

Local name : खेल , Khel (Gur.)

Distribution : WEC Nepal, alt. 2700-4300m. Himalayas (Nepal to Bhutan), W. China.

Description : A tree with smooth, paper like bark, peeling up in thin sheets, outer layer pinkish white and inner layer pink. Leaves long, alternate, petiolate, ovate, serrated and long pointed. Male flowers in pendulous spike and female flower in erect or pendulous spike.

Part (s) used : Bark uses paper from bark is used in making *Syakhu* (Umbrella). It has also ritual value.

Representative collection: Kaski, Sikles, Kori, 4000m. August 5 2004. L.J Gurung, 327. (Photo plate no. 1.6)

Bistorta affinis (D.Don.) Greene.

Family : Polygonaceae

Local name : Thunduru tah (Gur.)

Flowering/Fruiting: June-September
Distribution : Nepal (WCE. Alt.:3500-4800m).Afghanistan, Himalaya (Kashmir to Nepal), China (Xizang).
Description : Tufted glabrous perennial herb with prostrate woody rootstocks, flowering stems erect, 15-30cm. Leaves elliptic-lanceolate, 4-8x0.7-1.5cm, acute base attenuate, glabrous, sometimes glaucous beneath, 1-3cm, brown, many nerved, lacerate. Flower pale or deep pink. Racemes dense, terminal, perianth c5.
Part(s) used : Flower
Uses : Flower is considered as holy plant.
Representative collection: Kaski, Sikles, Mhije, 4500m. August 5 2004. L.J. Gurung, 321.

***Bistorta macrophylla* (D.Don) Sojak**

Family : Polygonaceae
Common name (s): Khaldi (Nep.)
Local name : Thundura ta (Gur.)
Flowering/Fruiting: June-Aug.
Distribution : Nepal (WCE. Alt.:2700-4500m). Himalaya (Uttar Pradesh to Bhutan), NE India, W. & C. China.
Description : A slender plant, stem mostly 5-15cm. Leaves oblong acute to broadly linear, lower leaves long stalked. Rounded or oval terminal clusters of pink or red flowers usually c.1 cm long.
Part(s) used : Flower
Uses : Flower is considered as holy plant
Representative collection: Kaski, Sikles, Mhije, 4500m. August 5 2004. L.J. Gurung, 322.

***Cannabis sativa* L.**

Family : Cannabaceae
Common name(s) : Ganja, Bhang (Nep.), True hemp (Eng.)
Local name : गाँज , Ganja (Gur.)
Flowering/fruited: June-September
Distribution : WCE, Nepal alt. 200-2700m.Probably native of C. Asia.

Description : An erect herb, leaves palmate or the lower opposite, flowers pale yellow green, unisexual, clustered, female flower axillary.

Part (s) used : Seed, Bark, Leaf

Uses : Medicinal uses: The crushed plant or powder of the plant is taken to relieve abdominal pain. Plant paste is applied to treat cut and wounds. Leaf paste is given to cattle suffering from diarrhoea and to get relief from swollen stomach pain. Fruits are recommended in case of cold.

Representative collection: Kaski, Sikles, 1600m. May 25 2005. L.J. Gurung, 385.

***Centella asiatica* (L.) Urb.**

Family : Umbelliferae

Common name (s): Ghodtapre (Nep.), Water pennywort (Eng.)

Local Name : न्वो मइ, Nhomai (Gur.)

Flowering/fruiting: June – July – August

Distribution : WCE Nepal, alt, 500-2100m. Nepal, wide spread in tropical and subtropical regions throughout the world.

Description : Herbs, leaves 1.2-6 cm in diameter, usually glabrous, kidney shaped, crenate, not lobed, petiole pubescent or glabrous, umbels small, sometimes clustered, flowers 3 or 4 in umbel, purple white.

Part (s) used : Whole plant, leaf

Uses : Medicinal uses: -Leaf paste is applied in cuts and wounds. Plant paste is applied in snakebites, skin diseases and severe headache.

Representative collection: Kaski, Sikles, 2000m. June 8 2005. L.J. Gurung, 421.

***Cheilathes albomarginata* C.B. Clarke**

Family : Pteridaceae

Common name (s): Rani Sinka (Nep.)

Local name : सिन्की , Sinki/Napu (Gur.)

Distribution : WCE Nepal, alt. 500-2100m.

Description : Rhizomes short with tufts of hair pointed scales. Stipes 4-13 cm long, with reddish-brown, white margined, lanceolate scales through out. Fronds bipinnate, lanceolate to ovate- lanceolate,

lamina covered with waxy powder on the under surface. Sori continuous along the margin.

- Part (s) used : Whole plant
- Uses : Medicinal uses: -Plant powder is taken each morning and evening for three days to treat severe fever. Plant is crushed and filtrate and taken to treat dysentery. Juice of the plant is used to treat cuts.

Representative collection: Kaski, Sikles, 2000m. September 10 2004. L.J. Gurung, 343.

***Chenopodium album* L.**

- Family : Chenopodiaceae
- Common name (s): Bethe (Nep.), Lamb's quarter (Eng.)
- Local name : लैनु, Lainu (Gur.)
- Flowering/fruiting: June August/June-September
- Distribution : WC Nepal, alt. 2000- 4000m. Cosmopolitan weed.
- Description : An annual herb to 1m tall with often purple-tinged stem and leaves. Leaves 2.5-6cm long, the lower ovate or oblong, with wavy toothed margin, stalked, the upper often narrow, entire. Flowers small, green in rounded clusters, borne in slender spikes.
- Part (s) used : Young shoot, seed
- Uses : Medicinal uses: - Seed powder is used to make bread and take for abdominal pain.
- Other uses : Shoot portion of this plant is cooked and eaten as a vegetable curry.

Representative collection: Kaski, Sikles, 2000m. May 25 2005. L.J. Gurung, 382.

***Choerospondias axillaries* (Roxb.) Brutt and Hill.**

- Family : Anacardiaceae
- Common name (s): Lapsi (Nep.), Nepalese hog plum (Eng.)
- Local name : कल्ला, Kalah (Gur.)
- Flowering/fruiting: September- November
- Distribution : E. Nepal 1200-1500m. Himalaya (Nepal, Sikkim), NE India, Thailand, C. and S. china, S. Japan.

Description : A tree, 20m high or more. Leaves about 30cms, pinnately compound, leaflets sub-sessile, lanceolate, acuminate, obscurely serrated or entire, glabrous. Panicle terminal and spreading on branchlets. Flowers small and green. Drupes 2-3cm long, oblong, rounded at both ends, yellowish when ripe. Edible.

Parts (s) used : Fruit, leaf, bark

Uses : Medicinal uses: -Fruits are taken raw for the treatment of menstrual disorder. Leaves cure rheumatism and good for sore throat. Bark is useful in dysentery.

Other uses : Fruit is used in pickle. Fresh fruits are eaten.

Representative collection: Kaski, sikles, Tine, 1250m. L.J Gurung, 405.

Cinnamomum tamala (Buch. – Ham). Nees and Eberm.

Family : Lauraceae

Common name (s): Tejpat (Nep.), Indian cassia (Eng.)

Local name : लेपु, Lepu (Gur.)

Flowering/fruiting: April – may / June – October

Distribution : WCE, Nepal, alt. 450-2000m. Himalayas (Kashmir to Bhutan), NE India.

Description : A small evergreen tree to 8m tall. Leaves aromatic when crushed, short stalked, ovate-lanceolate, long pointed, entire, glaucous beneath, with 3 conspicuous nearly parallel veins arising from near the base, the leaf tip often curved Flowers pale yellow.

Part (s) used : Bark, Leaf

Uses : Medicinal uses: -Decoction of leaf or bark is used in treatment of fever. Bark is eaten for blood purification and bad odour of mouth.

Other uses : Bark and leaves are used as spices. Leaves are added to the tea and meat to take great taste.

Representative collection: Kaski, Sikles, Madkyu, 1350m. August 8 2004. L.J. Gurung, 335.

Cirsium verutum (D.Don) Spreng.

Family : Compositae

Common name (s): Thakal (Nep.)

Local name : पो पुचु, Po Puchu (Gur.)

Flowering/fruiting: March- June/May-June

Distribution : WCE. Nepal 750-2200m. Afghanistan, Pakistan, Himalaya to Bhutan.

Description : An erect herb. Stem densely cottony hairy. Leaves hairless above, nearly hairless to cottony-haired beneath, the stem leaves with heart shaped clasping base, and with spiny lobes and teeth, basal leaves linear. Flower head purple, mauve or pink, in dense clusters, surrounded by the upper leaves, involucre bracts with woolly margins and strong erect or spread terminal spines.

Part (s) used : Root Young shoot.

Uses : Medicinal uses: -Root piece is chewed to treat abdominal pain, and water brash, and chest pain.

Other uses : Young shoot is cooked and taken as vegetable.

Representative collection: Kaski, Sikles, Nasago 2100m. May 24 2005. L.J. Gurung, 406.

***Coelogyne cristata* Lindl.**

Family : Orchidaceae

Common name(s) : Sungava (Nep.), Orchid (Eng.)

Local name : सल टा, Sal ta (Gur.)

Flowering/fruiting: March – May (Fl).

Distribution : WEC Nepal 1000-2000m. Himalaya (Utter Pradesh to Sikkim), NE India (Meghalaya)

Description : An epiphytic herb with oblong pseudo-bulb. Leaves sessile, lanceolate. In florescence drooping raceme. Flowers white.

Part (s) Used : Root, Flower

Uses : Pseudo bulbs of this plant is crushed and used for sticking light things.

Representative collection: Kaski, Sikles, Heura 2050m. L.J. Gurung, 392.

***Colebrookea oppositifolia* Sm.**

Family : Labiatae

Common name (s): चुरसेलो, Dhurselo (Nep.)

Flowering/ fruiting: April-June

Distribution : WCE Nepal 250-1700m. Punjab, Himalaya (Kashmir to Bhutan), India, Myanmar, China (Yunnan), Indo-China.

Description : A large, tomentose shrub. Leaves opposite or in whorls of 3, shortly petioled, lanceolate, acuminate, crenate, upper surface pubescent, wrinkled, lower grey-tomentose. Flowers white, in dense spikes, crowded in axillary and terminal panicles.

Part (s) used : Root, leaf, and flower

Uses : Medicinal uses: -Leaf juice is put into the eye to treat conjunctivitis of cattle. Root juice is given to cure typhoid, and leaf hairs are applied to heal wounds.

Other uses : Flower is used for brewing alcohol.

Representative collection: Kaski, Sikles, 1200m. May 25 2005. L.J. Gurung, 384.

Cordyceps sinensis (Berk) Sacc.

Family : Hypocreaceae

Common name (s): Yarsagumba, Jivanbuti (Nep.)

Distribution : From east to west Nepal and from sub alpine to alpine regions.

Description : A club shaped fungus parasitic, later becoming saprophytic on insect larva after its death.

Part (s) used : Whole fungus body together with host larva.

Uses : Medicinal uses:-It is taken for giving strengths and energy (Tonic) to cattle as well as human. It is also used for stimulation of sexual desire (Aphrodisiac) of human and cattle.

Representation : Kaski, Sikles, Mhije, 4500m.

Curcuma angustifolia Roxb.

Family : Zingiberaceae

Common name (s): Besar, Haldi (Nep.), Turmeric (Eng.)

Local name : बिसार, Besar (Gur.)

Flowering / fruiting: April – May (F1).

Distribution : CE Nepal 1500m. Himalaya (Uttar Pradesh to Nepal), N. India.

Description : A tall herb, root stock large, leaves very large in tufts up to 1.2m or more long, flowers in autumnal spikes 10-15cm long, peduncle 15 cm or more.

- Part (s) used : Rhizome
- Uses : Medicinal uses: -Rhizome paste is applied on the affected part to treat skin diseases. Decoction of Rhizome is taken for cough. Rhizome juice is used as eye drops. Decoction of rhizome is given to domestic animal to treat constipation. Rhizome juice is used to cure the stomach problem locally known as *Bikar pareko*.
- Other uses : Rhizome powder is used in cooked vegetables, Pickles and also used as dye.

Representative collection: Kaski, Sikles, Ghaili, 2000m. May 25 2005. L.J. Gurung, 395.

***Cynodon dactylon* (L.) Pers.**

- Family : Gramineae
- Common name (s): Dubo (Nep.), Bermuda grass (Eng.)
- Local Name : तु न्हो, Tu nho (Gur.)
- Flowering/Fruiting: Round the year
- Distribution : WCE Nepal, alt. 100-3000m. Widely distributed in all warm countries.
- Description : Perennial herb, creeping grass, leaves short, subulate glaucous, narrow flat, spike green.
- Part (s) used : Whole plant.
- Uses : Medicinal uses: -Plant juice is taken for inflammation of limbs and urinary tracts and gastric disorders. Plant paste is applied to treat haemorrhage.
- Other uses : This is religious plant, and used to worship god, marriage ceremony etc.

Representative collection: Kaski, Sikles, 2000m. May 26 2005. L.J. Gurung, 393.

***Cynoglossum jeyalinicum* (Vahl) Thunb.ex Lehm.**

- Family : Boraginaceae
- Common name(s) : Kanike kuro (Nep.)
- Local name : खिल ताना, Khil tana (Gur.)
- Flowering/fruitleing : May-October

Distribution : Nepal (WCE. 1200-4100m). Afghanistan, Himalaya (Kashmir to Bhutan), India, Sri Lanka, East to China and Japan, Malaysia.

Description : Herb erect, 40-6- cm tall. Stems single or several. Basal and lower stem leaves long petioles, oblong to oblong-lanceolate, upper stem leaves sessile, smaller. Inflorescence terminal and axillary, sub-dichotomously branching, ebracteate. Corolla blue, funnel form.

Part (s) used : Leaves

Uses : Medicinal uses:- Leaf paste is applied in cuts and wounds.

Representative collection: Kaski, Sikles, 2000m. July 10 2005. L.J. Gurung, 425.

Dactylorhiza hatagirea (D. Don) Soo

Family : Orchidaceae

Common name (s): Panchaunle (Nep.), Orchid (Eng.)

Local name : योरी डगे, Yori nghe (Gur.)

Flowering/fruited: June-July

Distribution : WCE Nepal, alt. 2800-4000m. Pakistan, Himalaya (Kashmir to Bhutan), China.

Description : A herb nearly 45 cm tall, growing on wet ground, root tuberous, slightly flattened and divided into 3 or 5 ginger like lobes, leaves oblanceolate, base sheathing, flowers purple bracts green, narrowly lanceolate.

Part (s) used : Root tuber

Uses : Medicinal uses: -Root tuber is made powder and then applied to burns. The powder is made paste and applied to cuts and wounds.

Representative collection: Kaski, Sikles, Mhije 4500m. August 5 2004. L.J. Gurung, 316. (Photo plate no. 1.7)

Daphne papyraceae Wall. ex Steud.

Family : Thymelaceae

Common name (s): Nepali kagaj (Nep.), Nepali paper plant (Eng.)

Local name : स्युसी , Syusi (Gur.)

Flowering/fruited: November- April – May

- Distribution : WC Nepal, 1500-2300 m. Himalaya (Kashmir to Nepal)
- Description : A much branched erect evergreen shrub with smooth grey bark, with dull green narrow lanceolate to oblanceolate leathery leave. Flowers scented white or greenish-white, in terminal clusters with persistent hairy bracts.
- Part (s) Used : Bark
- Uses : Bark of stem is crushed which is given to domestic animals to treat swollen stomach but if they are pregnant it is avoided to use because it induces abortion. Bark of stem is used for making ropes and strings.

Representative collection: Kaski, Sikles, Nalku khon 2800m. August 8 2004. L.J. Gurung, 333.

Dendrobium amoenum Wall. ex Lindl.

- Family : Orchidaceae
- Common name (s): Hardjorne (Nep.)
- Local Name : हारजोर्ने, Harjorne (Gur.)
- Flowering /Fruiting: May- June
- Distribution : E. Nepal, Himalayas (Nepal to Bhutan), NE India, China, Myanmar, Thailand, Indonesia China,
- Description : An erect perennial epiphytic orchid. Stem jointed, compressed, solid, yellowish rather deeply furrowed. Leaves sessile, oblong, obliquely notched. Flower subracemosus, purple.
- Part (s) used : Stem
- Uses : Medicinal uses: -Stem is crushed and used in bone fracture of both human and cattle.

Representative collection: Kaski, Sikles, 1600m. May 26 2005. L.J. Gurung, 389.

Dendrocalamus hamiltonii Nees & Am. ex Munro

- Family : Gramineae
- Common name (s): Choya bans (Nep.), Tufted bamboo (Eng.)
- Local name : री धुँ, Ri dhu (Gur.)
- Distribution : Nepal (WCE. 300-2000m)

Description : It is recognized by its dense and persistent white and brown culm pubescence. Culm walls thin, basal branches usually much smaller than mid-culm branches or absent.

Uses : It is used for construction of roofs and having flexible enough for low grading weaving.

Representative collection: Kaski, Sikles, Maphu, 2000m. July 11 2005. L.J. Gurung, 451.

***Dioscorea bulbifera* L.**

Family : Dioscoreaceae

Common name (s): Gittha, Gitthe Tarul, Ban Tarul (Nep), Potato yam (Eng)

Local name : बन तेमी, Ban teme (Gur.)

Flowering/fruiting: June – August/August

Distribution : WCE, Nepal, 150 – 2100m.

Description : A glabrous climber leaves deeply cordate, acuminate, 7-9 nerved, spike drooping in group, flowers not in groups, sepals linear-lanceolate.

Part (s) used : Tubers

Uses : Tubers are eaten as vegetable. It has also ritual value as it is eaten during special occasion (*Maghe sankranti*).

Representative collection: Kaski, Sikles, Maphu, 2000m. July 11 2005. L.J. Gurung, 452. (Photo plate no. 1.8)

***Diplazium maximum* (D. Don). C. Chr.**

Family : Woodsiaceae

Common name (s): Niuro (Nep)

Local name : लउ टा , Lau tah (Gur.)

Distribution : WCE, Nepal 1500-2500m.

Part (s) used : Young shoot

Uses : Medicinal uses: Young shoots are cooked and taken for stomach problem.

Other uses : Young shoots are eaten as vegetable curry or are pickled.

Representative collection: Kaski, Sikles, Maija dada 2087m. May 25 2005. L.J Gurung, 383.

Drymaria diandra Blume

- Family : Caryophyllaceae
Common name(s) : Abijalo (Nep), Lightning weed (Eng)
Local Name : स्या न्हो, Sya nho (Gur.)
Flowering/fruiting: September – October
Distribution : WCE Nepal 700-2000m. Africa, Himalaya (Uttar Pradesh to Sikkim) West and south China, Japan, Malaysia, Australia.
Description : A diffuse glabrous herb. Leaves simple, opposite, shortly petiolate, obtuse, rounded, and entire. Flowers in terminal and axillary cymes, small, white.
Part (s) used : Whole plant
Uses : Medicinal uses: -It is used to treat cold and cough. It is mixed with rice flour and fried in ghee making bread; bread is taken to cure stomach pain locally called "*Gano*".

Representative collection: Kaski, Sikles, 1800m. July 10 2005. L.J Gurung, 426.

Duchesnea indica (Andrews) Focke

- Family : Rosaceae
Common name (s): Bhuin Kaphal (Nep)
Local name : स पलाँ , Sa Palah (Gur.)
Flowering/fruiting: May – July/June- July
Distribution : WCE Nepal 1000-2500 m. Afghanistan, Himalaya, India, east to China and Japan, Malaysia.
Description : Prostrate herb with stout rootstock giving several stolons. Petioles 1-3cm, leaflets elliptic or obovate, obtuse, base rounded or cuneate, margin serrate, minutely pubescent on both surfaces. Fruit red, fleshy.
Part (s) Used : Root, Fruit
Uses : Medicinal uses: -Root is fed to treat colic in cattle. Root is crushed and filtrates, used in stomach problem locally known as *Bikar pareko*.

Other uses : Fruits are edible

Representative collection: Kaski, Sikles, 2000m. May 26 2005. L.J Gurung, 391.

Elaeagnus latifolia L.

- Family : Elaeagnaceae

Common name (s): Guyeli (Nep), Oleaster (Eng)
 Local Name : तुरु, Turu (Gur.)
 Flowering/fruiting: April-May-July-September
 Distribution : CE. Nepal 1500-2500m. Himalaya (Nepal to Bhutan).
 Description : A scandent shrub. Leaves petioled, elliptic or oblong-lanceolate, acute or acuminate, lower surface coated with silvery white scales. Flowers many in cluster, perianth clothed with silvery scales.
 Part (s) used : Stem, fruit
 Uses : Medicinal uses: -Fresh fruits are taken to clear stomach complaints.
 Other uses : The ripe fruits are eaten fresh. Stem is used for making agricultural implements like *Plough*, *Kodalo* etc.
 Representative collection: Kaski, Sikles, 2000m. July 11 2005. L.J Gurung, 434.

Engelhardia spicata Lesch. ex Blume

Family : Juglandaceae
 Common name(s) : Mauwa Nep)
 Local name : क्रो, Kro (Gur.)
 Flowering /fruiting: March – May / April – may
 Distribution : WC Nepal 800-1700m. Himalaya (Punjab to Sikkim), NE India, Myanmar, W. and S. china.
 Description : A large tree, 15m high. Leaves pinnate, leaflets 5-10, shortly petioled, oblong or oblong-lanceolate, entire, glabrous. Female spikes pendulous. Fruiting bracts 3 lobed, reticulate, linear-oblong, middle longer.
 Part (s) used : Bark, flower leaf
 Uses : Leaves and Bark are used as fish poison. It is used in the preparation of dyes.

Representative collection: Kaski, Sikles, Sabune 1600m. May 26 2005. L.J. Gurung, 390.

Equisetum debile Roxb. ex Voucher

Family : Equisetaceae
 Common name (s): Kurkureghans, Aankhle (Nep)

Local Name : सिम्यु तु, Simyu Tu (Gur.)
 Distribution : WCE Nepal 1300-2000m, Himalayan, South, China, Southeast Asia, Malaysia, Ceylon, India.
 Description : A slender herb with jointed stem attaining 3m, leaf scaly, subulate, acuminate, cone or spike 8-18mm long, sessile terminal at the branches.
 Part (s) used : Whole plant
 Uses : Medicinal uses: The plant is crushed and fried in oil and taken to cure the abdominal pain (*Phine*) during delivery. The rhizome is burnt in fire and the ash is applied in case of burns.
 Representative collection: Kaski, Sikles, 2000m. November 10 2004. L.J. Gurung, 362.

***Euphorbia royleana* Boiss.**

Family : Euphorbiaceae
 Common name (s): Siundi (Nep)
 Local name : सिउडी, Siundi (Gur.)
 Flowering/Fruiting: March – May (F1)
 Distribution : WC Nepal 1100-1200m, Himalaya (Uttar Pradesh to Nepal)
 Description : An erect fleshy shrub up to 3m high with a pair of stipular thorn on the margin of the ridged stem and branches. Leaves alternate or crowded at the apex, sessile.
 Part (s) Used : Whole plant, Latex
 Uses : Medicinal uses -Warmed leaf juice is put into an aching ear. Milky latex is used to get relief from boil, sprains and muscular swellings.
 Other uses : Latex of the plant is used as fish poison this is used as a hedge plant.

Representative collection: Kaski, Sikles, Teene, 1250m. July 11 2005. L.J. Gurung, 453.

***Ficus auriculata* Lour.**

Family : Moraceae
 Common name (s): Nimaro (Nep), Eye's apron (Eng)
 Local name : तौबु धुँ, Toubu dhu (Gur.)
 Flowering/fruiling: April-July

- Distribution : C Nepal 250 – 1700m. Himalayan (N. Pakistan to N. Myanmar), NE India, S. China, Indo-china.
- Description : A tree, leaves broadly ovate,, acute, base cordate, margins shallowly or coarsely toothed, veins 5-7 pairs, prominent beneath, 5- veined at base, inner basal pair straight forming an acute angle with midrib, glabrous above, petioles 7-10 cm, stipules triangular, peduncles 2-3cm on short, thick, leafless branches 5-15cm from trunk and major branches.
- Part (s) used : Fruit, latex
- Uses : Medicinal uses: Fruit is given to cure the bleeding of cattle with urine locally called "*Laumate*" latex is applied to treat cuts and wounds.
- Other uses : Ripen fruits are eaten. Latex from leaf, stem and bark are used as a gum to stick light things. e.g. Paper.

Representative collection: Kaski, Sikles village, 2000m. May 25 2005. L.J. Gurung, 388.

***Ficus neriifolia* Sm.**

- Family : Moraceae
- Common name (s): Dudhilo (Nep)
- Local name : डरा चुँ, Ng – ra Dhu (Gur.)
- Flowering/fruiting: July- September
- Distribution : C Nepal, 1800m. Himalaya (Nepal to Arunachal Pradesh), NE India (Meghalaya), Myanmar, China (Yunnan).
- Description : A glabrous sub- deciduous tree up to 8m high with white latex. Bark lenticellate, young bud reddish. Leaves alternate, stipulate, petiolate, ovate-elliptic or oblanceolate, base cuneate, entire. Receptacle axillary, sub-sessile, reddish when ripe. Female flower in separate receptacle. Fruit an achene, yellow.
- Part (s) used : Young shoot, fruit, and bark.
- Uses : Young shoots are eaten as vegetable. Ripen fruits are eaten. Stem bark is chewed as gum by children. It has ritual value in the study area.

Representative collection: Kaski, Sikles, 2000m. May 21 2005. L.J Gurung, 373.

***Ficus religiosa* L.**

- Family : Moraceae
Common name (s): Pipal (Nep), Peepal tree (Eng)
Local name : पिपल चूँ, Pipal dhu (Gur.)
Flowering/fruiting: June/September
Distribution : WCE Nepal 150-1500m. Widely cultivated in Nepal, India, SE Asia.
Description : A large glabrous tree, leaves broadly ovate, entire, petioled, flowers unisexual, male flower very few, only near the mouth of some receptacles and female flower sessile.
Part (s) used : Bark
Uses : It is planted as shelter.
Representative : Kaski, Sikles, Tije ne, 1600m.

***Ficus semicordata* Buch. Ham. ex Sm.**

- Family : Moraceae
Common name (s): Khanayo (Nep), Nepal fodder fig (Eng)
Local name : मोवा चूँ, Mowa (Gur.)
Flowering/fruiting: May – September
Distribution : WCE Nepal 200-1700m. Himalaya (Nepal, Arunachal Pradesh),
India, Myanmar, S. China, Indo- China, Malaya.
Description : Small tree to 6m. Leaves membranous, distichous, ovate-lanceolate, acuminate, base obliquely cordate, lower margin auriculate; Figs globose, 1.5-1.7 (-2) cm, pubescent and scale on the surface.
Part (s) used : Fruit
Uses : Ripen fruits are eaten.
Representative collection: Kaski, Sikles, Tine, 1250m. May 28 2005. L.J Gurung, 407.

***Holboella latifolia* Wall.**

- Family : Lardizabalaceae
Common name(s) : Gulpha, Guphala (Nep.)
Local name : मलकजी , Malkaji (Gur.)

Flowering/Fruiting: March/ September-October

Distribution : Nepal (WCE. 2000-4000m). Himalya (Uttar Pradesh to Arunchal Pradesh), NE India, Myanmar, W. China.

Description : A woody climber, stem and leaves glabrous. Leaves alternate, compound 3-5 foliate, unequal, petiolate, leaf base slightly swollen or connate. Leaves ovate, elliptic oblong or lanceolate, base rounded, leaf surface shining above and pale beneath. Inflorescence axillary solitary or fascicled. Flower creamy white to chocolate purple, sweet scented.

Part (s) used : Fruit

Uses : Fruit edible.

Representative collection: Kaski, Sikles, Heura 2050m. May 21 2005. L.J Gurung, 366.

Houttuynia cordata Thunb.

Family : Saururaceae

Common name(s) : Gane (Nep.), Lizard's tail (Eng.)

Local name : नगी फित्ता धुँ, Nagi fitta dhu (Gur.)

Flowering /fruiting: July-August

Distribution : Nepal (CE. 1300-2500m), Himalya (Punjab to Arunchal Pradesh), NE India, Thailand, China, Japan.

Description : Herb *ca.* 20cm. Leaves broadly ovate, acute or acuminate, base cordate, stipules oblong, adnate to petiole below. Flowers minute in spikes 1-2cm long, bracts, oblong or obovate, obtuse, white, thick. Stamens 3, anthers pale white.

Part(s) used : Leaves

Uses : Medicinal uses: Leaves paste is applied in cut and wounds.

Representative collection: Kaski, Sikles, 2000m. July 11 2005. L.J Gurung, 437.

Inula cappa (Buch – Ham. ex D.Don) DC.

Family : Compositae

Common name (s): Gai tihare (Nep), Golden samphire (Eng)

Local : स्याउला, Syaula (Gur.)

Flowering/Fruiting: November - December

Distribution : WCE Nepal 150-2500m. Himalayas (Uttar Pradesh to Bhutan), NE India to China, Thailand, java.

Description : An aromatic shrub with woolly or silky-haired branches. Leaves petioled, oblong lanceolate thick, leathery, weakly toothed, sharp pointed, green above, densely white felted beneath.

Part (s) used : Whole part.

Use : The plant is used in brewing alcohol.

Representative collection: Kaski, Sikles, 1900m. November 10 2004. L.J Gurung, 351.

***Juglans regia* L.**

Family : Juglandaceae

Common name(s) : Okhar (Nep), Walnut (Eng)

Local name : ओखर, Okhar (Gur.)

Flowering/fruiting: February- April/June-September.

Distribution : WCE Nepal, 1200-2100m. Himalaya (Kashmir to Bhutan), NE India (Meghalaya), China (Xizang)

Description : A large deciduous tree with vertically fissured gray bark. Leaves compound, pinnate, leaflets, elliptic to ovate, pointed, entire and leathery. Flowers unisexual, borne in catkins.

Part (s) used : Fruit, bark, stem

Uses : Medicinal uses: Bark paste of stem is applied in treating joint pain and swelling. Stem is used as teeth brush to cure dental diseases.

Other uses : The cotyledons of the fruit are eaten. Bark and peel of fruit of this plant are used for dyeing purpose.

Representative collection: Kaski, Sikles, 2000m. May 27 2005. L.J Gurung, 399.

***Leucosceptrum canum* Sm.**

Family : Labiatae

Common name (s): Bhusure (Nep.)

Local name : चिना चूँ, China dhu (Gur.)

Flowering/fruiting: Oct.-Apr.

Distribution : Nepal (WCE. 1000-2800m), Himalaya (Uttar Pradesh to Bhutan), NE India, Myanmar, China (Yunan)

Description : A shrub or small tree to 10m. Leaves elliptic lanceolate, entire or finely toothed. Dense erect cylindrical spikes of tiny whitish flowers with long projecting stamens and styles.

Part(s) used : Fruit

Uses : Fruit is eaten by children.

Representative collection: Kaski, Sikles, 2000m. May 21 2005. L.J Gurung, 370.

Litsea cubeba (Lour). Pers.

Family : Lauraceae

Common name(s) : Siltimur (Nep)

Local name : कूडु, Kudu (Gur.)

Flowering/fruiting : March-April/May-June

Distribution : CE Nepal, 1000-2700m. Himalaya (Nepal to Bhutan), NE India, Myanmar, Indo-china, china, Taiwan, Java,

Description : Evergreen dioecious trees or shrubs, rarely deciduous, leaves alternate. In floescence 4-6 flowered umbel. Fruits drupe or berry.

Part (s) used : Fruit.

Uses : Medicinal uses: About 15-20 fruits the taken, crushed and mixed with 1 glass of water and taken in case of gastric problems, swelling of stomach, fever it is also given to cattle in case of swelling of stomach.

Other uses : It is used as spices

Representative collection: Kaski, Sikles, Chudu mro dada, 2000m. May 25 2005. L.J. Gurung, 387.

Lycopodium clavatum L.

Family : Lycopodiaceae

Common name (s): Nagbeli (Nep), Club moss (Eng)

Local name : छ्योउ मइ, Chhyou mai (Gur.)

Fructification : July-September

Distribution : Nepal 1800-2500m, Korea, Formosa, china, India, Malaysia, Polynesia, Hawaii, North America, Europe and Africa.

Description : Stem long creeping. Rooting at regular intervals, densely leafy with long arms. Branches ascending, mostly dichotomously

forked, with linear, flat scale like and tip incurved leaves. Leaves spirally arrange. Strobili cylindrical.

- Part (s) used : Spore
Uses : Medicinal uses: Spore powder is taken and applied to burns. It is also taken for headache.
Other uses : The plant is used to make marriage gate for wedding ceremonies.

Representative collection: Kaski, Sikles, Prolu 2400m. November 10 2005. L.J Gurung, 364.

Lyonia ovalifolia (Wall). Drude.

- Family : Ericaceae
Common name (s): Angeri (Nep), Lyonia (Eng)
Local name : च्यासी, Chyarsi (Gur.)
Flowering/fruitleting: April – May (F1).
Distribution : WCE Nepal, 1300-3300m. Himalaya (Punjab to Bhutan), North East India, Myanmar, China.
Description : A small deciduous tree up to 10m high. Stem bark brown coloured and peels off into narrow stipes. Leaves petiolate, ovate, acute, long pointed and entire. Flowers white in axillary clusters numerous, flask shaped.
Part (s) used : Young shoot, leaves
Uses : Medicinal uses: Young leaves are applied to skin diseases.
Other uses : Young leaf is poisonous to fish, human beings and animals.

Representative collection: Kaski, Sikles, sabune 1600m. May 27 2005. L.J Gurung, 401.

Maesa chisia Buch- Ham ex D. Don.

- Family : Myrsinaceae
Common name (s): Bilaune (Nep)
Local Name : चोडी, Chodi (Gur.)
Flowering/Fruitleting: October-November
Distribution : WCE Nepal 1200-2600m. Himalayas (Nepal to Bhutan), NE India, N. Myanmar.

Description : A shrub with leaves lanceolate-elliptic, acuminate, base cuneate, some of the leaves distinctly toothed. Inflorescence a compound raceme.

Part (s) used : Leaf, stem

Uses : Stem Bark is used as insecticides. Leaves are used to wash milk pots like "*Theki*"

Representative collection: Kaski, Sikles, 2000m. November 10 2004. L.J Gurung, 354.

***Melia azedarach* L.**

Family : Meliaceae

Common name (s): Bakaino (Nep), China berry (Eng)

Flowering/Fruiting: March-May/July-December

Distribution : WEC Nepal, 700-100m. Iran, Himalaya, east to China, cultivated.

Description : A tall tree about 15m high. Leaves alternate, petiolate, large, bipinnate, leaflets opposite. Inflorescence many flowered axillary panicle. Fruit drupe, ovoid.

Part (s) used : Leaf, Bark, and Fruit

Uses : Bark Powder is taken and made paste with little water and is taken and in case of worm infection. Fruits and leaves are grinded and applied locally to control external parasites like ticks lice and bugs. It is also used as insecticides and pesticides.

Representative collection: Kaski, Sikles, Thoya, 2000m. May 25 2005. L.J. Gurung, 386.

***Mentha spicata* L.**

Family : Labiatae

Common name (s): Pudina (Nep), Spearmint (Eng)

Local name : पुदुना , Puduna (Gur.)

Flowering/Fruiting: November-December

Distribution : WC Nepal, 1880-2700m. Europe, Afghanistan, Pakistan, Himalayas (Kashmir to Nepal), China, N. America, Widely cultivated.

Description : An aromatic herb with runner underground stem. Leaves usually sessile or short petioled, ovate, to 3.8cm long, acute, dentate. Flowers small, white, in spike.

Part (s) used : Leaves

Uses : Medicinal uses: The pickle is taken to improve appetite.

Other uses : Leaves are crushed to make pickle.

Representative collection: Kaski, Sikles village, 2000m. May 26 2005. L.J. Guerng, 395.

***Morchella esculenta* (L.) Pers.**

Family : Morchellaceae

Common name(s) : Guchhi Chyau (Nep), Morel (Eng)

Local name : च्याबु, Chyabu (Gur.)

Description : An ascomycetous fungus with white, thick, erect, tapering stalk bearing rounded, or conical pileus, yellowish brown to olive covered with a number of prominent ridge.

Part (s) used : Whole plant

Uses : Whole plant is cooked and eaten as a vegetable.

***Myrica esculenta* Buch - Ham. ex D. Don.**

Family : Myricaceae

Common name (s): Kafal (Nep), Bay berry (Eng)

Local name : Kafal (Gur.)

Flowering/Fruiting: October – December / April- July

Distribution : WCE Nepal, 1200-2300m. Himalaya, India, Myanmar, East to West and South China.

Description : Evergreen, medium sized tree having branchlets clothed with thin glandular hairs. Leaves lanceolate, oblong-obovate, entire to the tip, base narrowly rounded. Flowers unisexual or bisexual. Inflorescence solitary in the leaf axils. Fruit red.

Part (s) Used : Bark, Fruit

Uses : Medicinal uses: -Decoction of Bark is used to treat diarrhoea, fever and stomatitis.

Other uses : Ripen fruits are eaten.

Representative collection: Kaski, Sikles, 2000m. July 11 2005. L.J Gurung, 431.

***Nardostachys grandiflora* DC.**

- Family : Valerianaceae
Common name (s): Jatamansi, Bhutle (Nep.), spikenard (Eng.)
Local name : जरामसी, Jaramashi (Gur.)
Flowering/fruiting: August-October
Distribution : WCE Nepal, 3200-500m. Himalayas (Uttar Pradesh to Bhutan), W. China.
Description : A perennial herb of about 75cm tall with long woody rhizomes having aromatic fibres making rhizomes very fragrant. Lower leaves larger than the upper leaves. Flowers small pinkish white and arranged in bunches.
Part (s) used : Roots and rhizomes
Uses : Medicinal uses: -Decoction of root is used for stimulant and a tonic. It is given to improve urination, menstruation and digestion. The watery extract of rhizome is used to cure eye disease and headache.

Representative collection: Kaski, Sikles, Mhije 4500m. August 5 2004. L.J. Gurung, 318. (Photo plate no. 2.1)

***Neopicrorhiza scrophulariifolia* (Pannell) Hong**

- Family : Scrophulariaceae
Common name (s): Kutki (Nep.), Gentian (Eng.)
Local name : कटुकी, Kutki (Gur.)
Flowering/fruiting: June – August
Distribution : WCE Nepal 3500-4800m. Himalaya (Uttar Pradesh to Bhutan), North Myanmar, China.
Description : A creeper with stout rootstock covered with old leaf bases above. Leaves 2-6cm, oblanceolate. Flowers dark blue to purple, in a dense cylindrical head, calyx hairy, nearly as long as corolla tube.
Part (s) used : Rhizome
Uses : Medicinal uses: Rhizome powder is used to treat, cough and fever, abdominal pain. The rhizome paste is applied to cure cuts and wounds.

Representative collection: Kaski, Sikles, Mhije 4500m. August 5 2004. L.J. Gurung, 328.

***Nicotiana tabacum* L.**

- Family : Solanaceae
Common name(s) : Katcho pat (Nep.), Tobacco (Eng.)
Local name : तमा पो, Tama po (Gur.)
Flowering/fruiting: Sep.-Oct/Nov
Distribution : Nepal (WCE 800-1800m), Tropical American, widely cultivated and naturalized elsewhere.
Description : An erect, glandular, pubescent herb, 2m high. Lower leaves large, oblong or elliptic, upper ones obovate, amplexicaule, acute. Flowers pink, in terminal panicles. Capsule ovate.
Part (s) used : Leaves
Uses : Medicinal uses: Leaf juice is applied in earache.
Other uses : Leaf has ritual value.
Representative collection: Kaski, Sikles, 2000m. May 27 2005. L.J. Gurung, 397.

***Oxalis corniculata* L.**

- Family : Oxalidaceae
Common name (s): Chariamilo (Nep.), Creeping sorrel (Eng.)
Local Name : क्युप्रो, Kyupro (Gur.)
Flowering/fruiting: April-June/July-August
Distribution : WCE Nepal, 300-2900m. Almost cosmopolitan.
Description : A prostrate and pubescent herb. Leaves stalked, alternate, leaflets, 3 foliate, obcordate, entire. Flowers small, in long stalk, yellow. Fruits long, sub-cylindrical, brooved and hairy.
Part (s) used : Leaf, stem
Uses : Leaves, stems, which are sour in taste, are used to prepare pickles.
Representative collection: Kaski, Sikles, 2000m. May 27 2005. L.J. Gurung, 398.

***Paris polyphylla* Smith.**

- Family : Liliaceae
Common name (s): Satuwa (Nep.)
Local name : सतवा, Satwa(Gur.)
Flowering /Fruiting: April-may/June – July

Distribution : CE Nepal, 1800-3300m. Himalaya (Uttar Pradesh to Bhutan), NE India, China.

Description : A glabrous herb, leaves 4-9, shortly stalked, lanceolate, long pointed, petioled, dark green in colour, arranged in whorl at top of the stem, flowers stalked and solitary in the centre, yellow green perianth.

Parts (s) used : Rhizome

Uses : Medicinal uses: -Rhizome paste is applied to treat cuts and wounds. Rhizome is rubbed and applied to treat snakebite. Rhizome is chewed to treat abdominal pain.

Other uses : Ripen fruits are eaten.

Representative collection: Kaski, Sikles, Maija dada 2100m. July 11 2005. L.J. Gurung, 441. (Photo plate no. 2.2)

***Pedicularis hoffmeisteri* Klotzsh**

Family : Scrophulariaceae

Common name (s): Pedicularis (Eng.)

Local name : हेरबा टा, Herbai ta (Gur.)

Flowering/Fruiting: August-September

Distribution : Nepal (WCE. 2300-3900m). Himalaya (Himanchal Pradesh to Nepal).

Description : Hemi parasitic herb, 15-60 cm. Leaves narrow-elliptic, deeply lobed, coarsely toothed. Flowers predominantly pink or purple, each flower with a very distinctive long slender corolla-tube many times longer than the calyx, hooded nodding bell-shaped corolla.

Part (s) used : Flower

Uses : Flowers are considered as holy plant.

Representative collection: Kaski, Sikles, Mhije 4500m. August 5 2004. L.J Gurung, 323.

***Pedicularis scullyana* Prain ex Maxim.**

Family : Scrophulariaceae

Common name(s) : Pedicularis (Eng.)

Local name : हेरबा टा, Herba ta (Gur.)

Flowering/Fruiting: August-September
Distribution : Nepal (WCE. 3700-5000m). Himalaya (Nepal, Sikkim).
Description : Hemi parasitic herb, 6-45cm or more. Leaves linear-lanceolate, with numerous paired oblong coarsely toothed lobes. Flower with dense terminal cluster of numerous pale yellow or white, with mid-lobe of lower lip much smaller than the lateral lobes, beak curved.
Part (s) used : Flower
Uses : Flower is considered as holy plant.
Representative collection: Kaski, Sikles, Mhije 4500m. August 5 2004. L.J Gurung, 324. (Photo plate no. 2.3)

***Phytolacca acinosa* Roxb.**

Family : Phytolaccaceae
Common name (s): Jaringo (Nep.), Poker weed (Eng.)
Local name : ओली टा, Oli tah (Gur.)
Flowering/Fruiting: Apr.-sep.
Distribution : Nepal (WC 2200-3200m) Himalaya (Kashmir to Arunchal Pradesh), NE India, Laos, W. China.
Description : Stem erect. Leaves elliptic, acute, base attenuate, entire, glabrous but with numerous minute linear cystoliths on lower surface visible when dry. Racemes dense, pinkish, pedicel 6-10mm, bracts and bracteoles linear. Fruit depressed-globose, dark purple.
Part (s) used : Stem, leaves
Uses : Medicinal uses: Plant is cooked as vegetable and is taken for diarrhoea.
Representative collection: Kaski, Sikles village, 2000m. May 27 2005. L.J. Gurung, 404.

***Piper mullesua* D.Don**

Family : Piperaceae
Common name (s): Pipala (Nep.)
Local name : सिन्ड्री, Sindri (Gur.)
Flowering/fruitleing: October- November
Distribution : WCE 1000-2500m. Himalaya (Nepal to Bhutan), India, Ceylon.

- Description : Terrestrial or epiphytic shrub, sometimes climbing. Leaves dark green when dry, those of creeping stems ovate-cordate, those on aerial branches elliptic to ovate, acuminate. Male spike slender, erect. Female spikes globose or shortly cylindrical on short peduncle. Fruiting spikes 6-12×6-10 mm drupes c2mm, densely clustered.
- Part (s) used : Fruits
- Uses : Medicinal uses: Fruit powder is taken with hot water to treat fever, asthma and cough.
- Other uses : The fruits are also used as spices.
- Representative collection: Kaski, Sikles, 2085m. May 21 2005. L.J Gurung, 371.

***Polygonum molle* D.Don**

- Family : Polygonaceae
- Common name (s): Thotne (Nep.), Vegetable smart weed (Eng.)
- Local name : तुमु, Tumu (Gur.)
- Flowering/Fruiting: May-Nov.
- Distribution : Nepal (WCE. 1000-2300m)
- Description : Sub shrub, 1-2.5m. Leaves elliptic, acuminate, base cuneate, rounded or subcordate, appressed pubescent on both surfaces, more densely beneath, ocreae 4-5cm. Panicles richly branched. Perianth cream coloured, ca 3mm. Achenes enclosed in blackish, fleshy perianth.
- Part (s) used : Juvenile shoot
- Uses : Juvenile shoot is eaten raw for diarrhoea and dysentery.
- Representative collection: Kaski, Sikles, 2000m. July 11 2005. L.J Gurung, 369.

***Pouzolzia sanguinea* (Blume) Merr.**

- Family : Urticaceae
- Common name (s): Chiple Ghans (Nep.)
- Local name : गे मइ धुँ /प्लेटा छी, Ge mai dhu/ pleta chhi (Gur.)
- Flowering/fruitleing: July – August (f1).
- Distribution : Nepal (EC.600-1500m), Himalaya (Nepal to Bhutan), NE India, Myanmar.

Description : Shrub 1-3m. Leaves alternate, lanceolate, acute or acuminate, base rounded or cuneate, margin serrate or crenate. Flower cluster globose ca 6mm diameter, axillary. Achenes ellipsoid.

Part (s) used : Root bark, root

Uses : Powder of root bark is used in bread making. Root paste is used as soap and gum to stick light things e.g. Paper.

Representative collection: Kaski, Sikles, 2000m. July 11 2005. L.J Gurung, 432.

***Prinsepia utilis* Royle**

Family : Rosaceae

Common name (s): Dhatelo (Nep.)

Local name : बैमइ तिस्या, Baimai tisyā (Gur.)

Flowering/Fruiting: Apr.-May/Oct.-Nov.

Distribution : Nepal (WCE. 1500-2900m). Himalaya (Pakistan to Bhutan), NE India, W. China.

Description : A green stemmed shrub. Leaves dark leathery, stout spines and with short clusters of white flowers generally borne from the axils of the spines. Fruit oblong-cylindrical, fleshy, dark-purple, bloomed.

Part (s) used : Stem, fruit

Uses : Stem is used for making coal and the fruits are used as dye.

Representative collection: Kaski, Sikles, 2000m. May 27 2005. L.J Gurung, 396.

***Prunus cerasoides* D.Don.**

Family : Rosaceae

Common name (s): Painyu (Nep.), Himalayan cherry (Eng.)

Local name : च्यारबु, Chyarbu (Gur.)

Flowering/fruitletting: October-November/March-May

Distribution : WCE Nepal, 1300-2400m. Himalayas (Punjab to Bhutan), NE India, Myanmar, W. China.

Description : A large tree, leaves long variable in length and breadth, ovate, doubly serrate, petioled, slender, flowers white, pink or crimson, appearing before leaves and umbellate.

Part (s) used : Stem, leaf, fruit, gum

Uses : Ripen Fruits are eaten. Gum from the stem is used to stick papers. Stem is used to produce coal. The plant has ritual value.

Representative collection: Kaski, Sikles, 2000m. November 10 2004. L.J. Gurung, 443.

***Prunus persica* (L.) Batsch.**

Family : Rosaceae

Common name(s) : Aru (Nep.), Peach (Eng.)

Local name : खुलु धुँ, Khulu dhu (Gur.)

Flowering/fruiting: December – May

Distribution : W Nepal, 1200-2100m. China, widely cultivated in Asia and Europe

Description : A small tree to 8m tall, with glabrous twigs. Leaves oblong to broad lanceolate, serrate, glabrous. Flowers solitary, pink. Fruits subglobose, 5-7cm across, fleshy with a hard and deeply pitted stone.

Part (s) Used : Fruits

Uses : Ripen Fruits are eaten

Representative collection: Kaski, Sikles, 2000m. July 11 2005. L.J. Gurung, 439.

***Psidium guajava* L.**

Family : Myrtaceae

Common name (s): Amba, Belauti (Nep.), Guava (Eng.)

Local name : बेलवत, Belwat (Gur.)

Flowering /Fruiting: October-November

Distribution : WC, Nepal 800-1500m.

Description : A small tree, pubescent on the young branches, leaves on very short petioles, ovate or oblong and usually acuminate, glabrous, softly pubescent beneath and with the principal nerves prominent, peduncles axillary, 1-3 flowered, fruit globose or pear shaped.

Part (s) Used : Fruit, leaf, bark

Uses : Medicinal uses: Leaf power is taken with water, to cure dysentery. Paste of leaves is applied locally to the wounds of animals. Raw or grinded bark mixed with animal feed is given to the animal to control diarrhoea.

Other uses : Ripen fruits are eaten.

Representative collection: Kaski, Sikles, Tine 1250m may 28 2005. L.J. Gurung, 408.

Quecus glauca Thunb.

Family : Fagaceae

Common name(s) : Phalat (Nep.), Blue Japanese oak (Eng.)

Local name : डसी चूँ, Ng-shi dhu (Gur.)

Flowering/fruiting: March-April

Distribution : Nepal (WCE. 450-3100m). Himalaya (Kashmir to Arunchal Pradesh), NE India, Myanmar, China, Indo-china, Korea, Taiwan, Japan.

Description : Tree 7-20m. Leaves elliptic, acuminate, base cuneate, margins sharply toothed in upper half, silky hairy on both surfaces at first becoming glabrous above, grayish appressed pubescent beneath, veins 9-12 pairs. Male spikes 4-6cm, flowers c 3mm, globose. Female flowers 2-4 on short axillary shoots 1-2cm. Acorns ellipsoid.

Part(s) used : Stem

Uses : Stem is used to make agricultural implements. Stem has ritual value.

Representative collection: Kaski, Sikles, Maye li 2400m. July 11 2005. L.J Gurung, 433.

Rheum australe D. Don

Family : Polygonaceae

Common name(s) : Padamchal (Nep.)

Local name : पुदुन चाले, Pudunchale (Gur.)

Flowering/Fruiting: June- July

Distribution : WCE Nepal, 3200-4200m. Himalaya (Himanchal Pradesh to Bhutan), China.

Description : A herb to 2m tall with very stout rootstock and green and brown-streaked stem. Leaves with a very stout leaf stalk, 30-45cm long and with rounded to broadly ovate blade with heart-shaped base. Flowers small, dark reddish purple.

Part (s) used : Root stock

Uses : Medicinal uses: -Decoction of root stock is applied and given hot compress to cure fracture, internal injury. Decoction of root is taken to cure diarrhoea and dysentery, abdominal pain and applied to cuts and wounds in both human and cattle. Stem is used as vegetable which makes the body stimulant.

Representative collection: Kaski, Sikles, Tasa 4000m. August 5 2004. L.J. Gurung, 327.

***Rhododendron anthopogon* D. Don**

Family : Ericaceae
Common name (s): Sunpati (Nep)
Local name : फर, Pharra (Gur.)
Flowering/Fruiting: October-November
Distribution : Nepal (WCE, 3300-5100m), Himalaya (Punjab to Bhutan), China
Description : A small strongly aromatic shrub to 60 cm tall with brown scaly young shoots. Leaves ovate, 1-3 cm, densely scaly beneath. Flowers with c. 2 cm across, white, or yellow tinged with pink, in compact clusters of 406, corolla with a narrow tube and 5 rounded spreading lobes. Capsule ca 3mm encircled by the persistent calyx.
Part(s) used : Whole plant
Uses : Plant is used as incense called *Dhup*. It is also considered as holy plant.

Representative collection: Kaski, Sikles, Mhije 4500m. August 5 2004. L.J. Gurung, 315.

***Rhodoendron arboreum* Sm.**

Family : Ericaceae
Common name (s): Lali gurans (Nep.), Rhododendron (Eng.)
Local name : पौरी टा, Pouri ta (Gur.)
Flowering/Fruiting: March-May/ August –March
Distribution : WCE Nepal, 1500-3300m. Himalayas (Kashmir to Arunachal Pradesh), China (Xizang), NE India, Myanmar.
Description : A small tree up to 15m tall, bark pinkish brown, somewhat rough, young shoot clothed with white scales, leaves oblong-

lanceolate, entire acute, flowers scarlet to pinkish white, campanulate, in many flowered head on branch tip.

- Part (s) uses : Flowers, Bark
Uses : Medicinal uses: Bark Paste is applied to treat cuts. Flowers are eaten to cure troubles from having fish bone into the neck.
Other uses : It is decorative and used in different festivals. Decoction of flower and bark are used for dying.

Representative collection: Kaski, Sikles, 2000m. May 21 2005. L.J Gurung, 375.

***Rhus javanica* L.**

- Family : Anacardiaceae
Common name (s): Bhakimlo (Nep.), Chinese Sumac (Eng.)
Local name : तिउरु/तिब्रु, Tiuru/Tibru (Gur.)
Flowering /fruiting: November –December
Distribution : WCE Nepal, 1300-2400m. Himalaya (Kashmir to Bhutan), Sri-Lanka,.
Description : A small tree with acrid juice, leaves alternate, odd pinnately compound leaflets 6-8 pairs, opposite, dentate, teeth large, triangular often sharp, flowers small in terminal and axillary panicules, fruit a drupe.
Part (s) used : Fruit, stem
Uses : Medicinal uses: Decoction of fruit is taken as a remedy in diarrhoea and dysentery, stomach complaints.
Other uses : Ripen fruits are eaten and also used in preparation of Pickle. The coal from the stem is used to make gun power locally called "*Baarud*". It has ritual value.

Representative collection: Kaski, Sikles, 1600m. November 10 2004. L.J. Gurung, 358.
(Photo plate no. 2.4)

***Rhus succedanea* L.**

- Family : Anacardaceae
Common name (s): Bhalayo (Nep.), Wax-Tree (Eng.)
Local name : कुर्जी धुँ, Kurji dhu (Gur.)
Flowering/Fruiting: July-August

Distribution : Nepal (WCE. 1300-2400m). Himalaya (Kashmir to Bhutan), NE India, Myanmar, Thailand, China.

Description : Tree ca 12m. Leaves to 25cm, leaflets 5-7, ovate, oblong or lanceolate, long acuminate, base cuneate, margin entire, scattered minute glands beneath. Panicles axillary, about half of leaf. Drupe reniform 5-8mm.

Part(s) used : Whole plant

Uses : Plant poison to human. It has also ritual value.

Representative collection: Kaski, Sikles, 2000m. July 11 2005. L.J. Gurung, 436.

Rubia manjith Roxb. E Fleming

Family : Rubiaceae

Common name(s) : Majitho (Nep.), Indian madder (Eng.)

Local name : लैरा, Lera (Gur.)

Flowering/Fruiting: June-Nov.

Distribution : Nepal (CE. 1200-2100m). Himalaya (Himanchal Pradesh to Bhutan), NE. India (Meghalaya).

Description : A herbaceous climbing perennial. Stem and branches quadrangular. Leaves unequal, petiolate, ovate to cordate, long pointed, with hooked prickles.

Part (s) used : Rhizome

Uses : Rhizome is used as red dye.

Representative collection: Kaski, Sikles, 2100m. August 8 2004. L.J. Gurung, 331.
(Photo plate no. 2.5)

Rubus ellipticus Sm.

Family : Rosaceae

Common name (s): Ainselu (Nep.), Golden evergreen raspberry (Eng.)

Local Name : पलाँ, Palah (Gur.)

Flowering/Fruiting: April-June/July-September

Distribution : WCE Nepal, 1700-2600m. Himalaya (Pakistan to Bhutan), Northeast India, Sri Lanka, Myanmar, East to west China, Philippine.

Description : A large shrub. Stem stout and spiny with rugose hairy bristles and recurved spines. Leaves trifoliate, petiolate, elliptic or obovate, toothed. Flowers in dense, branched cluster.

Part (s) used : Root, fruit, and young shoot

Uses : Medicinal uses: Watery extract of root is taken orally to treat lower abdominal pain locally called "*Gano*". Young shoot is taken in case of cold and cough.

Other uses : Ripen fruits are eaten. Root powder is used for brewing alcohol.

Representative collection: Kaski, Sikles, 2000m. July 11 2005. L.J Gurung, 442.

***Rumex nepalensis* Spreng.**

Family : Polygonaceae

Common name (s): Halalo, Hali (Nep.), Yellow doek (Eng.)

Local Name : ओल्मी, Olmi (Gur.)

Flowering/Fruiting: April –July (fl)

Distribution : WCE Nepal, 1200-4200m. SW Europe, W. Asia, Himalaya, India, East to W & C China, Java.

Description : A stout, erect herb, 1m high. Radical leaves long-petioled, oblong ovate, base cordate, cauline leaves petioled, narrowed to the base. Whorls distinct, raceme nearly leafless. Flowers directly white. Fruiting sepals orbicular-ovate, fringed with comb like hooked teeth.

Part (s) used : Root leaf, Young shoot.

Uses : Medicinal uses: Root paste is applied to cure white leprosy, bone fracture and to massage the sprained parts. Roots are grinded and filtrate with clean cotton cloth. The filtrate is taken to treat stomach pain locally called "*bikar pareko*" crushed leaf extract is applied to cuts & wounds. Young shoots are given to cattle for energy.

Other uses : Root is used for dyeing.

Representative collection: Kaski, Sikles, 2000m. July 11 2005. L.J. Gurung, 438.

***Saurauia napaulensis* DC.**

Family : Saurauiaceae

Common name (s): Gogan (Nep.)

Local Name : प्लेसी चुँ, Plehsi dhu (Gur.)
 Flowering/Fruiting: March-October (f1).
 Distribution : WCE Nepal 750-2100m. Himalaya (Uttar Pradesh to Arunachal Pradesh), NE India, N. Myanmar, Thailand, India, N. Myanmar, Thailand, Indo-China, W. China.
 Description : A deciduous shrub or small tree with reddish bark and soft spongy wood. Leaves large mostly 18-36cm, elliptic, with acute gland-tipped marginal teeth and many pairs of prominent lateral veins. Flowers many, pink. Fruit green.
 Part (s) used : Fruit
 Uses : Ripe fruits are eaten. Bark of plant is used as incense locally called "*Dhup*".

Representative collection: Kaski, Sikles, Ghaili, 2000m. July 11 2005. L.J. Gurung, 455.

***Saussurea gossypiphora* D.Don**

Family : Compositae
 Common name(s) : Kapase Phul (Nep.), Snow Lotus (Eng.)
 Local name : मुइ ओ टा, Muio ta (Gur.)
 Flowering/Fruiting: September-November
 Distribution : Nepal (CE. 4300-5600m). Kashmir to SW. China
 Description : A remarkable-looking plant like a snowball, the whole plant more or less globular and densely covered with long white or grey woolly hairs. Flower-heads deeply embedded in woolly hairs, cylindrical 1.2-2cm long, and with many purple florets, and surrounded by woolly leaves. Leaves obscurely or coarsely toothed or lobed embedded in very dense woolly hairs.
 Part (s) used : Whole plant
 Uses : It is considered as holy plant and it has ritual value.

Representative collection: Kaski, Sikles, Mhije 4500m. August 5 2004. L.J Gurung, 319

***Schima wallichii* (DC.) Korth.**

Family : Theaceae
 Common name (s): Chilaune (Nep.), Needle wood (Eng.)
 Local name : क्योसी, Kyosi (Gur.)
 Flowering/Fruiting: April- June

- Distribution : CE Nepal 900-2100m. Himalayas (Nepal to Bhutan), NE India, W. China.
- Description : A small or large tree with dark gray rugged bark, leathery evergreen leaves and showy terminal clusters of few white fragrant flowers. Leaves elliptic-oblong, 10-18 cm, entire, slightly toothed, hairless and reddish-veined beneath.
- Part(s) used : Leaf, fruit
- Uses : Medicinal uses: Fruit is used to cure stomach-ache during menstruation cycle.
- Other uses : Leaf juice is used as dye. Stem is used for making agricultural implements.
- Representative collection: Kaski, Sikles, Sabu ne, 1200m. May 27 2005. L.J. Gurung, 401.

***Scurrulla parasitica* L.**

- Family : Loranthaceae
- Common name (s): Lisso (Nep.)
- Local name : सिफु धुँ, Mephu dhu (Gur.)
- Flowering/Fruiting: August
- Distribution : Nepal (WCE. 200-2200m). Himalaya (Uttar Pradesh to Bhutan), India, Sri Lanka, Myanmar, Indo-china, China, Malaya.
- Description : A parasitic shrub. Leaves opposite, ovate, oblong, cordate or obovate or sub acute, upper surface mostly glabrous, lower surface with white or rusty tomentum. Inflorescent axillary sub-racemose fascicles. Flower pedicellate, bracteolate, tubular up to 2cm long, greenish yellow with reddish base.
- Part (s) used : Fruit
- Uses : Fruit is eaten by children.
- Representative collection: Kaski, Sikles, 2000m. May 21 2005. L.J Gurung, 372.

***Smilax aspera* L.**

- Family : Liliaceae
- Common name (s): Kukur daino (Nep.), Green briers (Eng.)
- Local name : नेरी, Neri (Gur.)

- Flowering/Fruiting: September –November / March –April
- Distribution : WCE Nepal, 1200-2600. Widespread from Mediterranean and F. Africa eastwards to India & Sri Lanka.
- Description : A tendril-climber with flexuous usually prickly stem. Leaves linear-lanceolate to rounded, leaf bases rounded, heart shaped or lobed, tendril paired, arising from the base of the leaf-stalked. Flowers small, fragrant, white, and unisexual. Fruit a berry, blue black when ripen.
- Part (s) used : Root, short
- Uses : Medicinal uses: Root paste is used to treat skin diseases.
- Other uses : Shoot has ritual value as it is used to make locally called "Plo" during *Arghum* ritual which is performed for the diseased spirits after death.

Representative collection: Kaski, Sikles, 2100m. May 21 2005. L.J Gurung, 367.

***Solanum aculeatissimum* Jacq.**

- Family : Solanaceae
- Common name (s): Kataiya (Nep.)
- Local Name : स नब मइ, Sa Naba Mai (Gur.)
- Flowering/Fruiting: December –July (fl)
- Distribution : CE, Nepal up to 1600m. TROPICALLY North America widely introduced into old world tropics and naturalized.
- Description : A spinous under shrub. Stem with recurved spines and glandular pubescences. Leaves alternate or 2-together, exstipulate, petiolate. Fruit globose yellowish green to orange yellow.
- Part (s) used : Fruit
- Uses : Medicinal uses: - The ripe fruit is pressed between teeth for 15 minutes to get relief from toothache.

Representative collection: Kaski, Sikles, 1200m. August 8 2004. L.J. Gurung, 334.

***Solanum nigrum* L.**

- Family : Solanaceae
- Common name (s): Kali Gedi (Nep.), Black nightshade (Eng.)
- Local Name : ताउजर खब मइ, Taujar khaba Mai/Khursani chhi (Gur)

Flowering/Fruiting: August-October
 Distribution : WCE, Nepal up to 900-2900m. Almost cosmopolitan.
 Description : An erect herb. Leaves alternate, ovate-oblong, acuminate, base narrowed, margin entire. Flowers in sub-umbellate raceme, small, white, calyx 5-lobed, narrow. Berry blackish.
 Part (s) used : Leaf
 Uses : Medicinal uses: Leaf paste is applied to treat cuts and wounds. Leaf paste is applied and massaged strongly on the forehead to treat fever.
 Representative collection: Kaski, Sikles, 2000m. November 10 2004. L.J. Gurung, 352.

***Solena heterophylla* Lour.**

Family : Cucurbitaceae
 Common name (s): Ban Kakri (Nep.)
 Local Name : तोजू, Toju (Gur.)
 Flowering/fruitleing: September-November
 Distribution : Nepal (WCE. 1600-3200m). Afghanistan , Himalaya, India, Sri-Lanka, Myanmar, Indo-China, SW China, Taiwan, Malaysia, Australia
 Description : Scandent climber. Stem slender, sulcate, rough glabrous. Petiole 0.5-1cm leaves deeply 3-lobed, hastate. Tendrils slender, glabrous. Male flower sub umbellate. Corolla greenish white. Female flower: Ovary glabrous.
 Part (s) : Root, fruit
 Uses : Medicinal uses: Root juice is taken to treat fever and to kill intestinal worms of both human and animals.
 Other uses : Fruits are eaten as raw.
 Representative collection: Kaski, Sikles, 2100m. November 10 2004. L.J. Gurung, 361.

***Swertia chirayita* (Roxb. ex Fleming) H. Karst.**

Family : Gentianaceae
 Common name (s): Chiraita (Nep.), Indain gentian (Eng.)
 Local Name : Tite (Gur.)
 Flowering/Fruitleing: August–November/November-December

- Distribution : WCE, 1200-3000m. Himalayas (Kashmir to Bhutan), Northeast India.
- Description : The plant is an erect annual. Stem is robust, branching, and cylindrical. Leaves are broadly lanceolate, 5 nerved and the flowers are greenish yellow.
- Part(s) used : Whole plant
- Uses : Medicinal uses: The plant powder is mixed with water and taken to treat cold and cough and fever. The plant juice is taken to cure abdominal pain.

Representative collection: Kaski, Sikles, 2300m. November 10 2004. L.J Gurung, 360. (Photo plate no. 2.6)

***Taxus wallichiana* Zucc.**

- Family : Taxaceae
- Common name (s): Lot Salla (Nep.), Himalayan Yew (Eng.)
- Local Name : सद्दज/संग्यू, Saij/Sangi (Gur.)
- Flowering /Fruiting: October – December
- Distribution : WCE Nepal, 2300-3400m. Afghanistan Himalayas, NE India, N Myanmar, Indo-China W.China, Malaysia.
- Description : An evergreen much branched tree. Bark thin, scaly, reddish brown. Leaves linear, flat, curved, spine-tipped, mostly spirally arranged, upper surface shining, lower surface pale, mid-rib conspicuous. Male flower in short stalk, globose heads in the axils of leaves. Female flowers, solitary, axillary, green. Fruit with red fleshy cup.
- Part (s) Used : Leaf, Fruit, stem
- Uses : Medicinal uses: Stem bark is mixed with rhizome of *Paris polyphylla* and grinded finely. The mixture is applied on hands and feet to heal skin cracks and fissures. Leaf and stem bark has anticancer property.
- Other uses : Fruits are edible. Stem is used for making agricultural implements.

Representative collection: Kaski, Sikles, Nalku khon 3400m. August 5 2004. L.J Gurung, 332.

***Thalictrum foliolosum* DC.**

- Family : Ranunculaceae

Common name (s): Dampate (Nep.), Meadow rue (Eng.)
 Local name : काउडे, Kaude (Gur.)
 Flowering/Fruiting: July-September
 Distribution : Nepal (WCE. 1300-3400m). Himalaya (Kashmir, Uttar Pradesh to Arunchal Pradesh), N. Myanmar, China (Xizang)
 Description : Herb. Leaves many time divided in oblong-ovate, rounded toothed, 3-lobed leaflets 1-1.5cm. Flowers small, white to dull greenish-purple. Petals ovate, 3-5mm green, soon falling, stamens much longer, filaments white. Achenes 2-5, ellipsoid, strongly ribbed, stalk less, beak curved.
 Part (s) used : Root
 Uses : Medicinal uses: Root extract is taken to cure diarrhoea, swollen of stomach and for appetite.

Representative collection: Kaski, Sikles, 1800m. July 10 2005. L.J Gurung, 423.

***Thysanolenia maxima* (Roxb.) Kuntze**

Family : Gramineae
 Common name(s) : Amriso (Nep.), Bouquet grass (Eng.)
 Local name : म्राछारबो कुज, Mra chharbo Kuj (Gur.)
 Flowering /Fruiting: December- March (F1)
 Distribution : CE Nepal, 100 -2500m. Nepal, India SE Asia, china, Malaysia.
 Description : A shrubby large elegant grass to 2m. Leaves linear, broad, lanceolate, acute apex, margin smooth, with slightly concave upper surface and many parallel veins. Flowers in panicle of spikelet.
 Part (s) used : Root, Flower
 Uses : Floral branches or inflorescence as a whole is used as a broom.

Representative collection: Kaski, Sikles, Dhaprang Thar, 2000m. May 27 2005. L.J. Gurung 403

***Urtica dioica* L.**

Family : Urticaceae
 Common name (s): Sisnu (Nep.), Stinging nettle (Eng.)
 Local name : फोल्, Polu (Gur.)

- Flowering /Fruiting: August – September
- Distribution : WCE Nepal 1000- 2500m. Europe, North Africa, West Siberia, Central Asia, Himalayas, west China. Naturalized widely in other temperate l regions.
- Description : A perennial herb, with angular, branched stems, covered with stinging hairs. Leaves opposite, petiolate, ovate to lanceolate, coarsely toothed. Flowers in long axillary tassel-like hanging or spreading clusters.
- Parts used : Root, young shoot
- Uses : Medicinal uses: -Decoction of root is considered to cure mental disorder, fever and stomach disorder.
- Other uses : Leaf powder is used in insecticides and pesticides Leaves are cooked and taken as vegetable.

Representative collection: Kaski, Sikles, 2000m. August 8 2004. L.J Gurung, 336.

***Usnia* sp.**

- Family : Usneaceae
- Common name(s) : Jhyau (Nep.), Lichen (Eng.)
- Local name : Chhyou mai (Gur.)
- Discription : Thallus fruticose, much branched, cylindrical, pendulous, yellowish brown, Apothecia common.
- Part (s) used : Whole plant
- Uses : Plant paste is used in cut and wounds.

Representative collection: Kaski, Sikles, 2000m. May 28 2005. L.J. Gurung, 381.

***Viburnum mullaha* Buch.-Ham. Ex D.Don**

- Family : Sambucaceae
- Common name(s) : Malo (Nep.)
- Local name : हेरा चुँ, Hera dhu (Gur.)
- Flowering/Fruiting: June-August
- Distribution : Nepal (WCE. 1500-3000m). Pakistan to SE. Tibet, Burma.
- Description : A large deciduous shrub. Stem dark grey. Leaves 7-15cm, ovate to ovate-lanceolate, long pointed, with few remote teeth, hairless above, hairless or with star-shaped hairs beneath. Large

rounded compound umbels of tiny white flowers each 3-4mm across. Fruit bright shining red, to 8mm.

- Part(s) used : Fruit
Uses : Medicinal uses: Fruit paste is applied in wounds.
Other uses : Fruits are edible. It has ritual value

Representative collection: Kaski, Sikles, 2100m. September 10 2004. L.J Gurung, 342.

***Viola pilosa* Blume**

- Family : Violaceae
Common name (s): Ghatte Phul (Nep.), Pansy (Eng.)
Local name : बौ मद्द, Bou mai (Gur.)
Flowering/Fruiting: February-May
Distribution : Nepal (WCE. 1200-3000m). India, Pakistan to S.W. China
Description : Stoloniferous perennial. Leaves 2-4.5x1.5-4cm, acute base deeply cordate, margin crenate-serrate, sparsely pubescent, petioles up to 10cm. Peduncles 2-6cm. Sepals 4-5mm, ciliate pubescent at base. Petals 8-10mm, mauve, pubescent within, spur 3-4mm rounded.
Part(s) used : Whole plant
Uses : Medicinal uses: - Leaf paste is applied in boils, wounds.
Representative collection: Kaski, Sikles, 2000m. May 21 2005. L.J Gurung, 374.

***Zanthoxylum armatum* DC.**

- Family : Rutaceae
Common name (s): Timur (Nep.), Nepal pepper prickly ash (Eng.)
Local Name : प्रुमो, Prumo (Gur.)
Flowering /Fruiting: April – May / July- November
Distribution : WCE Nepal 1100- 2500m. Himalayas (to Bhutan) N. India, East China, Taiwan, Philippines.
Description : A small spiny shrub to 3m. Stem woody branched and armed with prickles. Leaves alternate, stipulate with stipular spines at the base, leaflets 3-9, gland dotted. Flower small, in clusters and yellow in color. Fruit spherical or globose, wrinkled.
Part (s) Used : Fruit

- Uses : Medicinal uses: The fruit is crushed and taken to treat abdominal pain, headache, indigestion and for appetite.
- Other uses : Fruits are used in insecticides and pesticides. It is used in spices. It has ritual value.

Representative collection: Kaski, Sikles, 1800m. November 10 2004. L.J Gurung, 357.

5.4. Socio-economic importance of *Nigalo* and *Allo* based work in the Sikles area

Nigalo and *Allo* both have unique and significant role in the Sikles area. Both of these species have social as well as economically high value.

5.4.1 *Nigalo*

Small-statured bamboos (*Nigalo*), are of the most versatile NTFPs in Nepal, and are available to rural communities for many purposes. The hill farmers make practically everything they need from bamboo except the ploughshare. Bamboo technology is wide spread and processing skills have been traditionally practiced and mastered by large section of hill rural communities among whom a high level of traditional skill still exist. Bamboo and bamboo products, besides providing the local people with their various needs, also provide them with additional cash income. Development and encouragement of cottage industries based on bamboo have thus, a very high potential of providing the hill farmers with much needed cash income and making a very important contribution to hill farming economy.

The southern aspect of the Annapurna range is famous for *Nigalo*. The natural forest is the main source of *Nigalo* supply. With over-exploitation and shrinkage of their habitat, the resource has been depleted at an alarming rate. There is not attempt to manage the *Nigalo* forest technically. The main reason for this is the lack of sufficient research on the field of *Nigalo* forest.

Current forest value, its contribution to employment and income has been diminished by decades of harvesting, non-existent management and over exploitation of common property forest species. For forest to play a continued role on rural economy effective natural forest management strategies must be implemented.

The rapidly decline of forest resources base has laid a profound socio-economic impact on forest dwellers and local rural communities who depend on *Nigalo* for their living. There is thus a need for sustainable forest management which can provide adequate food, fodder, fuel, fibre, timber and wood for local and industrial uses besides maintaining the ecosystem. With the depletion of forest the *Nigalo* have also been

dwindling fast as the forest management cared only for firewood and timber production. The *Nigalo* forest has not received the attention of the forest managers as they deserved.

Environmental degradation in the Himalayan region is the result of a human intervention. Population growth exerts increasing pressure on limited resources. *Nigalo* forest at present is not receiving adequate attention which is necessary in the present circumstances, to improve the economy of the rural poor. *Nigalo* which can play significant role in uplifting the general economy have to be identified in this region.

The potential role which *Nigalo* could play in rural development and conservation of environment and bio-diversity is remarkable. *Nigalo* are not properly protected, extracted, their quality is not improved and awareness to market value added products are not forthcoming. Efforts are lacking for increasing their production for establishment of cottage & small scale industries based on *Nigalo*. Adequate measures for generation of employment and income are lacking due to poor management.

Ironically, *Nigalo* are one of the most difficult plants to understand taxonomically and studies carried out on bamboo in Nepal are meagre. Accurate identification of specimens requires both flower and vegetative material which rarely occur together. Therefore, an attempt is being made to identify various *Nigalo* species on the basis of leaves, culms, habitat, local names and uses.

Three major species of *Nigalo* are found in the study area.

Taxonomic treatment:

Vegetative key to principal *Bamboo* genera in study area

1. Leaves with clearly visible transverse veinlets in addition to the longitudinal veinlets giving a chequered appearance when held up to the light.....2
Leaves without visible transverse veinlets or with visible veinlets which are much more obscure than the longitudinal veinlets, culms arising in clumps.....*Drepanostachyum*

2. Culms arising singly from long slender running rhizomes which have elongated internodes.....*Arundinaria*
Culms arising in clumps from short rhizomes which are thicker than the culms and have short internodes, dead sheaths very persistent.....*Thamnocalamus*

Arundinaria maling Gamble.

Family: Gramineae

Malingo Nigalo (Nep.), प्लोमु मो *Plomu Mo* (Gur.)

This is the species which can occasionally be found as low as 2300m but becomes wide spread above 2800m. It is recognized by the very rough internodes on younger culms, which feel like sandpaper towards the top. Stems slender, 1.6-4 cm in diameter, internodes 30-38 cm long. Leaves narrow-lanceolate.

Representative collection: Kaski, Sikles, Plou 2200m. May 28 2005. L.J Gurung, 413. (Photo plate no. 4.1)

It is the raw material of the choice for making the best quality products, as it can be easily sliced into very thin strips and make flexible baskets, mats etc. In the study area this is the best and widely used species having multiple use for weaving materials, fodder and edible shoots.

Drepanostachyum intermedium (Munro) Keng f.

Family: Gramineae

Tite Nigalo (Nep.), कामु मो, *Kaamu Mo* (Gur.)

The common small-statured bamboo, found from 1200 to 2400m, both in cultivated land and occurring naturally in the forest areas, usually from 1200 to 1800m. Stem slender, glabrous. Leaves narrow-lanceolate without tessellation. It produces low quality weaving materials.

Representative collection: Kaski, Sikles, 2000m. May 28 2005. L.J Gurung, 411. (Photo plate no. 4.2)

Thamnocalamus aristatus (Gamble) E.G. Camus

Family: Gramineae

Ghude Nigalo (Nep.), छोमु मो, *Chhomu Mo* (Gur.)

This species is common in temperate region of Western Nepal. It is of little value as the culms are brittle and rarely used for weaving. Leaves with tessellation. It makes very good brushes as it is stiff and inflexible.

Representative collection: Kaski, Sikles, 2050m. May 28 2005. L.J Gurung, 412. (Photo plate no. 4.3)

Nigalo is one of very important NTFP in the studied area and the number of people dependent on *Nigalo* products for their livelihood. Only men are involved in the *Nigalo* based works. It becomes the source of income generation for the marginalized and poor people in the Sikles area.

5.4.1.1 Silvicultural characteristics:

Nigalo occurs in temperate region and most common on high elevations in Himalaya region. Silviculturally, these are attractive because once established they are easy to maintain. The clumps renew themselves after being cut and even if their flower produce seeds ensure adequate regeneration. Bamboo flowers sporadically as well as gregariously. In sporadic flowering, only the culms that produce flowers die and not the entire clump. Clumps of any size may produce flower. Gregarious flowering in any locality occurs only after a long period of years.

Bamboos are perennial grasses, with woody culms from rhizomes. Mature bamboo clumps produce new shoots every year, through the rainy season. These shoots develop rapidly and within two or three months reach their full height and diameter, the current years culms are however much softer and less woody than older culms. The culms persistent in the clumps if not cut for about 7-12 yrs, depending upon the species, dying slowly and being replaced by new culms (Stapleton, 1987). If older culms are not removed they restrict the development of the rhizome system and new shoots, much greater productivity is obtained by thinning out the poles regularly.

5.4.1.2 Condition of *Nigalo* in the study area

The heavy exploitation of *Nigalo* forest has diminished its productivity. The Malingo *Nigalo* (*Arundinaria maling*) is being scarce due to its multiple uses. Its use in non-economic sector is higher than that in the economically benefited sector. Its utilization as fodder for the livestock is much higher. The edible shoots of malingo *Nigalo* have high market value and it is widely used for handicrafts production as source of income. Now it is being difficult to obtain in sufficient amount as it was found in the past.

Ghude *Nigalo* (*Thamnocalamus aristatus*) is not used to weave special products except basket and fencing materials. Due to lack of flexibility in the culm-strip of this species it is not the choice of preference for the handicraft product. As it is rarely used its natural status is not significantly changed as that of Malingo *Nigalo* (*Arundinaria maling*). There is no change in its availability during last few decades.

Tite *Nigalo* (*Drepanostachym intermedium*) is planted by farmers in their farm surrounding the homesteads. Its productivity has increased when malingo *Nigalo* is

being heavily exploited from natural forest as the substitute of Malingo *Nigalo* (*Arundinaria maling*).

Table 10

Species preferred by the respondents.

Particulars	Malingo	Ghude	Tite
1. Weaving material	* * *	*	* *
2. Edible shoots	* * *	* *	-
3. Fodder	* *	* * *	*
4. Time saving in processing	* * *	*	* *

Source: field survey 2005

* * * Highest value

* * Medium value

* Lowest value

5.4.1.3 Harvesting Practice and Management System of *Nigalo* in the study area

Nigalo are abundant in Annapurna range due to its moist temperate climate. People harvest *Nigalo* selectively choosing culms of 1-2 years old and relatively young culms are left to grow further and for new shoots to come up. But it is not actually happening in the field. It is harvested without any concern for conservation measures. People of the study area harvest the *Malingo Nigalo* (which is best for weaving and have comparatively high economic value) twice a year during the months of March-May and October –December. The survey revealed that they harvest the young culms rather than old one. There is not proper management and people harvest whatever type of *Nigalo* they obtained. People of the village are destroying at least doubled number of *Nigalo* shoots than required during harvesting period.

The villagers are managing the *Nigalo* forest traditionally since last few decades. In the recent years, it has completely banned the collection of edible shoots, free grazing during rainy season and collection of younger culms. If a person illegally collects the *Nigalo* shoots he is punished with some due. However, this practice is not strictly followed.

Due to poor management the older culms are not removed and they are restricting the development of the rhizome system and new shoots. A large number of cattle population graze inside the *Nigalo* forest. The *Nigalo* clump is severely destroyed by cattle. It is extensively used for fodder. The regeneration is severely destroyed by cattle when they are allowed free or haphazard grazing.

Table 11: Seasonal calendar for the *Nigalo* work in the study area

S.No	Particular	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
01	Harvesting												
02	Roofing material												
03	Mat weaving												
04	Basket weaving												
05	Syakhu weaving												
06	Edible shoot collection												

Source: Field survey 2005

5.4.1.4 Market condition

Various *Nigalo* products like *Doko*, *Dalo*, *Mandro*, *Syakhu*, *Bhakari* etc are easily marketable because of daily use in the rural area. About 30 households are engaged and getting benefit from this work. Sometime people from Pokhara come to the area for buying such products, but this business is not organized. People do not have time to make these products since they need to be involved in agriculture. If *Nigalo* related work was organized, people would devote themselves in this profession. They do not need any training on making these products as they are doing it very well traditionally.

Table 12: Market condition of some *Nigalo* products.

S.No	Items	Cost (Rs/Piece)	Price	Time required for making per piece
1.	<i>Jetho Mandro</i> (<i>Nigalo</i> mat of size 4m×3.2m)	Rs. 800-900/Pc		4 days
2.	<i>MailoMandro</i> (<i>Nigalo</i> mat of size 2m×1.2m)	Rs.250-350/Pc		3 days
3.	<i>Bhakari</i> (<i>Nigalo</i> mat)	Rs.300-350/Pc		3 days
4.	<i>Syakhu</i> (<i>Nigalo</i> umbrella)	Rs.300-500/Pc		3 days
5.	<i>Doko</i> (Basket)	Rs.120/Pc		1 ^{1/2} days
6.	<i>Dalo</i> (Basket)	Rs.200/Pc		2 days
7.	<i>Rage</i> (Big basket)	Rs.300/Pc		3 days

Source: Field Survey 2005

All the products have no equal demands. All the people who engaged in *Nigalo* production are not skilled and efficient for all *Nigalo* products like *Doko*, *Dalo*, *Mandro*, *Syakhu* etc. Mostly the products are replaced by plastic products, which also enforce to reduce the demand in market. The demand for *Nigalo* products in the market is shown in the table given below.

Table 13 The demand for different *Nigalo* products.

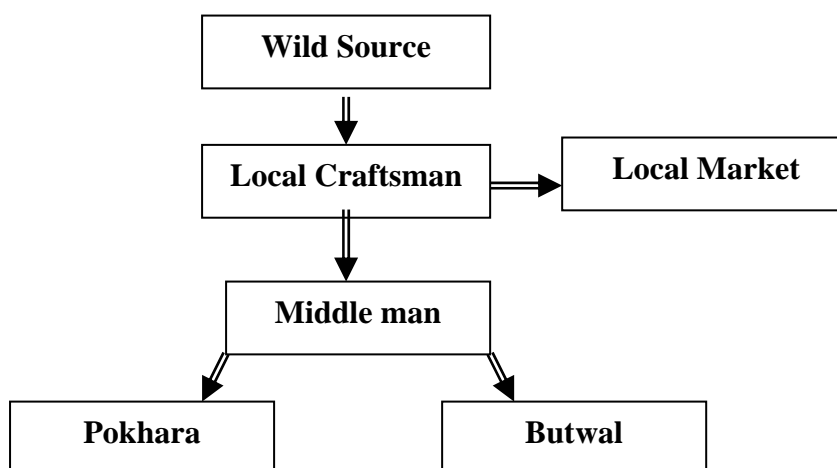
S.No	Items	Demand ranks
1.	<i>Mailo Mandro</i> (<i>Nigalo</i> mat of size 2m×1.2m)	1 (Maximum)
2.	<i>Doko</i> , <i>Dalo</i> etc	2
3.	<i>Jetho Mandro</i> (<i>Nigalo</i> mat of size 4m×3.2m)	3
4.	<i>Syakhu</i> , <i>Bhakari</i> etc	4

Source: Field survey 2005

5.4.1.5 Trade route for *Nigalo* product

Nigalo products are mainly sold in the local village by the local craftsman. They wave the products according to their demand. The other main customers (the middle man) of these products are from Pokhara. They sold the products in the local market of Pokhara during various occasions and also their main dealers are from Butwal.

Flow Chart: 2 Trade route of *Nigalo* Products from Sikles area



Source: Field survey 2005

5.4.1.6 Nature of problem associated with *Nigalo* based work

Nigalo based craft works are one of the small-scaled industries, which is traditionally carried out in the Sikles area. As it is traditional job of this area, the workers have traditional skill of making different *Nigalo* products.

The main problem of *Nigalo* based work is less availability of raw materials. This may be the reason due to poor management and harvesting of *Nigalo*. People from the surrounding villages are destroying or misusing at least doubled the number of *Nigalo* shoots than required during harvesting period. There is also haphazard collection of young shoots due to its high demand. The other problem facing by them is the market. They have no properly managed market to sell the products. Most of the *Nigalo* products are replacing by the plastic products, so the demands of these products are decreasing.

Young generations are not interested to do this job and their parents are also not enforcing them to join the job. This also hampers the development of this industry. The cottage products are also facing the problem of transportation. The Sikles area has not concrete road and not good transportation facility. To uplift the quality and demand of the products, the people of the Sikles area are not trained by any sector.

5.4.2. *Allo* or *Puwa* (*Girardinia diversifolia*)

Allo is a fibrous plant grown widely. The stem barks yields fibre with unique qualities like strength, smooth, light and when appropriately treated a silk-like lustre.

The *Allo* (*Girardinia diversifolia*) plant grows in most northern parts of Nepal and is also found in the hills from the west to the east of the country at altitudes ranging between 1,200m and 3,000 m. It flourishes under the shade of deciduous forests, and in moist, sandy soils, especially ravines; it can also be found on shrub land and on the edges of cultivated land, where it is used to consolidate bunds on terraced land. Growing to a height of 3 m. The plant has long, white thorns that have a very nasty sting, the effect of which lasts for about half-an-hour or so.

Taxonomic treatment:

Girardinia diversifolia (Link) Friis.

Family : Urticaceae
Common name (s) : *Allo* (Nep), Himalayan nettle (Eng)
Local Name : नी पोल्नु, Ni Polu (Gur.)

Flowering/fruiting	:	July – August (F1)
Description	:	Herbs up to 2m tall. Leaves broadly ovate, shallowly or deeply lobed, acuminate, base rounded, petioles 3-10 cm. Male flower ca. 1.5 mm diameter. Female flowers ca. 1.5 mm, perianth becoming split on one side. Achens blackish, ca. 2.5mm diameter.
Part (s) used	:	Root, Bark
Uses	:	Fibre extracted from the stem bark is used for making local bags like <i>Thailo</i> , <i>Bhangro</i> and ropes.
Medicinal uses	:	Root is crushed and filtrate, the filtrate is taken to treat gastric disorder and chest pain.

Representative collection: Kaski, Sikles, 2100m. July 11 2005. L.J Gurung, 435. (Photo plate no. 7.1)

Allo or *Puwa* (*Girardinia diversifolia*) is one of the valuable NTFPs having significance socio-economic importance in the study area. Each communities of the Sikles village have their own *Allo* bushes in the high hill natural forest. There are sufficient amount of *Allo* in the Sikles area.

5.4.2.1. Harvesting and Processing Technique

Although there are variations in weaving techniques in different parts of Nepal, the basic methods of *Allo* harvesting and spinning remain similar all over. Harvesting of *Allo* takes place between August and December. One has to walk about half or one day to reach in the area for *Allo* collections. They spend about two to three days in the jungle and extract the barks of *Allo*. Both men and women are involved in the *Allo* harvesting but only women take part in weaving activities.

The best-quality fibre comes from the early harvests. *Allo* weavers believe that *Allo* growing under shade yields the finest and whitest fibres, while plants that are more exposed to the sun are brownish in colour. Fibres from plants growing at high altitudes are the most valued for weaving. Only mature, thick stems are harvested others are left to seed. The stems are cut using sickles (*Hasias*) at about 15 cm from the ground in order to leave sufficient stem for new shoots to sprout. The stinging thorns on both stem and leave make the cutting of the stems hazardous and the harvesters protect their hands with bundles of cloth. Often, the stems are left for a few days before fibre extraction begins - this is done to reduce the potency of the stinging hairs. On an average, in one day, the barks of about 370 stems are harvested. The fresh bark of one *Allo* stem can weigh up to 100 grams - it yields a maximum of 5 grams of dry fibre.

The bark is left to dry for a few weeks. The bark is placed in a pot with water and wood ash and boiled for about three hours before being left to simmer overnight. By the morning the fibres will be exposed and the other plant matter can be removed by beating and washing (Photo plate no. 7.2). The wet fibres are then rubbed with a micaceous soil, the absorbent and lubricating properties of which will make separating and spinning the fibres easier. The strands of fibres are then dried in the sun (Photo plate no. 7.3), after which they can be teased apart (Photo plate no. 8.1) ready for spinning. Spinning is done by using a spinning wheel (*Charkha*) (Photo plate no. 8.2).

Traditionally, all *Allo* cloth was woven on back-strap or body-tension looms, the women using a lightweight hand-spindle, about 40 cm long (Photo plate no. 8.3). Spindles and looms are standard equipment of every home. Weaving takes place mainly during winter when no fieldwork is done. With the minimum of simple components this type of loom fulfils the basic function of keeping the warp threads under tension while the weft thread is interwoven with them at right angles. All parts of the loom, except the wooden beater, are carved from bamboo at home. Though spinning by hand-spindle is slower than spinning on a wheel, the spindle has the advantage of weighing very little, being easily carried and used anywhere. When the weaving is completed or at the end of the day, the loom parts can just be rolled together into a bundle, which is easily stored in the roof rafters.

Allo was especially used for weaving *Bhangra and Sacks*; both items are popular in the area. *Bhangra* is a special type of cloth especially used by the Gurung community which is as a part of their culture (Photo plate no. 6.4).

5.4.2.2. Nature of problem associated with *Allo* Based works

The processing of *Allo* fibre is very complex and labour intensive, and weaving frame (Tan) used in the area is very traditional. Market for the *Allo* production is a problem and due to cheap and easily available cotton, the products are gradually replaced by cotton cloths.

Mainly women of the community are engaged in the *Allo* based work, they don't have any access to the market. The *Allo* products are use by community people during feast and festivals and during other works especially by males of the community. Thus, *Allo* weaving has been taken as non-economical work in the community. Beside that only elder people are involved in this work. Young generation is not taking interest in this work; therefore, the indigenous technique is in risk.

CHAPTER SIX

6. DISCUSSION

Considering the importance of wild plants on human welfare and documentation of ethnobotanical knowledge of the local people for the management of local plant resources, the present study has been undertaken with the three main objectives: To explore and identify the plant species used as NTFPs by the people in the study area, to categorize the NTFPs according to their use and to study the socio economic importance of *Nigalo* and *Allo* products in the study area. All the information mentioned here is based on the field observation, applying RRA, PRA tools and interviewing with local healers, older people, knowledgeable persons and *Nigalo* and *Allo* weavers.

6.1 Ethnobotanical knowledge in study area

There are three different major ethnic groups in Sikles area viz. Gurung (84.78%), Kami (11%) and Damai (3.59%) (Gurung, 1999). Among these the most dominant groups is Gurung having their own tradition and culture. There is close relationship between their culture and plants.

Both elder male and female respondents possess sufficient knowledge on NTFPs since they utilized them as traditional medicine, fibre plants, cultural purpose, etc. People from young generation have little knowledge on NTFPs. The declining of knowledge transfer to the young generation in the study area is due to problem of knowledge transfer as the knowledgeable persons hesitate to transfer their knowledge, lack of interest on traditional occupation, due to lack of proper management, market price of NTFPs and the trend of job service to abroad. People from the low economic status paid more interest on practices and utilization of NTFPs as they do not have any alternative jobs.

6.1.1 Plant use categories

Based on the uses, 14 different plant use categories have been presented in two groups: Medicinal and other uses.

6.1.1.1 Medicinal plant

A large number of valuable medicinal plants are reported to be found in the study area. However, majority of the villagers are unfamiliar to it. Only a few old people and traditional healers are aware about the importance and uses of these. They stated by saying “for the knowledgeable people all the plants are medicinal but for the unknowledgeable people all the plants are weeds” and “Our forest can serve as a hospital if the available plants are used properly”.

Sixty Six species of plants belonging to 65 genera and 50 families are used to treat 36 different types of disease and disorder. The maximum numbers of species are that belonging to Compositae, Liliaceae, Polygonaceae, and Solanaceae containing three species used for different diseases, which are followed by Anacardaceae, Ericaceae, Labiatae, Lauraceae, Orchidaceae, Rosaceae, Urticaceae and Zingiberaceae containing two species. Rest of 57 families has only one species to treat disease and disorder (Table 7). Highest number (17 species) of plants was used for the treatment of abdominal diseases. Similarly, 15 species are used for cut and wounds, 11 species (15.06%) for fever, eight species (10.95%) for gastric disorders, seven species (9.58%) for cough and cold, dysentery; four species (5.47%) for sprains, stomachic; three species (4.10%) each for body itching, boils, bone fracture, burns, dental diseases, diarrhoea, headache, snake bite, urinary problem, intestinal worm, menstrual disorder; two species (2.73%) each for blood purification, chest burn, water brash and one species (1.36%) each was used for other 16 diseases. Most commonly used medicinal plants in the study area are *Aconitum gammiei* (Nirmashi), *Artemisia dubia* (Titepate), *Asparagus racemosus* (Kurilo), *Centella asiatica* (Ghodtapre), *Dactylorhiza hatagirea* (Punchaunle), *Litsea cubeba* (Siltimur), *Paris polyphylla* (Satuwa), *Viola pilosa* (Ghatte phul), *Zanthoxylum armatum* (Timur) etc.

The results show that the uses of plants by the local people of the Sikles area for different medical purposes are mostly similar to that of the used by other communities of Nepal and India. However, the uses of some species are found to be quite different as practiced in other communities (Kirtikar *et al.* 1935; Anonymous 1970; Manandhar 1985, 1989, 1992; Jain *et al.* 1991; Bhattarai 1992; Mandal 1992; Anonymous 1993; Sapkota 1994 and Sarkar 1994, Chhetri 1999, Gurung 2002).

Root of *Asparagus racemosus* is used in stomach pain, colic and to increase lactation. Of these uses it is reported that the plant is commonly used in lactation by other author too (Mandal 1992, Shrestha 1993, Sarkar 1994, Chhetri 1999 and Gurung 2002). Besides the above use of *Asparagus racemosus*, the plant are also used as diuretic (Anonymous 1948; Anonymous 1993), rheumatism (Anonymous 1970), viral infection of nose (Gurung 2002)

Centella asiatica is commonly available and very popular medicinal plant in the study area. It has a high medicinal value. It is used in cuts and wounds. It is also applied in snake-bite, skin diseases and severe headache. Its use in skin diseases has been reported by Tiwari and Joshi (1990), Shrestha and Pradhan (1986), Mahato (1998), Manandhar (1990), DPM (1970) and Coburn (1984). Shahi (2002) mentioned its use in cut and wound, heat problem and urine purification. Subedi (2002) mentioned its use in headache and abdominal pain. Gurung (2002) mentioned its use in tonsillitis, sore throat, brain tonic and loss of appetite, Devkota (2003) mentioned it's used in cuts and

wounds, brain tonic, vitamin, insomnia, fever, stomatitis, skin-diseases, severe headache, alopecia and hiccups. Its use in snake-bite could be a new report.

Swertia chirayita is taken to treat cold and cough, fever and abdominal pain. Manandhar (1986), Siwakoti and siwakoti (1998), Bhattarai (2002) describe its use in fever. Tiwari and Joshi (1990), Chhetri (1999) reported its use in stomachic, laxative, anthelmintic, in jaundice, skin diseases, febrifuse and cholagogue. Bhattarai (2002) describes its use in cough and cold, fever, stomachache. Devkota (2003) mentioned its use in malaria, pneumonia, fever and abdominal pain.

In the study area, *Paris polyphylla* was the most famous among the medicinal plants. The plant was used to treat cuts and wounds, snake-bite, and abdominal pain. The same plant was reported to be useful in intestinal worms by (Manandhar 1986 b, 1995, Chhetri 1999) and in food poisoning by Joshi and Edington (1990), gastritis, cholera, constipation by Gurung (2002).

Comparing to Joshi and Edington (1990), some of the common plant species are reported to have same and different medicinal value. Plants like *Eupatorium adenophorum* for cuts, *Cannabis sativa* for stomach pain, *Lyonia ovalifolia* for skin diseases, *Zanthoxylum armatum* for intestinal disorder, *Acorus calamus* for cough and cold. Plants found to be in their uses are *Rubus ellipticus* for kufat in contrast to fever and food poisoning, *Allium sativum* for high altitudinal sickness and high blood pressure in contrast to cough and pneumonia.

One of the rarely found species in the study area, *Bergenia ciliata* was used to get relief from roundworm, swollen stomach, urinary trouble and menstrual disorder. The same plant was reported to have curative property for fever, boils, astringent, diuretic and ophthalmia (Manandhar, 1980)

Rubus ellipticus was taken to cure stomach disorder, cold and cough and kufat. Joshi and Edington (1990) describe its use in fever and food poisoning. Bhattarai (1993) reported its use in dysentery and Jain *et al.* (1991) describes its use in malarial fever.

Zanthoxylum armatum was one of the commonly used plant species in the study area. It was used to treat abdominal pain, headache, indigestion and for appetite. Joshi and Edington (1990) described its use in stomach disorders, cholera. Manandhar (1993) described its use in anthelmintic.

In addition to the above mentioned species, the use of *Centella asiatica* in snake bite; *Drymaria diandra* in lower abdominal pain locally called “Gano”; *Elaeagnus latifolia* in stomach complaints; *Equisetum debile* in lower abdominal pain during delivery locally called “Phine”; *Ficus auriculata* for treatment of the bleeding through urination in the cattle locally called “Laumate”; *Girardinia diversifolia* in gastric disorder and

chest burn; *Lycopodium clavatum* in headache; *Rubus ellipticus* in “Gano”; *Urtica dioica* in mental disorder; *Litsea cubeba* in swelling of stomach; *Polygonum molle* in dysentery; *Solena heterophylla* in fever; *Taxus wallichiana* in skin cracks; *Ananas comosus* in urinary problem (Kharo); *Duchesnea indica* in stomach problem “Bikar pareko”; *Schima wallichii* in stomachache during menstruation cycle are the different uses that have not been documented and published so far, therefore are new addition to the ethnobotanical documentation.

Villagers of the study area are not found to be involved in trade of medicinal plants. But collection of plants by the outsiders was a common practice. *Aconitum gammiei*, *Aconitum ferox*, *Cordyceps sinensis*, *Dactylorhiza hatagirea*, *Neopicrorhiza scrophulariifolia* are the most preferred species for the collection.

6.1.1.2 Other use categories

Altogether there are eight plant species belonging to the eight genera and seven families used for agricultural implement, household equipment and construction materials (Appendix III).

Some of the plants are poisonous plants. They are poisonous to fish, human, cattle and insects. Thirteen plant species belonging to 12 genera and 11 families used as poisonous plants. Bark and leaf of *Lyonia ovalifolia* are crushed and kept in the slow or stagnant water for fishing. *Aconitum ferox*, etc. are poisonous to human as well as cattle. *Artemisia dubia*, *Melia azedarach*, etc. are used as insecticides in the study area.

There are altogether five plant species used for gum. Such plants are used for sticking things such as paper, envelopes, etc. Among these, *Coleogyne crista*, *Pouzolzia sanguinea* are most preferably used.

Sixteen plant species are used in different cultural and religions ceremonies. Such species are found in use for ceremonies like marriage, death and different worshipping ceremonies. Stem of *Arundinaria* sp. is used to make marriage gates for wedding ceremonies. There are eight species of Ceremonial ritual plants which are new addition to ethnobotany. They are Stem of *Smilax aspera* and *Viburnum mullaha* are used to make human model locally called "Plo" during the *Arghum* ritual, which is performed for the diseased spirits after death. The bark of *Betula utilis* is used in one of ritual ceremony locally called "Syotheba". *Asparagus racemosus* is used in preparation of gate to welcome Groom during marriage ceremony. Leaf of *Ficus neriifolia* is used in "Bratabandha" locally called "Chhewar". Leaf and stem of *Prunus cerasoides* is used during spiritual healing process especially during sacrifice of birds and animals locally

called as "*Ghhyansaibaa*". Fruit of *Zanthoxylum armatum* is used for making "*Jantar*" locally called "*Jhhandra*" for keeping bad spirit away. It is used for both human and cattle. Small pieces of stem of *Rhus javanica* sprinkled with blood of hen are used to protect each household in the village from bad spirits by keeping it in the main entrance of the house and village. It is locally called "*Siuli*".

Eight species of plants are used for dying. Bark of different plants are mixed and cooked in water for a long time to prepare dye. Only two species are used for hedge and shade plants three species of plant are used for broomstick.

Different plant species are used for making alcohol. There are altogether four species of plants used for brewing alcohol. Among these species root and fruit of *Rubus ellipticus* seed of *Eleusine coracana* are most widely used. There are altogether 21 plant species used for making vegetable, pickle and spice. *Arundinaria maling*, *Chenopodium album*, *Diplazium maximum*, *Litsea cubeba*, *Mentha spicata*, *Piper mullesua*, *Rhus javanica* *Zanthoxylum armatum*, etc. are widely used vegetable, pickle and spices. There are altogether 24 species of widely used and eaten edible fruits. They are *Berberis aristata*, *Berberis asiatica*, *Holboellia latifolia*, *Prunus cerasoides* *Rubus ellipticus*, *Solena heterophylla*, *Viburnum mullaha* etc.

Three species of plants are used for preparing detergent; they are *Aesculus indica*, *Asparagus racemosus* and *Pouzolzia sanguinea*. Utilization of *Asparagus racemosus* and *Pouzolzia sanguinea* as detergent is also new addition to the ethnobotanical documentation.

The coal obtained from the stem of *Rhus javanica* is used to make gunpowder, locally called "*Barood*"; and blacksmith uses the coal obtained from *Prinsepia utilis* in their occupation are also documented as new information.

6.2 *Nigalo* as one socioeconomically important species in the study area

Nigalo is another greatly abundant resource found in the area. Three major species of *Nigalo* are found in the area such as Malingo (*Arundinaria maling*) abundantly found above 2800m, Ghude (*Thamnocalamus aristatus*) between 2300m to 2800m and Tite (*Drepanostachyum intermedium*) at an altitude from 1200 m to 1800m. *Nigalo* are one of the most difficult plants to understand taxonomically as the accurate identification of specimens requires both flower and vegetative material, which rarely occur together. However, an attempt is being made to identify various species on the basis of leaves, culms, habitat, local names and uses. *Nigalo* grow in clumps and have no pronounced checkered leaf venations (tessellation) are included in the genera *Drepanostachyum*. *Nigalo* having clump forming tessellate species are classified as *Thamnocalamus* and having long rhizome and produce solitary culms arising at substantial distance apart

with tessellate species are classified as *Arundinaria*. All three species are widely used as construction materials for building the houses and other household use such as *Doko*, *Dalo*, *Bhakari*, *Mandro* etc. The young shoots of Malingo species is used for making curry.

6.2.1 Socio-economic impact of *Nigalo* based work in the Sikles area.

In the study area, most of the *Nigalo* works are done during their free time while there is not farm work. The result of the survey reveals that the income from *Nigalo* work ranges from Rs. 4000-5000 per month. This additional income is very important to the local people. If *Nigalo* related work is organized, people will devote themselves in this profession and can earn more income, which may improve the life standard of marginalized and poor people. Only men are involved in the *Nigalo* based works. It is due to need of physical strength for the works. People from poor, landless and marginalized can get extra income from these works for their betterment of life. This also cause in the work division between men and women. The *Nigalo* products are made available in the market through middlemen. It was seen that the middlemen through this work took more benefit. If the market is made easily accessible and well managed, the local people can get more benefit.

Due to poor management and harvesting of *Nigalo*, there is less availability of raw materials. Generally, *Nigalo* is to be harvested choosing culms of 1-2 years old and relatively young shoots are left to grow further. However, such practice is not done. People from the surrounding villages are destroying or misusing at least doubled the number of *Nigalo* shoots than required during harvesting period. Over grazing and over collection for fodder also resulted in declination of *Nigalo*. There is also illegal collection of young shoots due to its high demand. Due to less availability of *Nigalo* near to the village, people have to go far for the collection. The lack of *Nigalo* results more time in collection and finally high production cost. There is no proper managed market for *Nigalo* products in the study area and people are not getting proper price in the marketing area. This may cause decrease in weaving of such products. Most of the *Nigalo* products are replacing by the plastic products. The demands of these products are decreasing.

Due to modernization, young people are interested in study and go to abroad for earning. They can earn more from other business than this work. They are not interested to do this job and their parents are also not enforcing them to join the job. This also hampers the development of this industry. The Sikles area has not concrete road and not good transportation facility. To uplift the quality and demand of the products, the people of the Sikles area are not trained by any sector. If the market is properly managed and

the *Nigalo* work is industrialized, this work may become the supportive part for the betterment of poor and marginalized people.

6.3 *Allo* as one socio-economically important species in the study area

Allo (*Girardinia diversifolia*) is one of the species of the family Urticaceae. It is a fibrous plant having stem bark, yeilds fibre with unique qualities.

The *Allo* (*Girardinia diversifolia*) plant grows at altitudes ranging between 1,200m and 3,000 m. It flourishes under the shade of deciduous forests, and in moist, sandy soils, especially ravines; it can also be found on shrub land and on the edges of cultivated land, where it is used to consolidate bunds on terraced land.

Allo (*Girardinia diversifolia*) is one of the most valuable NTFPs in the rural areas of Nepal. It is the main raw material for the textile tradition of most of the indigenous people of Nepal. *Allo* is of having both cultural as well as economical significance in the study area. People weave *Bhangra*, *sacks* etc which are the parts of their culture.

Allo weaving has become an important Forest Based Small scale Enterprises (FBSSSEs) in Sikles. FBSSSEs are of the particular important because substantial portion of their labour is made up of economically disadvantage groups including women and landless. This is very much true with *Nigalo* and *Allo* weaving as it involves the skill and labour of women and landless people. *Allo* weaving is seasonal and household based that provides much needed supplementary income for the weavers. It is very crucial for the local women as alternative means of income generation is unavailable for them. The expanding trade of *Allo* along with weaving is helping the women to become economically independent, maintaining unique skill and providing the opportunity to remain at home with family. Income so earned can be used to buy foods, and thus relieve the pressure on the land, reduce out migration and contribute toward the socio-economic upliftment of women.

Though, *Allo* processing and weaving is a part of the textile tradition of the Gurungs and one of important Forest Based Small scale Enterprises (FBSSSEs), it is unable to flourish as a income generating activity in the area. The main cause of it is the high production cost and low return. *Bhangra*, weaved product of *Allo* has market price of around NRs 900-1000/ pc of with work load of 15-20 days, which is very low. Due to the difficulty in access to proper market and lack of interest in younger generation, only few people harvest the *Allo* for their domestic uses at present.

CHAPTER SEVEN: CONCLUSION AND RECOMMENDATIONS

7.1 Conclusion

7.1.1 NTFPs use

The NTFPs, a total of 111 species (79 species of dicot, and 21 species of monocot, four species gymnosperm, four species of pteridophytes, two species of fungi and one species of Lichen) are being used for 14 different purposes. These include: medicinal plants, edible plants, veterinary used plants, agricultural implements, poisonous plants, fibre yielding plants, handicraft making plants, dye yielding plants, ceremonial plants, hedge and shade plants, broomstick plants, detergent plants, plants used as gum and miscellaneous used plants.

A total of 36 disease and disorders are treated with 66 different plant species. Most illness are treated by the used of more than one plant species while a single plant species also cures more than one ailment. In some cases it was observed that the local healers use the combination of many plant parts of for the treatment of single disease. The most commonly used plants are *Aconitum gammiei*, *Acorus calamus*, *Artemisia dubia*, *Centella asiatica*, *Dactylorhiza hatagirea*, *Lycopodium clavatum*, *Paris polyphylla*, *Viola pilosa*, *Zanthoxylum armatum* etc.

Likewise 49 species of plants are edible plants. These edible plants are divided into three sub- use categories viz. 24 species edible fruits, 21 species vegetable, pickle and spices and five species are used for brewing alcohol. *Arundinaria maling*, *Asparagus racemosus*, *Berberis aristata*, *Diplazium maximum*, *Elaeagnus latifolia*, *Ficus semicordata*, *Juglans regia*, *Litsea cubeba*, *Rubus ellipticus*, *Zanthoxylum armatum* etc are commonly used edible plants. 14 species of plants are veterinary used plants, seven species of plants are agricultural implements, 16 species are of ceremonial plants, four species are of fibre yielding plants, 15 species are of poisonous plants, four species of handicrafts making plants, three species of hedge and shade plants, three species of broomstick plants two species of detergent plants, and four species of gum plants (Appendix III).

In the present work several information on NTFP utilization, especially on medicinal use and ceremonial use in Gurung community, are new addition to the ethnobotanical documentation.

Most of the forest areas have been handed over to the local community as community forest involving the local people directly in decision-making and management of local resources with their own rules, regulations and power. Such a participatory approach has brought the awareness and active involvement of local people in the conservation and sustainable use of forest resources, which ensures the long-term availability of plant

species as well as lowers the danger of loss and extinction. However, *Paris polyphylla* is rare and *Bergenia ciliata*, *Swertia chiraiyita*, *Aconitum ferox*, *Aconitum gammiei*, *Cordyceps sinensis*, etc are highly threatened in the present study area

7.1.2 Importance of *Nigalo* and *Allo* in study area and associated problems

Nigalo and *Allo* weaving, based on the traditional practices of Gurungs, have many prospects in terms of rural income generation, promotion of indigenous knowledge and technology, development of craft based cottage industry and improvement in socio-economic condition of marginalized and poor people especially women and landless people. They have high potentiality to be established as a rural forest based cottage industry. These traditional uses of *Nigalo* and *Allo* for domestic as well as for commercial purpose, is assisting the stimulation of indigenous entrepreneurship.

The *Nigalo* is used widely in the study area. Local people cannot run their life without *Nigalo* products. Many household products are prepared from *Nigalo* except ploughshare that could not be made from *Nigalo*. Many people in the area derived their livelihood from *Nigalo* products. Only men are involved in the *Nigalo* based works. Therefore, there is good chance for the men especially the landless people to earn extra income from this work. *Nigalo* are used for manufacture of value added goods, handicrafts, cottage industry and a large number of dwellers depend on them for their livelihood. If *Nigalo* work is properly managed, they can fully devote to this work and there is possibility of earning attractive income.

Nigalo products selling which once provided a supplementary source of family income to some of the poor households in the study area is now declining due to heavy exploitation of resources. In community forests there is scarce distribution of *Nigalo* species; major source of the *Nigalo* species is natural forest, which is about 4-5 hrs walks away from village area. Lack of easy access, destruction of natural forest, lack of cultivation practice in community forest and private forest and lack of proper market leads to decline in the interest toward this occupation.

The Himalayan nettle *Girardinia diversifolia* locally called *Allo* or *Jungali Sisnu* is valued for its fibre. The fibre from this plant is the main raw material for the textile tradition of most of the indigenous people of Nepal. *Allo* weaving is not only an art of textile making; it does correlate with the wider socio-economic setting of the users in the study area. For Gurungs, an *Allo* product is an integral part of their tradition and religion. Only women are involved in the *Allo*-based work except in harvesting. It is very crucial for the local women as alternative means of income generation and to become economically independent with maintaining the unique skill of weaving.

The processing of *Allo* fibre is very complex and labour intensive, and weaving frame (Tan) used in the area is very traditional and outdated. Market for the *Allo* production is a problem and due to cheap and easily available cotton, the products are gradually replaced by cotton cloths.

In spite of the problem of modernization and competition with other similar products in market *Nigalo* based products are sold at market to some extent and help in alternative income generation but *Allo* products have no market at all. In this case gender play important role as in *Nigalo* products male members of the community has major work so easily access to the market for alternative livelihood means. Whereas *Allo* products are totally women based and these products are used by male counterparts and other members of family but they are not trying to search market for *Allo* products.

The new generation is not interested and not involved in *Nigalo* and *Allo* handicraft production even though they are not engaged in any other income generating works, which causes the loss of indigenous knowledge as well.

7.2 RECOMMEDATIONS

Following measures are recommended in order to document, preserve and the traditional knowledge of the local people for the betterment of the life standards of the people. Furthermore, measures to be taken to conserve and use the local plant resources in a sustainable manner are included in the following recommendations.

- A permanent research plot should be established in order to estimate growth and yield of NTFPs regularly. Further more researches are recommended on NTFPs. The knowledge on ethnobotanical use of NTFPs should be tapped from the traditional healers and elderly people and should be disseminated among the users as well as documented for the sake of future generations.
- It is highly necessary that the local people be made acquainted with the species and importance of NTFPs. For this purpose, proper counselling/ awareness programs on the conservation and importance of natural resources, sustainable utilization, management, harvesting and preservation of the valuable plant species at the local level need to be conducted.
- The FUGs need to be encouraged and mobilized to grow and cultivate the important and valuable NTFPs in a larger scale in their personal lands as well as bare part of the forest area. This will help in the upliftment of their economic conditions.
- Market is the main constraint for the development of the resources. So the market should be identified or created. The over-exploitation and illegal or early harvesting should be discouraged.

- It is recommended that special attention should be paid for protection, regeneration and optimum collection of *Nigalo* along with institutional arrangement for the marketing of such products. It should be examined the impact of different rates and techniques of harvesting on *Nigalo* population.
- *Nigalo* products have limited market, it should be extended. At same time *Allo* products should be promoted. Access of *Allo* product to market means directly raising economic condition of women in the community, so it is very important.
- Technological intervention is necessary for more quality improvement and mass production. Processing of fibre, spinning and harvesting methods need to be improved.
- The weavers should be given training to produce newer products suitable for both the rural as well as urban consumers. Modern weaving accessories and techniques should be introduced at local level. However such intervention must be compatible to the local socio-cultural conditions.
- Involvement of Local NGOs is necessary in conservation and promotion of NTFPs especially *Nigalo* and *Allo* works. This will help to disseminate traditional knowledge at one hand and at other bulk production of products of *Nigalo* will provide alternative to the plastic goods that are source of environmental pollution.

REFERENCES

- Acharya, S.K.1996.Folk Uses of Some Medicinal Plants of Pawannagar, Dang District.J. *Nat.Hist.Mus.* **15**: 25-36.
- Adhikari, B. 2003. Forest Flora of Duradanda Lamjung, Central Nepal. [M.Sc. Dissertation] Central Department of Botany, Tribhuvan University, Kirtipur, Nepal.
- Adhikari, P.M. and T.P. Shakya. 1977. *Pharmacological Screening of Some Medicinal Plants Nepal*, *J. Nep. Pharma. Assoc.* **5** (1): 41-50
- Adhikari, S. 1996. Identification of Non-timber Forest Products and their Uses in the Rural Households. A Report submitted to ACAP, Pokhara, Nepal.
- Amatya, G. and S. Tiwari. 2002. Mountain Ecosystems, Floral Diversity and the Role of Sustainable Harvesting of MAPs/NTFPs in Poverty Alleviation: A case study from IUCN Initiatives in the Seti Area, West Nepal. In *Proceedings of International Seminar on Mountains – Kathmandu*. RONAST. pp.191 – 207.
- Amatya, K.R., P.Bajracharya, P.R Shyakya, B.R Chitrakar, and P.M Tuladhar, 1995. *Medicinal and Aromatic Plants in Nepal Himalayas: Problem, Prospectus and Development Strategy*. ICIMOD, Kathmandu, Nepal.
- Anonymous 1999. Nepal District Profile, Nepal Research Associates Kathmandu, Nepal.
- Anonymous. 1970. Medicinal Plants of Nepal. Bull. No.11, Department of Medicinal Plants, HMG Press, Kathmandu, Nepal.
- Anonymous. 1982. Wild Edible Plants of Nepal. Bull.No.9, Department of Medicinal Plants, HMG, Thapathali, Kathmandu, Nepal.
- Anonymous.1984. Medicinal Plants of Nepal, (Supplement Volume).Department of Medicinal Plants, HMG Press, Kathmandu, Nepal.
- Anonymous.1986. Flora of Kathmandu Valley. Bull. No.11, Department of Medicinal Plants, HMG Press, Kathmandu, Nepal.
- Anonymous. 1993. Indian Medicinal Plants Vols. I to V. Arya Vaidya Sala Kottakkal, India.
- Aryal, B. 2001. Traditional Veterinary Medicine Practice in Area Adjoining Panchase Forest of Parbat District, Nepal. [M.Sc. Dissertation] submitted to Central Department of Botany. Tribhuvan University, Kirtipur, Nepal.
- Aryal, R.S.2002. Legal Positions of Medicinal Plants. The Sunday Post December 22, 2002, published by Kantipur Publication, Kathmandu.
- Aryal, Y. 2003. Demographic Study of New Species of Pedicularis in Sikles, Kaski. [M.Sc. Dissertation] Central Department of Botany, TU Kirtipur, Kathmandu, Nepal.

- Arya, K. R., P.C. Pande, and V. Prakash, 1999. Ethnobotanical Study on Tribal Areas of Almora District-II, India. *Ethnobotany*, **11**: 100-104.
- Bajracharya, D. 1985. Some Nepalese Edible Wild Fruits and their Nutritive Values. *Tribhuvan University Journal*. **11**(1):89-118.
- Banerji, M.L. 1955. Some Edible and Medicinal Plants from East Nepal. *J. Bombay Nat. Hist. Soc.***53**:153-155.
- Basnet, B.K. 1998. Medicinal Plants in Sindhuli District: Utilization, Trade and Management Practice. M.Sc. dissertation submitted to Central Department of Botany, Tribhuvan University, Nepal.
- Bhandary, H.R.and Shrestha, P.B.1999. Poisonous Plants of Kathmandu Valley. In: T.C. Majupuria and R.K.Majupuria (Eds.): *Nepal Natures Paradise*, M.Devi, Gwalior, India. PP.151-158.
- Bhatt, D.C., Mehta, S.K.and Mitaliya, K.D.1999.Ethnomedicinal Plants of Shetrunjara Hill of Palitana, Gujarat. *Ethnobotany*, **11**:22-25.
- Bhatta, L.R.1999. Ethnobotanical Study in a Village at Rukum District, Nepal Banko Janakari, *A Journal of Forestry Information for Nepal*, **9** (2): 40-43. Department of Forest Research and Survey, Kathmandu, Nepal.
- Bhattacharjee S.K. 1998. Handbook of Medicinal Plants. Pointer Publishers, Jaipur (India), 474 pp.
- Bhattarai, M. 2002 Documentation of Medicinal Plants Used by Bhotiya and Sherpa Communities around Makalu Barun National Park and Buffer of Botany, Tribhuvan University, Kathmandu, Nepal.
- Bhattarai, N.K.1987. Traditional Pharmaceutical Practice in Central Nepal. *J. Nep. Pharm. Assoc.* **14**(1, 2): 15-31.
- Bhattarai, N.K. 1989a. Traditional Phototherapy Among the Sherpa of Helambu, Central Nepal. *J. Ethnopharmacol.* **27** (1/2):45:54
- Bhattarai, N. K.1992a.Medical Ethnobotany in the Karnali Zone, Nepal. *J. Ecom. Bot.* **46** (3): 257-261.
- Bhattarai, N.K.1992b. Folk Use of Plants in Veterinary Medicine in Central Nepal. *Fitoterapia* **63** (6): 497-506.
- Bhattarai, N.K.1993a. Folk Herbal Remedies for Diarrhea and Dysentery in Central Nepal. *Fitoterapia* **64** (3): 243-250.
- Bhattarai, N.K. 1993b. Medical Ethnobotany in the Rapti Zone Nepal. *Fitoterapia* **64** (6): 483.

- Canning, A.J and Green, J.H.S 1986. Nepalese “Allo” (*Girardinia diversifolia*) Improved Processing & Dyeing. Tropical Development & Research Institute, London, UK.
- CBS 2001. Statistical Year Book. Central Bureau of Statistics. His majesty Government of Nepal (HMG/N), Kathmandu.
- Chaudhary, R.P. 1993. Plants Used in the Treatment of Domestic Cattle in Narayani Zone, Central Nepal. In: *Proceedings of 11th National Conference on Science and Technology* Royal Nepal Academy Science and Technology (RONAST), Nepal. PP. 835-947.
- Chaudhary, R.P. 1998. *Biodiversity in Nepal (Status and Conservation)*. Tecpress, Bangkok.
- Chettri, D.B. 1999. Diversity of Medicinal and Aromatic Plants in Manang, with emphasis on ecology and essential oil variation of Jatamansi. [M.Sc. Dissertation] Central Department of Botany, TU Kirtipur, Kathmandu, Nepal.
- Coburn, B. 1984. Some Native Medicinal Plants of Western Gurungs, *Kailadsh* **11**(1/2):55-87.
- Cunningham, A.B. 2001. *Applied Ethnobotany: people, wild plant use and conservation*. Earthscan publications Ltd., London and sterling, VA.
- Dangol, D.R. and S.B. Gurung 1999. Ethnobotany of Tharu tribe of Chitwan district. Nepal. *Int. J. Pharmacognosy*, **29** (3) :203-209.
- Devkota, R. 2003. Documentation of Indigenous Knowledge of Non Timber Forest Products in Gwallek VDC of Baitadi District, Far -Western Nepal. M.Sc. Dissertation Submitted to Central Department of Botany, Tribhuvan University Nepal
- DMP, 1969. Flora of Phulchoki and Godawari. *Bulletin of the Department of Medicinal plants, No. 2*, Department of Medicinal Plants (DMP), Kathmandu, HMG Nepal.
- DMP, 1970. Medicinal plants of Nepal. *Bulletin of the Department of Medicinal plants, No. 3*, Department of Medicinal Plants (DMP), Kathmandu, HMG Nepal 154p.
- DMP, 1982. Wild edible plants of Nepal. *Bulletin of the Department of Medicinal plants, No. 9* Department of Medicinal Plants (DMP), Kathmandu, HMG Nepal.
- DMP, 1984. Supplement to the medicinal plants of Nepal. *Bulletin of the Department of Medicinal Plants, No. 10*. Department of Medicinal Plants (DMP), Kathmandu, HMG Nepal, 98 P.

- Dobermez, J.F. 1976. Exploitation and prospects of medicinal plants in Eastern Nepal. *Mountain Environment and Development*. Kathmandu, SATA (Swiss Association for Technical Assistance), pp.97-110.
- Dunsmore, S. 1985. The Nettle in Nepal: A Cottage Industry. Land resources development Center, Survey, UK.
- Edwards, D.M., 1993. *Non-Timber Forest Products from Nepal: Aspects of the Trade in Medicinal and Aromatic Plants*. FORESC Monograph No. **1/96**, Forest Research and Survey Center, Ministry and Soil Conservation, Kathmandu.
- Edwards, D.M. 1995. *Non Timber forest products from Nepal: The medicinal and Aromatic Trade*, Forest Research and Survey Center, Ministry of Forest and soil Conservation, Kathmandu.
- Edwards, D.M. 1996. *Non- Timber forest product in Nepal*. Non-timber forest products from Nepal: Aspects of the trade in medicinal and aromatic plants FORSEC Monograph No: **1/96**, Forest Research and Survey Center, Ministry of Forest and Soil Conservation, Kathmandu.
- Edwards, D.M. 1996 Non-timber forest products and Community Forestry: Are They Compatible? *Banko Janakari. A Journal of Forestry Information for Nepal*, **6**(1): 3-8. Department of Forest Research and Survey, Kathmandu, Nepal
- FAO, 1990. Case Studies in Forest Based Small Scale Enterprises in Asia: Rattan, Matchmaking and Handicrafts. Campbell Jeffery (edit.). Community Forestry Case Study No. **4**. FAO, Bangkok.
- Gautam, S.K., 2003. Ecological Distribution of Promotion of NTFPs: A Case Study from Arghakhachi District in the Middle Hill of Nepal. [M.Sc. Dissertation] Department of Forestry, TU, Pokhara, Nepal
- Ghimire, S.K., Shrestha, A.K., Shrestha, K.K. and Jha, P.K., 2000. Plant Resource use and Human Impact around National Park, Nepal *J.Nat. Hist. Mus.* **19**: 3-26.
- Gurung, A. 2002. A Study on Medicinal Plants and their Traditional Uses in Chitre Village development Committee (Parvat) and Bhadure/ tamagi Village Development Committee (Kaski) [M.Sc. Dissertation]. Central Department of Botany, Tribhuvan University, Kathmandu, Nepal.
- Gurung, H.M. 1999. An Assessment of Indigenous Farming system among the Gurungs of Sikles Village in Kaski District. [MA Dissertation]. Central Department of Sociology and Anthropology, Tribhuvan University, Kathmandu, Nepal.
- Gurung, O., Y. Raut, M.B. Khatri 2001. Livestock Production System in Upper-slop of Karnali Region an Initial fact- Finding Research Report Prepared for International Fund for Agricultural Development. Kathmandu.

- Gurung, P.C. 1999. Forest Management Practice and Demand and Supply Condition of forest Resources, Ghalekharka-Sikles Ecotrekking Rout. A Report submitted to ACAP.
- Gurung, V.L. 1979. Medicinal ferns of Nepal. *J. Nep.Pharm. Assoc.* **7**: 49-56.
- Hara, H., Stern, W.T. And Williams, L.H.J. 1978. *An enumeration of the flowering plants of Nepal*, Volume I. Trustees of British Museum (Natural History), London.
- Hara, H., and Williams, L.H.J. 1979. *An enumeration of the flowering plants of Nepal*. Volume II. Trustees of British Museum (Natural History), London.
- Hara, H., Charter, A.O. and Williams, L.H.J. 1982. *An enumeration of the flowering plants of Nepal*. Volume III. Trustees of British Museum (Natural History), London.
- Hooker, J.D., 1872-1997. *The Flora of British India*. Volumes I-VII. L.Reeve and Co., London.
- IUCN. 2000. *National register of Medicinal Plants*. The World Conservation Union (IUCN), Lalitpur, Nepal.
- Jain, S.K., B.K. Sinha and R.C. Gupta 1991. *Notable plants in Ethno medicine of India*. Deep publications, India.
- Jayaswal, M.L. 2000. *Experiences of the NTFPs-based enterprise development in Nepal*. Paper presented at the seminar on the harvesting of NWFPs in Menenmen-Izmar. 2-8th Oct. Turkey.
- Joshi, A.R. and Joshi, K. 2000. Indigenous Knowledge and uses of medicinal plants by local communities of the Kali Gandaki watershed area, Nepal. *J. Ethnopharmacol.*, **73**(1-2):175-184.
- Joshi, K.K. and S.D. Joshi 2001. *Genetic Heritage of Medicinal and Aromatic Plants of Nepal Himalaya*. Buddha Academic Publishers and Distributors Pvt. Ltd., Kathmandu, Nepal
- Joshi, A.R. and Edington, J.M. 1990. The Use of Medicinal Plants by two Village Communities in the Central Development Region of Nepal. *J.Econ. Bot.* **44** (1): 71-83.
- Kanai, H. 1971. Bir Nigantu: A Nepalese Herbal Encyclopedia. *J. Jap.Bot.* **46**:347-377.
- Karki, L. 2001. *Documentation of Indigenous Knowledge on the Utilization of Plant Resources by the Chepang Community of Dhusa VDC. Dhading District, Central Nepal*. [M.Sc. Dissertation]. Central Department of Botany, Tribhuvan University, Kathmandu, Nepal.
- Kanel, K.R. 2000. Analyzing Policy for Poverty Alleviation: an example of Non-Timber Forest product Sub sector. *Banko Janakari, a journal of forestry*

- Information for Nepal*, **10** (2): 3-8. Department of Forest Research and Survey, Kathmandu, Nepal.
- Kanel, P. 2002 Jumla Gillama Gairakastha Ban Paidabar Byabasthapan Ra Sambhabhyata. District Forest office, Jumla.
- Karna, K., 1997. Medicinal plants and traditional practice in Chapagaun VDC of lalitpur district, central Nepal. M.Sc. Dissertation Submitted to Central Department of Botany, Tribhuvan University Nepal
- Kayastha, R.S 1983. The study of Medicinal Plants of Pokhara Valley. A project submitted to Institute of Science and Technology, T.U. Kathmandu, Nepal.
- K.C., B.M. 2005.Utilization of Plant Resources and Environmental Justice in Resunga, Gulmi District: A Case Study. M.Sc. dissertation submitted to Central Department of Botany, Tribhuvan University, Kathmandu, Nepal.
- Kritikar, R.R. and B.D. Basu. 1918. Indian Medicinal Plants. 4, Panni Office Allabad, India.
- Kumer, V. and Jain, S.K. 1998. A Contribution to Etnobotany of Surjuja District in Madhya Pradesh, India. *Ethnobotany*, **10**: 8996.
- Kumer V. and Rao, R.R. 2001. Some Plant Bewares used on Traditional Medicine. *Ethnobotany*, 13: 36-39.
- Lama, YC, Ghimire, SK and Aumeerudy-Thomas, Y 2001. *Medicinal plants of Dolpo*. People and plants initiative, WWF Nepal Program, Kathmandu. 150pp.
- Lawrence 1951. *Taxonomy of Vascular Plants*. The Macmillan Company, new York, U.S.A.
- Lewington, A. 1993. *Medicinal Plant extracts: A review of their importation into Europe*. Traffic International, Cambridge, UK.
- Maden, K. and Dhakal, M.R. 1998. General survey of Edible Wild Fruits from Koshi Zone, Eastern Nepal. *J. Tribhuvan Univ.* **21** (1):77-84.
- Mahara, A. 1999. Wild edible plants of the Royal Chitwan National Park: Dependency of the local on the forest resources and it's potential for economic alternatives for the indigenous community. M.Sc. dissertation submitted to Central Department of Botany, Tribhuvan University, Kathmandu, Nepal.
- Maharjan, M.R. 1995. *Income generation through NTFPs in community forestry: a case studies of the Koshi Hills*. A paper presented in a Regional Seminar on Income Generation through Community Forestry, 18-20 October 1995. Bangkok, Thailand.
- Mahat, 1986. Forestry Farming Linkage in the Mountains. ICIMOD Occasional Paper No. 7, Kathmandu Nepal.
- Mahto, R.B. 1998. Notes on some plants of Ethnobotanical Importance from Palpa District. *Tribhuvan Univ. J.* **21**:71-76.

- Majupuria, T.C. 1999. Religious Plants. In: T.C. Majupuria and R.K. Majupuria (Eds.): *Nepal Nature's Paradise*, M.Devi, Gwalior India. PP298-302
- Malla, S.B. 1994. Medicinal Herbs in the Bagmati Zone. ASDPI series NO. 8, ICIMOD.
- Malla, S.B. 1994. Religious Plants. In: T.C. Majupuria and R.K. Majupuria (Eds.): *Nepal Nature's Paradise*, M.Devi, and Gwalior, India. PP 298-302
- Malla, S.B. and P.R. Shakya 1984-85. Medicinal Plants of Nepal. In: T.C. Majupuria and R.K. Majupuria (Eds.): *Nepal Nature's Paradise*, M.Devi, and Gwalior, India.
- Malla, S.B., Shakya, P.R., Rajbhandari, K.R., Subedi, M.N. and Shrestha, B.L. 1996. *Identification Manual for Some Non-Timber Forestry Products of Nepal*. FRIS Project Paper No. 8, HMG/ FINNIDA. Forest Resource Information System Project, Kathmandu, Nepal.
- Malla S.B., Shakya, P.R., Rajbhandari, K.R., Bhattarai, N.K. and Subedi, M.N. 1995. *Minor forest Products of Nepal, General Status and Trade*. FRIS Project Paper No. 4 HMG/ FINNIDA. Forest Resource Information System Project, Kathmandu, Nepal.
- Manandhar, NP. 1985. Ethnobotanical Notes on certain Medicinal Plants used By Tharus of Dang Deokhuri District, Nepal. *Int.J. Crude Drug Res.* **23**(4): 153-159.
- Manandhar, N.P. 1986a. A Contribution to the Ethnobotany of Mooshar Tribes of Dhanusa District, Nepal. *J.Nat. Hist Mus.* **10** (1-4):53-64.
- Manandhar, N.P. 1986b. Ethnobotany of Jumla District, Nepal. *Int.J. Crude Drug Res.* **24** (2): 81-89
- Manandhar, N.P. 1987. Traditional Medicinal plants used by Tribals of Lamjung District, Nepal. *Int. J. Crude Drug Res.* **25**(4): 236-240.
- Manandhar, NP. 1989a. Medicinal Plants used by Chepang tribes of Makawanpur District, Nepal. *Fitoterapia*, **60** (1) s61-68.
- Manandhar, N.P. 1989b. Ethno Veterinary Medicinal Drugs of Central Development Region of Nepal. *B.M.E.B.R.* **10** (3-4):93-99.
- Manandhar, N.P 1990a. Medico-Botany of Gorkha District, Nepal: An Elucidation of Medicinal Plants. *Int.J.Crude Drug Res.* **28**(1):17-25.
- Manandhar, N.P. 1990b. Traditional Phytotherapy of Danuwar tribes of Kamlakhong in Sindhuli District, Nepal. *Fitoterapia* **61**(4): 325-332.
- Manandhar N.P. 1991. Some Additional Note on Wild Food Plants of Nepal *J.Nat. Hist. Mus.* **12** (1-4): 19-32.
- Manandhar, N.P. 1991. Medicinal Plant lore of Tamang Tribe of Kabrepalanchok District, Nepal. *Eco. Bot.* **45** (1): 58-71

- Manandhar, N.P. 1993. Herbal Remedies of Surkhet District, Nepal. *Fitoterapia* **64** (3): 266-272.
- Manandhar, N.P. 1994. An Ethnobotanical survey of herbal drugs of Kaski district, Nepal. *Fitoterapia*, **65** (1): 7-13
- Manandhar, NP. 1995. Medicinal Folklore about the plants used as anathematic agents in Nepal. *Fitoterapia* **64** (2): 1s49-155.
- Manandhar, N.P. 1998. Ethnobotany in Nepal. In Shrestha, K.K., Jha, P.K. Shengji, P., Rastogi, A., Rajbhandary, S., Joshi M. (Eds.). *Ethnobotany for Conservation and Community Development*. Proceedings of the National Training Workshop in Nepal, January 6-13, 1997. Pp. 20 -27.
- Manandhar, N.P. 2002. Plant and People of Nepal. Timber Press
- Mandal, L.N. 1992. Medicinal Plants and Traditional Medicinal Practice in Saptari District of Nepal. A Dissertation Submitted to the Central Department of Botany, Tribhuvan University.
- Martin, G.J. 1995. *Ethnobotany, a methods manual*. Chapman and hall, London.
- Meena, S.L., K.C. Sharma and R. Gopalan, 2003. Ethno-medicinal plants of Karauli district. *Journal of Economic and Taxonomy Botany* **27** (1) 177-180.
- Mohanty, R.B. and Rout, M.K. 1999. Ethnobotanical Studies on Traditional Washing of Garments in Rural Orissa, India. *Ethnobotany*, **11**: 122-124.
- Muller- Booker, U. 1993. Ethnobotanical Studies among the Chitwan Tharus. *Journal of the Nepal Research Centre* **9**: 17-56.
- Nepal, B.K, and P.P. Sapkota 2005. Resource analysis and indigenous knowledge on plants use: A case study of Humla district, Nepal. *Nepal Journal of plant Science* **1**: 57-63 Nepal Botanical society, Kathmandu.
- Nicholson, K 1995. Income Generation through Production and Marketing of Handicrafts and Non-Timber Forest Products. The Makalu Barun National park and Conservation Project Working Paper.
- Niraula, K. 2001. Vegetation analysis and Ethnobotany of the medicinal plants in and around Tinjure hill, Tehrathum and Sankhuwasabha district, eastern Nepal. [M.Sc. dissertation] submitted to central department of botany, Tribhuvan University, Kathmandu.
- Nwosu, M.O. 2001. Ethnobotanical Studies on some Pteridophytes of Southern Nigeria. *Ethnobotany*, **13**:29-35.
- Ojha, H.R. 2000. *Current policy issue in NTFP development in Nepal*. Asian Network for Small Scale Bio-resources, Kathmandu.
- Pakia, M. and J.A. Cooke, 2004. The Ethnobotany of the Midzichends tribes of the Coastal Forest Area in Kenya: Medicinal plant uses. *South African Journal of Botany* **69** (3):382-395.

- Parajuli, D.P. 1998a. Samudaik banma Gaihrakastha banupaja (NTFPs) Ko Mohato ra Bikashka Sambhabanaharu. *Kalpabrycha*, **8** (83, 84, and 85): 11-13:
- Parajuli, D.P. 1998b. Nepal ma Panchauleko Sanakalanma Lageko Pratibandha Kati Thik Kati Bethik. *Kalpabriksya*, 9(88, 89): 17-20.
- Parajuli, D.P, Gyanwali A.R. and Shrestha, B.M. 1998. Manual of Important Non timber forest products in Nepal PD 103/ 90 Rev. 1(F), Institute of Forestry/ International tropical Timber Organization Project, Pokhara Nepal .
- Parajuli, D.P. 2000. *Assessment of Regularity and Institutional Environment* (A Paper Presented in National training Workshop on Enterprise Development in NTFP sector organized by ANSAB)
- Parajuli, S. 2001. Medicinal plants used in cuts and wounds in Kaski district and their antimicrobial activities. [M.Sc. dissertation] submitted to central Department of Botany, Tribhuvan University, Kathmandu.
- Parajuli, S.P., 2000. Ethnobotanical study at Khadbaari Municipality of Sankhuwasabha District, Nepal. *Banko Jankari, a Journal of Forestry Information for Nepal*, **10** (2): 29-34. Department of Forest Research and Survey, Kathmandu, Nepal.
- Paudel, D. and Rosset, C. 1998. *What Hanuman brought was not only 'Jadibuti ...* Non Timber Forest Products in Dolakha and Ramechhap Districts. Swiss Agency for Development and Cooperation, Nepal Swiss Community Forestry Project (NSCFP), Kathmandu, Nepal. PP 1-45.
- Paudyal, P.P. 2000. Bamboo for Soil Stabilization and other usage in Nepal. *Banko Janakari, a Journal of Forestry Information for Nepal*, **10** (2): 57-58. Department of Forest Research and Survey, Kathmandu, Nepal.
- Paudyal, S.K. 2000. Ethnobotanical study of the Tharus living in central part of Dang (mid-western Nepal). M. Sc. dissertation submitted to Central Department of Botany, Tribhuvan University, and Kathmandu, Nepal.
- Pohle, P. 1990. *Useful plants of Manang District*. (A contribution to the ethnobotany of the Nepal Himalaya). Nepal Research Centre Publications. No. 16, edited by A. Wezler, Franz Steiner Verlag Wiebaden GMBH, Stuttgart.
- Polunin, O. and Stainton, A. 1984. *Flowers of the Himalayas*. Oxford Press, New Delhi, India.
- Prakash, V. 1998. India Medicinal Plants: Current Status –I. *Ethnobotany*, **10**:112-121.
- Prasad, V.K., Rajagopal, T, Kant Y. and Badarinath, K.V.S. 1999. Food Plants of Konda Reddis of Rampa Agency, East Godavari District, Andhra Pradesh- A Case Study. *Ethnobotany*, **11**:92-96.

- Press, J.R., Shrestha, K.K., and Sutton, D.A. 2000. *Annotated checklist of the flowering plants of Nepal*. Natural History Museum, London and Central Department of Botany, Tribhuvan University, Kathmandu.
- Punjali, B.L. 1998. Plants used as Toothbrush by Tribes of District Sabarkantha (North Gujarat). *Ethnobotany*, **10**: 133-135.
- Rai, J. 1996. Indigenous Knowledge of the Kulung Rais on the use of Allo, an Anthropological Case Study of Tamku VDC, Sankhuwasabha District, Koshi Zone. [MA Dissertation] central Department of Anthropology, TU, Kathmandu, Nepal.
- Rajbhandari, K.R., 1991. Grassland Ecology and preliminary Studies of Bamboo in the Apsuwa valley. The Makalu Barun Conservation Project Working Paper Publication series. Report **13**.
- Rajbhandary, S. and S. Ranjitkar. 2006. Herbal drugs and pharmacognosy: Monographs on commercially important medicinal plants of Nepal. Ethnobotanical Society of Nepal, Kathmandu.
- Ranjitkar, S. 2005. Taxonomic and Pharmacognostic Treatment on Some Commercially Important Medicinal Plants of Kathmandu Valley. M. Sc. Dissertation. Central Department of Botany, TU, Kathmandu, Nepal.
- Rawal, R.B. 1995. Commercialization of aromatic and medicinal plants of Nepal. In Beyond Timber: Social, economic and cultural dimension of non wood forest products in Asia and Pacific (Eds.P.B. Durst and A. Bishop). *Proceeding of a regional Export Consultation 28 Nov/Dec FAO/RAP, Bangkok*.
- Regmi, P.P. 1999 Fiber-Yielding Plants. In: T.C. Majupuria and R.K. Majupuria (Eds.): *Nepal Nature's Paradise*, M.Devi, and Gwalior, India. Pg. 247-251.
- Rijal, A. 1994. Ethnobotany of Padampur: Analysis of dependency and conflict. M.Sc. Thesis submitted to Agriculture University of Norway.
- Sacherer, J. 1979. The High Altitude Ethnobotany of the Rolwaling Sherpas. *Contribution to Nepalese Studies VI* (2): 45-64.
- Saiju, H.K. 2001. Potential species of Medicinal and Aromatic plants in ex-situ and in situ conservation in different agroecological Zones of Nepal and their propagation technique. An unpublished article. Department of plant resources, Thapathali, Kathmandu, Nepal.
- Sapkota, C. 2002. Bajhangi Jadibuti Yek Parichya. District Forest Office, Bajhang, Nepal. (In Nepal).
- Sapkota, P.P. 2000. Ecological study and traditional uses of medicinal plants at Malika forest, Baglung. [M.Sc. dissertation] submitted to Central Department of Botany, Tribhuvan University, Kathmandu.

- Sarkar, K., 1994. Indigenous medicinal plants and traditional medicinal practices in Parsa district. M.Sc. dissertation submitted to Central Department of Botany, Tribhuvan University, Nepal.
- Shahi, S. 2002 Study on Indigenous Knowledge and Practice in the Utilization on Some MAPs of Gwallek VDC Baitadi, Nepal. GEF. PP. 1-14.
- Shakya, J.D., Joshi, G.P. and Aryal, B. 2000 Floristic Composition of Butwal area and its surrounding hills. *Banko Janakari, A journal of Forestry Information for Nepal*, **10** (1) 42-46. Department of Forest Research and Survey, Kathmandu Nepal.
- Shakya, P.R, I. Shrestha, S. Paudyal and S.Shakya, 2002. Study on Non-Timber Forest Products in Annapurna Conservation Area (ACA) Nepal. *Annual Report of Pro Natura Foundation*, **2:109-132**
- Sharma, PP. and Singh, N.P. 2001. Ethnomedicinal uses of Some Edible Plants in Dadra, Nagar Haveli and Daman (U.T). *Ethnobotany*, **13**: 121-125.
- Shrestha, A.K. 1997. Documentation of indigenous knowledge on the utilization of plant resources by the Tharu Community around Royal Bardia National Park, West. Nepal. M.Sc. dissertation submitted to Central Department of Botany, Tribhuvan University, Nepal, 75 p.
- Shrestha, I. and Joshi, N. 1993. Medicinal Plants of Lele Village of Lalitpur District, Nepal. *Int. J.Pharmacog.* **32** (2):130-134.
- Shrestha, I. and Pradhan, N. 1986. Medicinal Plants of Chobhar Village of Kathmandu District, Nepal. *J. Nat. Hist. Mus.* **10** (1-4): 65-72.
- Shrestha, K. 1987. Report on Edible Wild Plants from Pokhara and its Northern Region. *J. Nat. Hist. Mus.* **11** (1-4): 85-97.
- Shrestha, K.K. 1998. Ethnobotanical Inventory and Plant Taxonomy: Basic Approaches for Ethnobotanical Research. In Shrestha, K.K. Jha, P.K., Shengji, P.Rastogi, A., Rajbhandary, S. and Joshi, M. (Eds.). *Ethnobotany for Conservation and community Development*. Proceedings of the National Training Workshop in Nepal, January 6-13, 1997. PP. 58-65.
- Shrestha, K.K., N.N. Tiwari and S.K. Ghimire. 2001. MAPDON - Medicinal and Aromatic Plants Database of Nepal. In Proceedings - Nepal-Japan Joint Symposium on Conservation and Utilization of Himalayan Medicinal Resources. Nov. 6-11. Kathmandu, Nepal. pp. 33-75.
- Shrestha, K.K. and Sah, J.P. 1995. Diversity and Conservation strategy of Potential Medicinal Plants in Manang (Gyasumdo Valley). A Report Submitted to KMTNC/ACAP Nepal.
- Shrestha, N.B. 2001. An introductory course on Medicinal and Aromatic plants of Nepal. Unpublished article. Ministry of forest and soil conservation, Babarmahal, Kathmandu, Nepal.

- Shrestha, K. 1998. *Dictionary of Nepalese Plant names*. Mandala Book point, Kantipath, Kathmandu, Nepal.
- Shrestha, P. 1998. Selected Bibliography of Ethnobotanical literatures of Nepal. In Shrestha, K.K. Jha, P.K. Shengji, P., Rastogi, A. Rajbhandary, S. Joshi, M. (Eds.). *Conservation and Community Development*. Proceedings of the National Training Workshop in Nepal, January, 6-13, 1997, PP. 121-144.
- Shrestha, R. 1995. Nettle Fibre in Bhujung VDC: A Survey of its Potentiality. ACAP/KMTNC
- Shrestha, R. 1999. Studies on the Himalayan Nettle "*Girardinia diversifolia*" in Nepal, Ecological, Ethnobotanical and Sociological Aspects. TU, Kathmandu.
- Shrestha, T.B. & R.M Joshi, 1996. Rare, Endemic and Endangered Plants of Nepal. WWF Nepal Program, Kathmandu, Nepal, 244pp.
- Sigdel, K.P. 2004. Non-Timber Forest Products of Two Community Forests of Makawanpur District: Availability, Utility & Sustainability. M.Sc. Dissertation submitted to the central Department of Botany, Tribhuvan University, Kirtipur.
- Singh, F. 1989. Allo Nettle Processing in Nepal. A Preliminary study of its potential for Development. A Report by EDA for ITD Group, England.
- Singh, S. and Shrestha, H. 1998. Bahupayogee Allo. *Kalpabriksha*, **8** (83, 84, and 85): 16-19.
- Singh, K.K. 1994. Ethnobotanical Heritage of the Tharu Tribe of Uttar Pradesh, India, *Applied Botany Abstracts*. 14 (2): 97-113.
- Siwakoti, M. and Siwakoti, S. 1998. Ethnomedicinal uses of Plants among the Limbu of Morang District, Nepal. *Ecoprint* 5 (1): 79-84.
- Siwakoti, M. Siwakoti, S. and Varma, S.K. 1997. Ethnobotanical Notes on Wild Edible Plants Used by Satars of Nepal J. Tribhuwan University. XX. (1): 57-64.
- Stainton, A, 1988. *Flowers of the Himalaya-a supplement*. Oxford Press, New Delhi, India.
- Stainton, J.D.A. 1972. *Forest of Nepal*. John Murray, London.
- Stapleton, C.M.A., 1987. "Bamboos". In Jackson, J.K., Manual of Afforestation in Nepal. HMG Department of Forest, Kathmandu, Nepal, 199-213 pp.
- Subedi, B.P. 1997. *Utilization of Non-Timber Forest Products: Issue and Strategies Environmental conservation and economic development*. Theme paper presented in the workshop on "The Utilization of NTFPs for Environmental conservation and Economic development Nepal" organized by ANSAB on March 29, 1997 in Kathmandu, Nepal.

- Subedi, 2002. Report on Herbs Processing Interaction Workshop, District Forest Office, Baitadi. Natural Resource management sector Assistance Programme, Regional Programme Office, and Dhanghadi.
- Thapa, C.B. 1998. Traditional uses of Plants and their Distribution in Shivapuri Watershed and Wildlife Reserve Area. M.Sc. Dissertation submitted to the Central Department of Botany, Tribhuvan University, Kirtipur.
- Thapa, S. 2001. Documentation of indigenous knowledge on the utilization of plant resources by the Tharu Community around Royal Sukla Phanta Wildlife Reserve, West. Nepal. M.Sc. dissertation submitted to Central Department of Botany, Tribhuvan University, Nepal.
- Tiwari, N.N. and Joshi, M.P. 1990a. Medicinal Plants of Nepal: I. *J. Nep. Med Assoc.* **15** (28): 181-190.
- Tiwari, N.N. and Joshi, M.P. 1990b. Medicinal Plants of Nepal: II *J.Nep. Med. Assoc.* **15** (28): 266-279.
- Ukyab, T. and S. Adhikari 2000. *The Nationalities of Nepal*. His Majesty's Government of Nepal, Ministry of Local Development, National Committee for Development of Nationalities, Kathmandu, Nepal, pp. 69
- Upadhyaya and D.P. Joshi. 1997. Nepalese Medicinal Plants and their Role in the World Market *Proceeding of IInd National Conference on Science and Technology*, June 8-11, 1997. Royal Nepal Academy of Science and technology, Kathmandu, Nepal. Sajha Press Cooperative Society Ltd. Subidhanagar, Kathmandu, pp. 817.
- Usho, U.C. Trisonthi and K. Chayamarit, 2005. Ethnobotanical studies in Muslim Thai Communities located around Toh-Daeng peat swamp forest in Thailand. *Chiang Mai Journal of science* **31**(2): 157-170.
- Vaidhya, B. 2003, *Livelihood and sustainability aspects of NTFPs in Terai Arc Landscape, Nepal. A review*. WWF Nepal Program, Kathmandu.
- Vityakon, P., V. Limpinuntana and S. Subhadhira 1995. The use of rapid rural appraisal techniques in local level biodiversity studies. *In: P. Shenghji and P. Sajise (eds.), Regional study on biodiversity: Concepts, frameworks and methods*. Yunan University Press, China.

Appendix - I
Questionnaire

1. General Information:

Respondent's name: _____

Age: (< 15, 15-25, 25-50, >50)

Sex: (Male/Female)

Ethnicity: _____

VDC/Village/Ward: _____

Education: _____

Occupation: _____

2. Information provided by:

Source of Knowledge (institutional/from ancestors/self):

Questionnaire for NTFPs

3. Could you please name the locally used plant species and their availability that occur in your forest?

S.No.	Species Name	Availability		
		Sufficient	Intermediate	Rare

4. Have you experience of using medicinal plants for curing human and animal diseases? If yes, specify the name of the plants, parts used the diseases and method of uses.

S.No.	Species Name	Parts Use	Diseases	Habit

5. Name the plants found in your forest that can be used as fruits, seeds, oil, vegetables, spices & pickle.

S.No.	Species Name	Parts Use	Purpose	Habit

6. Name the cultural significance of particular plants in your caste group.

S.No.	Species Name	Cultural Significance	Parts Used	Habit

7. Name the plants found in your forest that can be used as dye yielding plants

S.No.	Species Name	Parts Use	Purpose	Habit

8. Name the plants found in your forest that can be used as fibre yielding plants.

S.No.	Species Name	Parts Use	Purpose	Habit

9. Are there local medical practitioners in your village?

.....

10. Please, tell the methods that you do use and seasons/times of harvest of NTFPs.

.....

Questionnaire for *Nigalo* and *Allo* works.

11. Please name the types of *Nigalo* and *Allo* you have used.

.....

12. What are the products you made?

- a) *Mandro, Doko, Dalo, Syakhu etc*
- b) Racks
- c) Decorative materials
- d) Bags (*Bhangro, Thailo*)
- d) Others

13. from where you get the raw materials (*Nigalo & Allo*)?

- a) Natural Forest
- b) Community forest
- c) Private forest

14. Why do you choose these jobs?

- a) Traditional job
- b) More profitable
- c) Easier than other
- d) Easily available raw materials

15 Can you run this work through the year?

- a) Yes
- b) No

16. 1. If no, what are the problems?

17. Where do you sell the products?

- a) Local market
- b) Neighboring villages
- c) Local businessman

18. Which item has higher demand in market?

19. What are the problems associated in these jobs?

- a) Transport
- b) Market
- c) Low price
- d) Raw material
- e) Others

20) What is the present state of the indigenous knowledge on the uses of *Nigalo & Allo*?

21) What are the methods/technologies of *Nigalo & Allo* utilization?

22) Are people managing or over exploiting the *Nigalo & Allo* plants?

APPENDIX- II

Glossary for Technical Terms

Anthelmintic	:	A drug used for combating intestinal worms
Antiseptic	:	An agent that destroys or checks germs
Aphrodisiac	:	A drug that stimulates sexual desire.
Aromatic	:	A fragrant or spicy or mildly stimulant drug.
Asthma	:	A chronic inflammation of the bronchial tubes
Cancer	:	Any malignant growth of tissues caused by uncontrolled proliferation of corresponding cells.
Bloat and tympanites	:	Gassy swelling of the abdomen
Colic	:	Pain due to spasmodic contraction of the abdomen
Decoction	:	An extract of a crude drug obtained by boiling in water
Diarrhoea	:	Abnormal frequency and fluidity of faecal discharge
Dysentery	:	An infectious disease causing acute diarrhea and discharge of mucus and blood.
Haemorrhage	:	profuse bleeding from ruptured blood vessel
Laxative	:	A mild purgative
Leprosy	:	An infectious disease characterized by ulcers and white, scaly scabs.
Rheumatism	:	A term used for pains in the muscles, joints and certain tissues.
Scabies	:	An itching skin disease caused by mite
Sprain	:	Injure a joint by twisting violently resulting pain and swelling
Stomachic	:	A drug that stimulates the appetite, thereby promoting the functional activity of the stomach.
Tonic	:	An agent giving strength and energy.

Glossary for local Terms

Arghum [Pai (Gur.)]	:	A Gurung ritual performed after a person's death for his/her spirit
Bhakari [Bhagar (Gur.)]	:	Grain storage bins
Bhangro [Reiga (Gur.)]	:	A sack for carrying stuff in the back
Charkha [Rar (Gur.)]	:	Spinning wheel
Dalo [Tabar (Gur.)]	:	A kind of basket made from bamboo

Dhiki [Kundu (Gur.)]	:	A manual wooden thresher
Doko [Pei (Gur.)]	:	A conical bamboo basket
Kufat	:	A condition in which the patient suffers from loss of appetite, continuous internal fever and indigestion.
Gano	:	Pain movement of lower stomach
Ghatta [Chhyodo (Gur.)]	:	Water mill
Goth [Prouh (Gur.)]	:	Cattle shed
Halo [Koahr (Gur.)]	:	Plough
Jato [Rehdo (Gur.)]	:	Stone grinder
Mandro [Pyoh (Gur.)]	:	A kind of mat made from bamboo
Namlo [To (Gur.)]	:	Head straps for carrying loads
Nanglo [Nauli (Gur.)]	:	Winnowing trays
Nasa (Gur.)	:	Gurung village
Nasa Ban (Gur.)	:	Whole village owned forest or natural forest
Pilo [Bo (Gur.)]	:	Infected painful swelling of the skin
Syakhu [Kuh (Gur.)]	:	An umbrella made from bamboo.
Thailo [Kuldu (Gur.)]	:	Grain sack
Thunche [Suidi (Gur.)]	:	A conical bamboo basket.
Raage [Korbe (Gur.)]	:	A conical bamboo basket.

Forms of Medication

Paste: It is prepared by crushing the fresh plant parts by stone pestle on a stone mortar.

Juice: It is obtained by squeezing or crushing the parts of plant with mortar and pestle and filtered through few layers of cloth by twisting it lightly.

Powder: The plant parts are dried in open sun; the dried samples were crushed with dried mortar and pestle to make powder.

Decoction: The whole plant parts boiled in water and then extract of crude drug is used as decoction.

Liquid Drug: The above forms of medication such as paste, juice, powder and decoction are dilute with water whenever required.

The above forms of medication such as paste, juice, powder and decoction are dilute with water whenever required.

Massage: The paste is prepared by crushing of plant and rubbed on effected part.

APPENDIX-III

List of plant species according to the use categories

1. Medicinal Plants

S.No	Scientific Name	Family	Nepali/Local Name	Part (s) used	Habit
1.	<i>Aconitum ferox</i>	Ranunculaceae	Bikh (Nep)/Megai (Gur.)	Root	Herb
2.	<i>Aconitum gammiei</i>	Ranunculaceae	Nirmashi (Nep.)/ Narmashi (Gur.)	Root	Herb
3.	<i>Acorus calamus</i>	Araceae	Bojho (Nep.)/ Chhyodomai (Gur.)	Rhizome	Herb
4.	<i>Agave cantula</i>	Agavaceae	Ketuki (Nep., Gur.)	Whole plant	Herb
5.	<i>Ageratum conyzoides</i>	Compositae	Gane (Nep.)/ Thanau nho (Gur.)	Whole plant	Herb
6.	<i>Amomum subulatum</i>	Zingiberaceae	Alainchi (Nep., Gur)	Seeds	Herb
7.	<i>Ananas comosus</i>	Bromeliaceae	Bhuikatar (Nep., Gur.)	Fruit	Herb
8.	<i>Artemisia dubia</i>	Compositae	Titepati(Nep.)/ Chewuri (Gur.)	Leaves, stem	Herb
9.	<i>Allium sativum</i>	Amaryllidaceae	Lasun (Nep.)/Noo (Gur.)	Bulb, leaf	Herb
10.	<i>Asparagus racemosus</i>	Liliaceae	Kurilo (Nep.)/ Puchu Touru (Gur.)	Root, Young shot	Climber
11.	<i>Begonia picta</i>	Begoniaceae	Magar kache(Nep.)/ Prugyu (Gur.)	Root	Herb
12.	<i>Berberis aristata</i>	Berberidaceae	Chutro (Nep)/Tishya (Gur)	Root	Shrub
13.	<i>Bergenia ciliate</i>	Saxifragaceae	Pakhan bed (Nep.)/ Ghur basana (Gur.)	Rhizome	Herb
14.	<i>Bombax ceiba</i>	Bombacaceae	Simal (Nep., Gur.)	Bark, Root	Tree
15.	<i>Cannabis sativa</i>	Cannabaceae	Ganja (Nep., Gur)	Seed, Bark, leaf	Herb
16.	<i>Centella asiatica</i>	Umbelliferae	Ghodtapre (Nep.)/ Nho Mai (Gur)	Whole plant	Herb
17.	<i>Cheilanthes albomarginata</i>	Pteridaceae	Ranisinka(Nep.)/ Singi(Gur.)	Whole plant	Herb
18.	<i>Chenopodium album</i>	Chenopodiaceae	Bethe(Nep.)/Lainu (Gur.)	Young shoot, seed	Herb

19.	<i>Cinnamomum tamala</i>	Lauraceae	DalChini(Nep)/Lepu(Gur)	Bark, leaf	Tree
20.	<i>Cirsium verutum</i>	Compositae	Thakailo (Nep.)/ Popuchu (Gur.)	Root	Herb
21.	<i>Choerospondias axillaries</i>	Anacardiaceae	Lapsi (Nep.)/Kalah (Gur.)	Fruit, leaf, bark	Tree
22.	<i>Colebrookea oppositifolia</i>	Labiatae	Dhurselo (Nep., K., D.)	Root	Shrub
23.	<i>Cordyceps sinensis</i>	Hypocreaceae	Yarsagumba (Nep., Gur.)	Whole plant	Fungi
24.	<i>Curcuma angustifolia</i>	Zingiberaceae	Besar (Nep., Gur.)	Rhizome	Herb
25.	<i>Cynodon dactylon</i>	Gramineae	Dubo(Nep.)/ Tu-nho (Gur.)	Whole plant	Herb
26.	<i>Cynoglossum zeylanicum</i>	Boraginaceae	Kanike kuro(Nep.)/ Khil tana (Gur.)	Leaf	Herb
27.	<i>Dactylorhiza hatagirea</i>	Orchidaceae	Panchaunle (Nep.)/ Yori-nghe (Gur.)	Root	Herb
28.	<i>Dendrobium amoenum</i>	Orchidaceae	Hardjorne (Nep., Gur.)	Stem	Herb
29.	<i>Diplazium maximum</i>	Woodsiaceae	Niuro (Nep.)/Lauta (Gur.)	Yong shoot	Fern
30.	<i>Duchesnea indica</i>	Rosaceae	Bhui kaphal (Nep.)/ Sa Palah (Gur.)	Root	Herb
31.	<i>Drymaria diandra</i>	Caryophyllaceae	Abijalo (Nep.)/ Sya nho (Gur.)	Whole plant	Herb
32.	<i>Elaeagnus latifolia</i>	Elaeagnaceae	Guyalo (Nep.)/ Tuwuru (Gur.)	Fruit	Tree
33.	<i>Equisetum debile</i>	Equisetaceae	Akhle jhar (Nep.)/ Simyu Tuh (Gur.)	Whole plant	Fern
34.	<i>Euphorbia royleana</i>	Euphorbiaceae	Siudi (Nep., Gur)	Whole plant	Shrub
35.	<i>Ficus auriculata</i>	Moraceae	Nimaro (Nep.)/ Toubu (Gur.)	Latex	Tree
36.	<i>Girardinia diversifolia</i>	Urticaceae	Allo (Nep.)/ Ni polu (Gur.)	Root	Herb
37.	<i>Houttuynia cordata</i>	Saururaceae	Gandhe (Nep.)/ Nagi fitta dhu (Gur.)	Leaf	Herb

38.	<i>Juglans regia</i>	Juglandaceae	Okhar (Nep., Gur.)	Stem, Bark	Tree
39.	<i>Litsea cubeba</i>	Lauraceae	Siltimur(Nep)/Kudu(Gur)	Fruit	Tree
40.	<i>Lycopodium clavatum</i>	Lycopodiaceae	Nagbeli(Nep.)/ Chhyoumai (Gur.)	Spore	Creeper
41.	<i>Lyonia ovalifolia</i>	Ericaceae	Angeri(Nep)/ Chyarsi(Gur.)	Young shoot	Tree
42.	<i>Melia azedarach</i>	Meliaceae	Bakaino (Nep., Gur.)	Bark	Tree
43.	<i>Mentha spicata</i>	Labiatae	Pudina(Nep.)/ Puduna(Gur.)	Leaves	Herb
44.	<i>Nardostachys grandiflora</i>	Valerianaceae	Bhutle,Jaramansi(Nep., Gur.)	Rhizome	Herb
45.	<i>Neopicrorhiza scrophulariifolia</i>	Scrophulariaceae	Kutki (Nep., Gur)	Rhizome	Herb
46.	<i>Nicotiana tabacum</i>	Solanaceae	Kacho pat (Nep.)/ Tama po (Gur.)	Leaf	Herb
47.	<i>Paris polyphylla</i>	Liliaceae	Satwa (Nep., Gur.)	Rhizome	Herb
48.	<i>Phytolacca acinosa</i>	Phytolaccaceae	Jaringo Sag (Nep.)/ Oli tah (Gur.)	Leaf, stem	Herb
49.	<i>Piper mullesua</i>	Piperaceae	Pahadi Pan (Nep.)/ Sindri (Gur.)	Fruit	Climber
50.	<i>Polygonum molle</i>	Polygonaceae	Thotne(Nep)/Tumu(Gur.)	Juvenile shoot	Herb
51.	<i>Psidium guajava</i>	Myrtaceae	Amba(Nep)/Belwat(Gur.)	Leaf	Tree
52.	<i>Rheum australe</i>	Polygonaceae	Padamchal (Nep.)/ Pudunchale (Gur.)	Root, stem	Herb
53.	<i>Rhododendron arboreum</i>	Ericaceae	Lali Gurans (Nep.)/ Pauri ta (Gur.)	Flower, Bark	Tree
54.	<i>Rhus javanica</i>	Anacardiaceae	Bhakimlo(Nep.)/ Tiuru/Tibru (Gur.)	Fruit	Tree
55.	<i>Rubus ellipticus</i>	Rosaceae	Aiselo(Nep.)/Palah (Gur.)	Root, young shoot	shrub
56.	<i>Rumex nepalensis</i>	Polygonaceae	Hali (Nep.)/Olmi (Gur.)	Root, leaf	Herb
57.	<i>Smilax aspera</i>	Liliaceae	Kukurdaino (Nep.)/ Neri dhu (Gur.)	Root	Climber

58.	<i>Solanum aculeatissimum</i>	Solanaceae	Kataiya (Nep.)/ Sa naba Mai (Gur.)	Fruit	Herb
59.	<i>Solanum nigrum</i>	Solanaceae	Jangali bihi(Nep.)/ Taujarmai (Gur.)	Leaf	Herb
60.	<i>Solena heterophylla</i>	Cucurbitaceae	Bankakri(Nep)/Toju(Gur)	Root	Climber
61.	<i>Swertia chirayita</i>	Gentianaceae	Chiraita(Nep.)/Tite (Gur.)	Whole plant	Herb
62.	<i>Taxus wallichiana</i>	Taxaceae	LotSallo (Nep.)/ Saij/Sangi (Gur.)	Leaf, bark	Tree
63.	<i>Thallictrum foliosum</i>	Ranunculaceae	Dampate(Nep)/ Kaude(Gur.)	Root	Herb
64.	<i>Urtica dioca</i>	Urticaceae	Sisnu (Nep.)/Polu (Gur.)	Root	Herb
65.	<i>Viola pilosa</i>	Violaceae	Ghatta phul (Nep.)/ Bou mai (Gur.)	Whole plant	Herb
66.	<i>Zanthoxylum armatum</i>	Rutaceae	Timur (Nep.)/ Prumo (Gur.)	Fruit	Shrub

2. 1 Plants for edible fruit

S.N	Scientific Name	Family	Local Name	Habit
1.	<i>Ananas comosus</i>	Bromeliaceae	Bhuikatar (Nep., Gur.)	Herb
2.	<i>Berberis aristata</i>	Berberidaceae	Chutro (Nep.)/Tisya (Gur.)	Shrub
3.	<i>Berberis asiatica</i>	Berberidaceae	Chutru (Nep., Gur.)	Shrub
4.	<i>Choerospondias axillaries</i>	Anacardiaceae	Lapsi (Nep.)/Kalah (Gur.)	Tree
5.	<i>Duchesnea indica</i>	Rosaceae	Bhui kafal (Nep.)/Sa palah (Gur.)	Herb
6.	<i>Elaeagnus latifolia</i>	Elaeagnaceae	Guyalo (Nep.)/Tuwuru (Gur.)	Tree
7.	<i>Ficus auriculata</i>	Moraceae	Nimaro (Nep.)/Toubu (Gur.)	Tree
8.	<i>Ficus neriifolia</i>	Moraceae	Dudhilo (Nep.)/Ng-ra (Gur.)	Tree
9.	<i>Ficus semicordata</i>	Moraceae	Khanayo (Nep.)/Mowa (Gur.)	Tree
10.	<i>Holboellia latifolia</i>	Lardizabalaceae	Guphla (Nep.)/Malkaji (Gur.)	Shrub
11.	<i>Juglans regia</i>	Juglandaceae	Okhar (Nep., Gur)	Tree
12.	<i>Leucocephtrum canum</i>	Labiatae	Bhasure (Nep.)/China dhu (Gur.)	Tree
13.	<i>Litsea cubeba</i>	Lauraceae	Siltimur (Nep.)/Kudu (Gur.)	Tree
14.	<i>Myrica esculenta</i>	Myricaceae	Kafal (Nep., Gur.)	Tree
15.	<i>Paris polyphylla</i>	Liliaceae	Satwa (Nep., Gur.)	Herb

16	<i>Prunus cerasoides</i>	Rosaceae	Paiyu (Nep.)/Chyarbu (Gur.)	Tree
17	<i>Prunus domestica</i>	Rosaceae	Alu Bokhara (Nep., Gur.)	Tree
18	<i>Prunus persica</i>	Rosaceae	Aru (Nep.)/Khulu (Gur.)	Tree
19	<i>Psidium guajava</i>	Myrtaceae	Amba (Nep.)/Belwat (Gur.)	Tree
20	<i>Rhus javanica</i>	Anacardiaceae	Bhakimlo (Nep.)/Tiuru/Tibru (Gur.)	Tree
21	<i>Rubus ellipticus</i>	Rosaceae	Aiselo (Nep.)/Palah (Gur.)	Shrub
22	<i>Saurauia napaulensis</i>	Saurauiaceae	Gogan (Nep.)/Plehsi (Gur.)	Tree
23	<i>Scurrula parasitica</i>	Loranthaceae	Lisso (Nep.)/Mephu (Gur.)	Shrub
24	<i>Solena heterophylla</i>	Cucurbitaceae	Ban kakri (Nep.)/Toju (Gur.)	Climber

2.2 Plants for Vegetable, Pickle and spices

S.N	Scientific Name	Family	Nepali/Local Name	Part(s)used	Habit
1	<i>Arundinaria maling</i>	Gramineae	Malingo Nigalo (Nep.)/ Blomu mo (Gur.)	Young stem	Shrub
2	<i>Allium sativum</i>	Amaryllidaceae	Lasun (Nep.)/Noo (Gur.)	Bulb, leaf	Herb
3	<i>Asparagus racemosus</i>	Liliaceae	Kurilo (Nep.)/ Puchu Toru (Gur.)	Young stem	Climber
4	<i>Begonia picta</i>	Begoniaceae	Magar Kaache (Nep.)/ Prugyu (Gur.)	Petiole	Herb
5	<i>Chenopodium album</i>	Chenopodiaceae	Bethe(Nep.)/Lainu (Gur.)	Young shoot	Herb
6	<i>Cinnamomum tamala</i>	Lauraceae	Dal Chini (Nep.)/ Lepu (Gur.)	Leaf	Tree
7	<i>Cirsium verutum</i>	Compositae	Thakal (Nep.)/ Po puchu (Gur.)	Young stem	Herb
8	<i>Curcuma angustifolia</i>	Zingiberaceae	Besar (Nep.,Gur.)	Rhizome	Herb
9	<i>Dioscorea bulbifera</i>	Dioscoreaceae	Ban Tarul (Nep.)/ Ban Temi (Gur.)	Tubers	Climber
10	<i>Diplazium maximum</i>	Woodsiaceae	Tiuro(Nep.)/Lautah(Gur.)	Young shoot	Fern
11	<i>Litsea cubeba</i>	Lauraceae	Siltimur(Nep)/Kudu(Gur)	Fruit	Tree
12	<i>Mentha spicata</i>	Labiatae	Pudina(Nep)/Puduna(Gur)	Leaves	Herb
13	<i>Oxalis corniculata</i>	Oxalidaceae	Chariamilo(Nep.)	Leaf, stem	Herb
14	<i>Phytolacca acinosa</i>	Phytolaccaceae	Jaringo Sag (Nep.)	Leaf, stem	Herb
15	<i>Piper mullesua</i>	Piperaceae	BanPan(Nep.)	Fruit	Climber

			Sindri (Gur.)		
16	<i>Polygonum molle</i>	Polygonaceae	Thutne (Nep.)/ Tumu (Gur.)	Juvenile shoot	Herb
17	<i>Rheum australe</i>	Polygonaceae	Padamchal (Nep.)/ Pudunchale (Gur.)	Stem	Herb
18	<i>Rhus javanica</i>	Anacardaceae	Bhakimlo(Nep)/ Tiuru/Tibru(Gur.)	Fruit	Tree
19	<i>Rumex nepalensis</i>	Polygonaceae	Hali (Nep.)/Olmi (Gur.)	Young shoot	Herb
20	<i>Urtica dioica</i>	Urticaceae	Sisnu (Nep.)/Polu (Gur.)	Young shoot	Herb
21	<i>Zanthoxylum armatum</i>	Rutaceae	Timur(Nep)/Prumo(Gur.)	Fruit	shrub

2.3 Plants for brewing alcohol

S.N	Scientific Name	Family	Nepali/Local Name	Part(s)used	Habit
1	<i>Asparagus racemosus</i>	Liliaceae	Kurilo (Nep.)/ Puchu Toru (Gur.)	Root	Climber
2	<i>Colebrookea oppositifolia</i>	Labiatae	Durselo (Nep., K., D.)	Flower	Shrub
3	<i>Inula cappa</i>	Compositae	Syaula (Nep.,Gur.)	Leaf, flower	Herb
4	<i>Rubus ellipticus</i>	Rosaceae	Aiselo (Nep.)/Palah (Gur.)	Root	Shrub

3. Veterinary used Plants

S.N	Scientific Name	Family	Local Name	Part(s)used	Habit
1	<i>Aconitum gammiei</i>	Ranunculaceae	Nirmashi (Nep.)/ Narmashi (Gur.)	Root	Herb
2	<i>Asparagus racemosus</i>	Liliaceae	Kurilo(Nep.)/ PuchuToru (Gur.)	Root	Climber
3	<i>Berberis aristata</i>	Berberidaceae	Chutro (Nep.)/Tisya (Gur.)	Root	Shrub
4	<i>Bergenia cristata</i>	Saxifragaceae	Pakhan bed (Nep.)/ Ghurbasana (Gur.)	Rhizome	Herb
5	<i>Cannabis sativa</i>	Cannabaceae	Ganja (Nep., Gur)	Leaf	Herb
6	<i>Colebrookea oppositifolia</i>	Labiatae	Dhurselo (Nep., K. D.)	Leaf	Shrub
7	<i>Curcuma angustifolia</i>	Zingiberaceae	Besar (Nep., Gur)	Rhizome	Herb
8	<i>Dendrobium</i>	Orchidaceae	Hardjorne (Nep., Gur.)	Stem	Herb

	<i>amoenum</i>				
9	<i>Daphne papyraceae</i>	Thymelaceae	Lokta (Nep.)/Syusi (Gur.)	Bark	Shrub
10	<i>Ficus auriculata</i>	Moraceae	Nimaro(Nep.)/Toubu (Gur.)	Fruit	Tree
11	<i>Litsea cubeba</i>	Lauraceae	Siltimur(Nep.)/Kudu (Gur.)	Fruit	Tree
12	<i>Rheum australe</i>	Polygonaceae	Padamchal (Nep.)/ Pudunchale (Gur.)	Root	Herb
13	<i>Rumex nepalensis</i>	Polygonaceae	Hali (Nep.)/Olmi (Gur.)	Young shoot	Herb
14	<i>Solena heterophylla</i>	Cucurbitaceae	BanKakri(Nep.)/ Toju(Gur.)	Root	Climber

4. Plants used for agricultural implements

S.N	Scientific Name	Family	Nepali/Local Name	Part(s)used	Habit
1	<i>Elaeagnus latifolia</i>	Elaeagnaceae	Guyalo(Nep)/Tuwuru(Gur.)	Stem	Tree
2	<i>Prunus cerasoides</i>	Rosaceae	Paiyu(Nep)/Chyarbu (Gur.)	Stem	Tree
3	<i>Rhododendron arboreum</i>	Ericaceae	Lali Gurans (Nep.)/ Pauri ta (Gur.)	Stem	Tree
4	<i>Schima wallichii</i>	Theaceae	Chilaune(Nep)/Kyosi(Gur.)	Stem	Tree
5	<i>Taxus wallichiana</i>	Taxaceae	Loth Salla (Nep.)/ Saij/Sangi (Gur.)	Stem	Tree
6	<i>Quercus glauca</i>	Fagaceae	Phalat (Nep.)/Ng-si (Gur.)	Stem	Tree

5. Ceremonial and Ritual Plants

S.N	Scientific Name	Family	Nepali/Local Name	Part(s)used	Habit
1	<i>Artemisia dubia</i>	Compositae	Titepati(Nep.)/ Chewuri (Gur.)	Shoot	Herb
2	<i>Arundinaria maling</i>	Gramineae	Malingo Nigalo (Nep.)/ Plomu Mho (Gur.)	Shoot	Shrub
3	<i>Aconitum ferox</i>	Ranunculaceae	Bikh (Nep.)/Megai (Gur.)	Root	Herb
4	<i>Asparagus racemosus</i>	Liliaceae	Kurilo (Nep.)/ Puchu Toru (Gur.)	Shoot	Climber
5	<i>Bistorta affinis</i>	Polygonaceae	Khaldi (Nep.)/ Thunduru ta (Gur.)	Flower	Herb
6	<i>Bistorta macrophylla</i>	Polygonaceae	Khaldi (Nep.)/ Thunduru ta (Gur.)	Flower	Herb

7	<i>Cynodon dactylon</i>	Gramineae	Dubo (Nep.)/Tu nho (Gur.)	Shoot	Herb
8	<i>Drepanostachyum intermedium</i>	Gramineae	Tite Nigalo (Nep)/Kaamu Mo (Gur)	Shoot	Grass
9	<i>Ficus neriifolia</i>	Moraceae	Dudhilo(Nep.)/Ng-ra (Gur.)	Stem	Tree
10	<i>Lycopodium clavatum</i>	Lycopodiaceae	Nagbeli (Nep.)/ Chhyou mhai (Gur.)	Whole plant	Herb
11	<i>Prunus cerasoides</i>	Rosaceae	Paiyu(Nep)/Chyarbu (Gur.)	Stem	Tree
12	<i>Rhus javanica</i>	Anacardiaceae	Bhakimlo(Nep)/Tibru (Gur)		
13	<i>Smilax aspera</i>	Liliaceae	Kukurdaino(Nep.)/ Neri (Gur.)	Stem	Climber
14	<i>Thamnocalamus aristatus</i>	Gramineae	Ghude(Nep)/Chhomu(Gur)		
15	<i>Viburnum mullaha</i>	Sambucaceae	Malo(Nep)/Hera Dhu (Gur)		
16	<i>Zanthoxylum armatum</i>	Rutaceae	Timur (Nep.)/Prumo (Gur.)	Fruit	Tree

6. Fiber Yielding Plants

S.N	Scientific Name	Family	Nepali/Local Name	Part(s)used	Habit
1	<i>Agave cantula</i>	Agavaceae	Ketuki (Nep., K.D.)	Leaf	Herb
2	<i>Cannabis sativa</i>	Cannabaceae	Ganja (Nep., Gur)	Bark	Herb
3	<i>Daphne papyraceae</i>	Thymelaeaceae	Lokta (Nep.)/Syusi (Gur.)	Bark	Shrub
4	<i>Girardinia diversifolia</i>	Urticaceae	Allo (Nep.)/ Ni polu (Gur.)	Bark	Herb

7. Poisonous Plants

7.1. Poisonous to Human being and Cattle

S.N	Scientific Name	Family	Nepali /Local Name	Part(s)used	Habit
1	<i>Aconitum ferox</i>	Ranunculaceae	Bikh (Nep.)/Megai (Gur.)	Whole	Herb
2	<i>Arisaema costatum</i>	Araceae	Sarpa makai(Nep)/ Tabyo (Gur.)	Whole plant	
3	<i>Arisaema tortuosum</i>	Araceae	Kag makai (Nep.)/ Tijya (Gur.)	Whole plant	Herb
4	<i>Lyonia ovalifolia</i>	Ericaceae	Angeri(Nep)/Chyarsi (Gur.)	Whole plant	Herb

7.2 Poisonous to Insects

S.N	Scientific Name	Family	Nepali/Local Name	Part(s)used	Habit
1	<i>Acorus calamus</i>	Araceae	Bojho (Nep.)/ Chhyodo mhai (Gur.)	Rhizome	Herb
2	<i>Aconitum ferox</i>	Ranunculaceae	Bikh (Nep.)/Megai (Gur.)	Root	Herb
3	<i>Artemisia dubia</i>	Compositae	Titepati(Nep.)/ Chewuri (Gur.)	Leaf	Herb
4	<i>Melia azedarach</i>	Meliaceae	Bakaino (Nep., K., D.)	Fruit, leaf	Tree
5	<i>Maesa chisia</i>	Myrsinaceae	Bilaune(Nep.)/ Chhohdi (Gur.)	Bark	Shrub
6	<i>Urtica dioica</i>	Urticaceae	Sisnu (Nep.)/Polu (Gur.)	Leaf	Herb
7	<i>Zanthoxylum armatum</i>	Rutaceae	Timur (Nep.)/Prumo (Gur.)	Fruit	Shrub

7.3 Poisonous to fish

S.N	Scientific Name	Family	Nepali/Local Name	Part(s)used	Habit
1	<i>Engelhardia spicata</i>	Juglandaceae	Mouwa (Nep)/Kro (Gur.)	Leaf, Bark	tree
2	<i>Euphorbia royleana</i>	Euphorbiaceae	Siudi (Nep., Gur.)	Latex	Shrub
3	<i>Lyonia ovalifolia</i>	Ericaceae	Angeri(Nep)/Chyarsi (Gur.)	Bark, leaf	Small tree

8. Dye yielding plants

S.N	Scientific Name	Family	Nepali/Local Name	Part(s)used	Habit
1	<i>Berberis aristata</i>	Berberidaceae	Chutro (Nep.)/Tisya (Gur.)	Bark	Shrub
2	<i>Berberis asiatica</i>	Berberidaceae	Chutru (Nep., Gur.)	Bark	Shrub
3	<i>Engelhardia spicata</i>	Juglandaceae	Mauwa (Nep.)/Kro (Gur.)	Bark	Tree
4	<i>Juglans regia</i>	Juglandaceae	Okhar (Nep., Gur)	Fruit, Bark	Tree
5	<i>Rhododendron arboreum</i>	Ericaceae	Lali Gurans(Nep.)/ Pauri ta(Gur.)	Flower, Bark	Tree
6	<i>Rumex nepalensis</i>	Polygonaceae	Hali (Nep.)/Olm (Gur.)	Root	Herb
7	<i>Prinsepia utilis</i>	Rosaceae	Dhatelo (Nep.)/ Baimai Tisya (Gur.)	Fruit	Shrub
8	<i>Schima wallichii</i>	Theaceae	Chilaune(Nep.)/ Kyosi (Gur.)	Leaf	Tree

9. Plants used as handicrafts

S.N	Scientific Name	Family	Nepali/Local Name	Habit
1	<i>Arundinaria maling</i>	Gramineae	MalingoNigalo(Nep.)/BlomuMho(Gur.)	Grass
2	<i>Thamnocalamus aristatus</i>	Gramineae	GhudeNigalo(Nep.)/ChhomoMho(Gur.)	Grass
3	<i>Drepanostachyum Intermedium</i>	Gramineae	Tite Nigalo (Nep.)/Kamu Mho (Gur.)	Grass

10. Hedge and shade Plants

S.N	Scientific Name	Family	Nepali/Local Name	Habit
1	<i>Agave cantula</i>	Agavaceae	Ketuki (Nep., K.D.)	Herb
2	<i>Euphorbia royleana</i>	Euphorbiaceae	Siudi (Nep., Gur.)	Shrub
3	<i>Ficus religiosa</i>	Moraceae	Pipal (Nep., Gur)	Tree

11. Broomstick Plants

S.N	Scientific Name	Family	Nepali/Local Name	Parts used
1	<i>Thamnocalamus aristatus.</i>	Gramineae	Ghude Nigalo,Chhomu Mho(Gur.)	Stem
2	<i>Eulaliopsis binata</i>	Gramineae	Babiyo (Nep.)/Babyo (Gur)	Leaf
3	<i>Thysanolaena maxima</i>	Gramineae	Amrisho(Nep.)/Mrachharbakuj (Gur.)	Floral Branches

12. Detergent Plants

S.N	Scientific Name	Family	Nepali/Local Name	Parts used
1.	<i>Aesculus indica</i>	Hippocastanaceae	Pangra (Nep.)/Chimal (Gur.)	Fruit
2	<i>Asparagus racemosus</i>	Liliaceae	Kurilo (Nep.)/Puchu Toru (Gur.)	Root
3	<i>Pouzolzia sanguinea</i>	Urticaceae	Chiple ghans (Nep.)/Pleta chhi (Gur.)	Root

13. Plants Used as Gum

S.N	Scientific Name	Family	Nepali/Local Name	Parts used
1	<i>Coelogyne cristata</i>	Orchidaceae	Sungava (Nep.)/Sal ta (Gur.)	Bulb
2	<i>Ficus auriculata</i>	Moraceae	Nimaro (Nep.)/Toubu (Gur.)	Latex
3	<i>Ficus neriifolia</i>	Moraceae	Dudhjlo (Nep.)/Ng-ra (Gur.)	Latex, bark
4	<i>Pouzolzia sanguinea</i>	Urticaceae	Chipleghans(Nep.)/Pleta chhi (Gur.)	Bark
5	<i>Prunus cerasoides</i>	Rosaceae	Paiyu (Nep.)/ Chyarbu (Gur.)	Latex

14. Miscellaneous

S.N	Scientific Name	Family	Parts used	Used for
1.	<i>Arisaema tortuosum</i>	Araceae	Fruit	Bird's bait
2.	<i>Prinsepia utilis</i>	Rosaceae	Stem	Coal
3.	<i>Pouzolzia sanguinea</i>	Urticaceae	Root bark	Bread powder
4.	<i>Rhus javanica</i>	Anacardiaceae	Stem	Gun powder

APPENDIX -IV

Alphabetical index of Gurung Names

S.No	Gurung Name	Nepali Name	Scientific Name	Family
01	Baimai tisyā	Dhatelo	<i>Prinsepia utilis</i> Royle	Rosaceae
02	Ban Temi	Ban tarul	<i>Dioscorea bulbifera</i> L.	Dioscoreaceae
03	Belwat	Amba	<i>Psidium guajava</i> L.	Myrtaceae
04	Bou mai	Ghatte phul	<i>Viola pilosa</i> Blume	Violaceae
05	Cheehna dhu	Bhasure	<i>Leucocephalum canum</i> Sm.	Labiatae
06	Chewuri	Titepati	<i>Artemisia dubia</i> (Wall.) Schott. Wall. ex Besser	Compositae
07	Chhodi	Bilaune	<i>Maesa chisia</i> Buch. -Ham. ex D.Don	Myrsinaceae
08	Chhomu Mo	Ghunde Nigalo	<i>Thamnocalamus aristatus</i> (Gamble) E.G. Camus	Gramineae
09	Chhou Mai	Nagbeli	<i>Lycopodium clavatum</i> L.	Lycopodiaceae
10	Chhyodo Mai	Bojho	<i>Acorus calamus</i> L.	Araceae
11	Chhyola mai	Jhyau	<i>Usnea</i> sp	Usneaceae
12	Chimal	Pangra	<i>Aesculus indica</i> (Colebr. ex Cambess.) Hook.	Hippocastanaceae
13	Chyahbu	Guchhi chyau	<i>Morchella esculenta</i> Pers.	Morchellaceae
14	Chyarbu	Paiyu	<i>Prunus cerasoides</i> D.Don	Rosaceae
15	Chyarsi	Angeri	<i>Lyonia ovalifolia</i> (Wall.) Drude.	Ericaceae
16	Ghur basana	Pakhan bed	<i>Bergenia ciliata</i> (Haw.) Sternb.	Saxifragaceae
17	Ghyosi	Uttis	<i>Alnus nepalensis</i> D.Don	Betulaceae
18	Harjorne	Hardorne	<i>Dendrobium amoenum</i> Wall. ex Lindl.	Orchidaceae
19	Heir-ba ta		<i>Pedicularis scullyana</i> Pain ex Maxim	Scrophulariaceae
20	Hera	Malo	<i>Viburnum mullaha</i> Buch. -Ham. ex D.Don	Sambucaceae
21	Jaramanshi	Jatamanshi	<i>Nardostachys grandiflora</i> DC.	Valerianaceae
22	Kaamu Mo	Tite Nigalo	<i>Drepanostachyum intermedium</i> (Munro) Keng f.	Gramineae
23	Kafal	Kafal	<i>Myrica esculenta</i> Buch.-Ham. ex D.Don	Myricaceae
24	Kalah	Lapsi	<i>Choerospondias axillaries</i> (Roxb.)	Anacardiaceae

			B.L. Brutt. & A.W. Hill.	
25	Kaude	Dampate	<i>Thallictrum foliolosum</i> DC.	Ranunculaceae
26	Khel	Bhojpatra	<i>Betula utilis</i> D.Don	Betulaceae
27	Khil tana	Kanike kuro	<i>Cynoglossum zeylanicum</i> (Vahl) Thunb.ex Lehm.	Boraginaceae
28	Khorsani chhi	Khursani jhar	<i>Solanum nigrum</i> L.	Solanaceae
29	Khulu	Aru	<i>Prunus persica</i> (L.) Batch	Rosaceae
30	Kro	Mauwa	<i>Engelhardia spicata</i> Lsch.ex Bl.	Juglandaceae
31	Kudu	Siltimur	<i>Litsea cubeba</i> (Lour.) Pers.	Lauraceae
32	Kurji dhu	Bhalayo	<i>Rhus succedanea</i> L.	Anacardaceae
33	Kutki	Kutki	<i>Neopicrorhiza scrophulariifolia</i> (Pannell) Hong	Scrophulariaceae
34	Kyosi	Chilaune	<i>Schima wallichii</i> (DC.) Korth.	Theaceae
35	Kyupro	Chariamilo	<i>Oxalis corniculata</i> L.	Oxalidaceae
36	Lainu	Bethe	<i>Chenopodium album</i> L.	Chenopodiaceae
37	Lau Tah	Niuro	<i>Diplazium maximum</i> (D. Don). C. Chr.	Woodsiaceae
38	Lepu	Daal chini	<i>Cinnamomum tamala</i> (Buch.-Ham.) Ness & Eberm.	Lauraceae
39	Malkaji	Gophla	<i>Holboella latifolia</i> Wall.	Lardizabalaceae
40	Megai	Bikh	<i>Aconitum ferox</i> Wall. ex Ser.	Ranunculaceae
41	Me-phu dhu	Lisso	<i>Scurrula parasitica</i> L.	Loranthaceae
42	Mowa Dhu	Khanayo	<i>Ficus semicordata</i> Buch.-Ham. Ex Sm.	Moraceae
43	Mra chharba kuj	Amriso	<i>Thysanolaena maxima</i> (Roxb.) O.Kuntze	Gramineae
44	Muio ta	Kapase phul	<i>Saussurea gossypiphora</i> D.Don	Compositae
45	Nagi phitta	Gane	<i>Houttuynia cordata</i> Thunb.	Saururaceae
46	Na- pu	Rani sinka	<i>Cheilanthes albomarginata</i> C.B Clarke	Pteridaceae
47	Narmashi	Nirmashi	<i>Aconitum gammiei</i> Stapf.	Ranunculaceae
48	Neri dhu	Kukur daino	<i>Smilax aspera</i> L.	Liliaceae
49	Ng-ra Chhi	Dudhilo	<i>Ficus neriifolia</i> Sm	Moraceae

50	Ng-si dhu	Phalat	<i>Quercus glauca</i> Thunb.	Fagaceae
51	Nho Mai	Ghodtapre	<i>Centella asiatica</i> (L.) Urban.	Umbelliferae
52	Ni Polu	Allo	<i>Girardinia diversifolia</i> (Link) Friis	Urticaceae
53	Nuu	Lasun	<i>Allium wallichii</i> L.	Amaryllidaceae
54	Okhar	Okhar	<i>Juglans regia</i> L.	Juglandaceae
55	Oli tah	Jaringo Sag	<i>Phytolacca acinosa</i> Roxb.	Phytolaccaceae
56	Olmi	Hali	<i>Rumex nepalensis</i> Spreng	Polygonaceae
57	Palah	Aiselo	<i>Rubus ellipticus</i> Sm	Rosaceae
58	Pharra	Sun pati	<i>Rhododendron anthopogon</i> D.Don	Ericaceae
59	Plehsi	Gogan	<i>Saurauia napaulensis</i> DC	Saurauiaceae
60	Pleta chhi	Chiple ghas	<i>Pouzolzia sanguinea</i> (Blume) Merr.	Urticaceae
61	Plomu Mo	Malingo Nigalo	<i>Arundinaria maling</i> Gamble	Gramineae
62	Polu	Sisnu	<i>Urtica dioca</i> L.	Urticaceae
63	Po-puchu	Thakal	<i>Cirsium verutum</i> (D.Don) Spreng	Compositae
64	Pouri ta	Lali Gurans	<i>Rhododendron arboreum</i> Sm.	Ericaceae
65	Prugyu	Magar kaache	<i>Begonia picta</i> Smith	Begoniaceae
66	Prumo	Timur	<i>Zanthoxylum armatum</i> DC.	Rutaceae
67	Puchu Toru	Kurilo	<i>Asparagus racemosus</i> Willd.	Liliaceae
68	Puduna	Pudina	<i>Mentha spicata</i> L.	Labiatae
69	Pudunchale	Padamcha	<i>Rheum australe</i> D.Don	Polygonaceae
70	Ri-Dhu	Choya bans	<i>Dendrocalamus hamiltonii</i> Nees Am.& ex Monro	Gramineae
71	Sa naba mai	Kataiya	<i>Solanum aculeatissimum</i> Jacq.	Solanaceae
72	Sa Palah	Bhui kaphal	<i>Duchesnea indica</i> (Andr.) Focke	Rosaceae
73	Sal ta	Sungava	<i>Coelogyne cristata</i> Lindl.	Orchidaceae
74	Saij/Sangi	Lot sallo	<i>Taxus wallichiana</i> Zucc.	Taxaceae
75	Satwa	Satwa	<i>Paris polyphylla</i> Smith	Liliaceae
76	Simyu Tu	Akhle jhar	<i>Equisetum debile</i> Roxb. ex Voucher	Equisetaceae
77	Sindri	Ban Paan	<i>Piper mullesua</i> D.Don	Piperaceae
78	Syaa Nho	Abijalo	<i>Drymaria diandra</i> Blume	Caryophyllaceae
79	Syaula	Gai tihare	<i>Inula cappa</i> DC.	Compositae
80	Syusi	Lokta	<i>Daphne papyraceae</i> Wall. ex Steud.	Thymelaeaceae
81	Tabyo	Sarpa makai	<i>Arisaema costatum</i> (Wall.) Mart.	Araceae

82	Tamah poh	Kacho pat	<i>Nicotiana tabacum</i> L.	Solanaceae
83	Thanau Nho	Gandhe	<i>Ageratum conyzoides</i> L.	Compositae
84	Thundura ta	Khaldi	<i>Bistorta macrophylla</i> (D.Don) Sojak.	Polygonaceae
85	Tijya	Kag makai	<i>Arisaema tortuosum</i> (Wall.) Schott	Araceae
86	Tisya	Chutro	<i>Berberis aristata</i> DC.	Berberidaceae
87	Tiuru/Tibru	Bhakimlo	<i>Rhus javanica</i> L.	Anacardaceae
88	Tite	Chiraita	<i>Swertia chirayita</i> (Roxb.ex Fleming) Karst.	Gentianaceae
89	Tobu	Seto ekle ghas	<i>Anaphalis busua</i> (Buch.-Ham.ex Don) DC.	Compositae
90	Toju	Ban kakri	<i>Solena heterophylla</i> Lour	Cucurbitaceae
91	Toubu chhi	Nimaro	<i>Ficus auriculata</i> Lour	Moraceae
92	Tu nho	Dubo	<i>Cynodon dactylon</i> (L.) Pers.	Gramineae
93	Tumu	Thutne	<i>Polygonum molle</i> D.Don	Polygonaceae
94	Tuwuru	Guyalo	<i>Elaeagnus latifolia</i> L.	Elaeagnaceae
95	Yarsagumba	Yarsagumba	<i>Cordyceps sinensis</i> (Berk.) Sacc.	Hypocreaceae
96	Yori-nghe	Panchaumle	<i>Dactylorhiza hatagirea</i> (D.Don) Soo	Orchidaceae

APPENDIX -V

Comparison of medicinal uses between owns finding and other relevant literatures.

S. No.	Scientific Name	Present uses	Uses reported by others
1	<i>Aconitum gammiei</i> Stapf.	Wound, boils, diarrhea and dysentery, gastritis, pain of lower back	a) Disorder of digestive system, antidote (Chettri, 1999) b) Traditional medicine (Shrestha and Joshi 1996) c) Stomach pain (Sacherer, 1979)
2	<i>Acorus calamus</i> L.	Cough and cold, toothache, blood purification, diarrhea, wounds	a) Cough and cold, throat sore, bronchitis, toothache and head ache (Chettri, 1999)
3	<i>Agave cantula</i> Roxb.	Cuts and wounds	a) Diuretic (Gurung, 2002) b) Goitre (Jain et. al., 1992)
4	<i>Ageratum conyzoides</i> L.	Cuts and wounds	Leprosy, wound (Manandhar, 2002)
5	<i>Amomum subulatum</i> Roxb.	Stomachic, appetizer	Stomachic, neuralgia, stimulant, appetizer, eye inflammation (Joshi, 2001)
6	<i>Ananas comosus</i> (L.) Merr.	Urinary problem (Kharo)	Burns, itches, boils, anathematic & purgative (Manandhar, 2002)
7	<i>Artemisia dubia</i> (Wall.) Schott. Wall. ex Besser	Cut, smallpox, skin diseases	a) Fever, malaria, headache, scabies, diuretic (Gurung, 2002) b) Asthma (Joshi and Edington, 1990) c) Ringworm (Manandhar, 1985)
8	<i>Allium wallichii</i> Kunth	Hypertension, high altitudinal sickness	Headache, high altitude, constipation (Gurung, 2002)
9	<i>Asparagus racemosus</i> Willd.	Stomach pain, colic, lactation promotion	a) Viral infection of nose, lactation promotion

			<p>(Gurung, 2002)</p> <p>b) Refrigerant, dysentery and diarrhea (Chettri, 1999)</p> <p>c) Burning sensation while urinating (Manandhar, 1985)</p>
10	<i>Begonia picta</i> Smith	Constipation	<p>a) Gastritis (Gurung, 2002)</p> <p>b) Ulcers of mouth (Jain et. al 1991)</p>
11	<i>Berberis aristata</i> DC.	Intestinal worm	<p>a) Eye problem, Jaundice (Gurung, 2002)</p> <p>b) Intestinal worm (Devkota, 2003)</p> <p>c) Malarial fever (Anonymous, 1970)</p>
12	<i>Bergenia ciliata</i> (Haw.) Sternb.	Round worm, swollen stomach, urinary trouble, menstrual disorder	<p>a) Excessive bleeding, hypertension, bloat, body ache (Gurung, 2002)</p> <p>b) Abdominal pain, fever, colic (Devkota, 2003)</p> <p>c) Astringent, diuretic, fever, boils, and ophthalmia (Manandhar, 1980)</p>
13	<i>Bombax ceiba</i> L.	Cuts and wounds, burns, dysentery, gastritis	<p>a) Burns, paralysis (Devkota, 2003)</p> <p>b) Emetic, stimulant, tonic, aphrodisiac, demulcent, astringent, tonic (Malla et al. 1997)</p>
14	<i>Cannabis sativa</i> L.	Abdominal pain, cuts and wounds, cold	<p>a) Abdominal pain, cuts and wounds, skin diseases, colic (Devkota, 2003)</p> <p>b) Headache, intestinal worms (Gurung.2002)</p> <p>c) Wounds (Manandhar, 1986)</p>
15	<i>Centella asiatica</i> (L.) Urban.	Cuts and wounds, snake bites	<p>a) Cuts and wounds, promote memory tonic, fever,</p>

			<p>stomatitis (Devkota, 2003)</p> <p>b) Tonsillitis, sore throat, brain tonic, loss of appetite (Gurung, 2002)</p> <p>c) Gastritis (Manandhar, 1986b)</p> <p>d) Muscular pain, swelling (Manandhar, 1989a)</p>
16	<i>Cheilanthes albomarginata</i> C.B. Clarke	Fever, dysentery, cuts and wounds	<p>a) Fever, cuts (Devkota, 2003)</p> <p>b) Bloat and tympanites, cuts and wounds (Gurung, 2002)</p> <p>c) Cuts and wounds (Manandhar, 1989a)</p>
17	<i>Chenopodium album</i> L.	Abdominal pain	<p>a) Gastritis, backache, overheat (Gurung, 2002)</p> <p>b) Laxative, stomachic (Joshi, 2001)</p>
18	<i>Choerospondias axillaries</i> (Roxb.) B.L. Brutt. & A.W.Hill.	Menstrual disorder, sore throat, dysentery	<p>a) Menstrual disorder (Gurung, 2002)</p> <p>b) Pickles (Anonymous, 1970)</p>
19	<i>Cinnamomum tamala</i> (Buch. -Ham.) Nees & Eberm.	Fever, bad odor of mouth	<p>a) Fever, blood purification, body itching and bad odor of mouth, somnia (Devkota, 2003)</p> <p>b) Homeostatic, stomachache (Gurung, 2002)</p> <p>c) Intestinal disorders (Joshi and Edington, 1990)</p>
20	<i>Cirsium verutum</i> (D.Don.) Spreng	Abdominal pain, belching and water bash, chest pain	Abdominal pain, belching, water brash, stomachache (Devkota, 2003)
21	<i>Colebrookea oppositifolia</i> Sm.	Eye problem, typhoid, wounds.	Epilepsy, cough, anthelmentic, peptic ulcer, sprain, body pain, indigestion (Manandhar, 2002)

22	<i>Cordyceps sinensis</i> (Berk.) Sacc.	Tonic, Aphrodisiac	a) Aphrodisiac, tonic, cardiac tonic, expectorant (Joshi, 2001) b) Tonic (Chettri, 1999)
23	<i>Curcuma angustifolia</i> Roxb.	Cold & cough, bone fracture, skin diseases, stomach problem	a) Bone dislocation and bone fracture (Gurung, 2002) b) Bone dislocation (Manandhar, 1985)
24	<i>Cynodon dactylon</i> (L.) Pers.	Inflammation of limbs and urinary problem, gastritis, cuts and wounds	a) Epistaxis, paralysis (Devkota, 2003) b) Sore-throat, cuts and wounds (Gurung, 2002) c) Indigestion (Mahandhar, 1989a)
25	<i>Cynoglossum zeylanicum</i> (Vahl) Thunb.ex Lehm	Cuts and wounds	a) Eyes diseases (Karki, 2001) b) cut and wounds (Bhattarai, 1993c) c) Boils on tongue (Manandhar, 1987b) d) Ring worm (Manandhar, 1987a)
26	<i>Dactylorhiza hatagirea</i> (D.Don) Soo	Burns, cuts and wounds	a)Expectorant, Astrigent, demulcent, wounds, stomach problem (Manandhar, 2002) a) Burns, tonic, aphrodisiac (Chettri, 1999) b) Colic pain, fever, urinary trouble, expectorant, nervine tonic, aphrodisiac and demulcent (Joshi et. al 2001)
27	<i>Dendrobium amoenum</i> Wall. ex Lindl	Bone fracture	Boils and pimples (Manandhar, 2002)
28	<i>Diplazium maximum</i> (D. Don). C. Chr.	Stomach problem	Malarial fever, scabies (Manandhar, 2002)
29	<i>Duchesnea indica</i> (Andr.)	Stomach problem “Bikar pareko”,	Headache, Jaundice, colic,

	Focke	colic	(Devkota, 2003)
30	<i>Drymaria diandra</i> Blume	Cold and cough, stomach pain “Gano”	a) Cut and wounds, sinusitis (karki, 2001) b) Eye disease (Joshi and Edington, 1993) c) Sinutis, laxative & cooling (Manandhar, 2002) c) Fever (Manandhar, 1992a) d) Indigestion (Mahandhar, 1980b)
31	<i>Elaeagnus latifolia</i> L.	Stomach complaints	Boils (Devkota, 2003)
32	<i>Equisetum debile</i> Roxb.	Abdominal pain, burns	a) Burns, scabies, malarial fever, gonorrhea, dislocation of bones, chest & liver complaints (Manandhar, 2002) a) Burning micturition, cooling, sore eyes (Karki, 2001) b) Refrigerant (Acharya, 1996)
33	<i>Euphorbia royleana</i> Boiss	Earache, boils, sprains, muscular swellings	a) Appetizer, gastric trouble, boils, pimples and mumps (Manandhar, 2002) b) Antidote (Bhattarai, 2000)
34	<i>Ficus auriculata</i> Lour.	Bleeding, cuts and wounds	Cholera, vomiting, diarrhea, dysentery, constipation, cuts and wounds, leprosy, mastitis (Devkota, 2003)
35	<i>Girardinia diversifolia</i> (Link) Friis	Gastritis, chest burn	Burning micturition, cooling, sore eyes (Karki, 2001)
36	<i>Houttuynia cordata</i>	Cut and wounds	Indigestion, skin diseases, eye trouble, wounds (Manandhar, 2002)
37	<i>Juglans regia</i> L.	Joint pain and swelling, dental disease	a) Dental diseases, paralysis (Devkota, 2003) b) Join pain and swelling (Bhattarri, 2000)
38	<i>Litsea cubeba</i> (Lour.)	Gastric problem, swelling of	Gastric problem (Bharrarai, 2000)

	Pers.	stomach, fever	
39	<i>Lycopodium clavatum</i> L.	Burns, headache	a) Heart disease, constipation (Gurung, 2002) b) Diuretic, antispasmodic, rheumatism, wounds, cracks and fissures (Manandhar, 2002) b) Diuretic, antispasmodic rheumatism (Manandhar, 1980)
40	<i>Lyonia ovalifolia</i> (Wall.) Drude	Scabies	a) Scabies (Gurung, 2002) b) Skin diseases (Joshi and Edington, 1990)
41	<i>Melia azedarach</i> L.	Anti-lice	Bone fracture (Devkota, 2003)
42	<i>Mentha spicata</i> L.	Appetite	Neuralgia, indigestion, diarrhoea, carminative and stimulant (Joshi, 2001)
43	<i>Nardostachys grandiflora</i> DC	Stimulant, tonic, digestion, headache	a) Antispasmodic, stimulant, topic, convulsion, fits, palpitation of heart, constipation, urination, menstruation, digestion, digestion (Bhattacharjee, 1998) b) Aphrodisiac, purgative, stomachic, piles (Chettri 1999)
44	<i>Neopicrorhiza scrophulariifolia</i> (Pannell) Hong	Cough, fever, abdominal pain, cuts and wounds	a) Stomachic, purgative, fever, stomachache, dropsy, cough and cold (Manandhar, 2002) Fever and gastralgia, abdominal pain, liver complaints, anemia and jaundice (Joshi, 2001)
45	<i>Nicotiana tabacum</i> L.	Earache	a) Diuretic (Gurung, 2002) b) Antispasmodic, scorpion sting, emetic, sedative (Anonymous, 1970)
46	<i>Paris polyphylla</i> Smith	Cuts and wounds, snake bite, abdominal pain, diarrhea	a) Constipation, gastritis, snake bite, cuts and wounds, cholera

			(Gurung, 2002) b) Anthelmintic (Manandhar, 1986)
47	<i>Phytolacca acinosa</i> Roxb.	Diarrhoea	a) Narcotic effect (Joshi, 2001) b) Purgative (Bhattacharai, 1989a)
48	<i>Piper mullesua</i> D.Don	Fever, asthma, cough	Cough and cold (Manandhar, 2002)
49	<i>Polygonum molle</i> D.Don	Diarrhoea, dysentery	a) Diarrhoea (Pohle, 1990)
50	<i>Psidium guajava</i> L.	Dysentery, wound, diarrhea	a) Bloody dysentery, diarrhea cuts and wounds (Gurung, 2002) b) Diarrhoea and dysentery, antispasmodic, swollen gums, fever headache (Manandhar, 2002) c) Stomach complaints (Manandhar, 1985)
51	<i>Rheum australe</i> D.Don	Bone fracture, internal injury, diarrhea, dysentery, cuts and wounds.	a) Internal injury, headache (Joshi, 2001) b) Blood disorder, sore-throat, cuts, bone fracture (Chettri, 1999)
52	<i>Rhododendron arboretum</i> Sm	Fish bone into the neck	a) Throat problem due to fish bone (Gurung, 2002) b) Diarrhoea (Bharrarai, 1993) c) Headache, rheumatic pains (Joshi & Edington, 1990)
53	<i>Rhus javanica</i> L.	Diarrhoea and dysentery, stomach complaints	a) Cholera, diarrhea (Gurung, 2002) b) Paralysis, colic and diarrhea (Anonymous, 1970)
54	<i>Rubus ellipticus</i> Smith	Gano, cough and cold, kufat	a) Kufat, tonic, wound filling, snake-bite (Gurung, 2002) b) Chicken pox (Manandhar, 1990)
55	<i>Rumex nepalensis</i> Spreng	White leprosy, bone fracture, stomach pain, cuts and wounds	a) Fungal infection, itching (Gurung, 2002) b) Chicken pox (Manandhar, 1985) c) Cuts and wounds (Joshi and Edington (1990)
56	<i>Schima wallichii</i> (D.Don)	Stomachache during menstruation	a) Viral infection of nose, scorpion-

	Korth	cycle.	bite (Gurung, 2002) b) Skin cracks, fissures (Manandhar, 1989a)
57	<i>Smilax aspera</i> L.	Skin diseases	a) Fungal infection (Gurung, 2002)
58	<i>Solanum aculeatisissum</i> Jacq.	Toothache	a) Toothache, intestinal worms (Gurung, 2002) b) Teeth worms (Manandhar, 1989a)
59	<i>Solanum nigrum</i> L.	Cuts and wounds, fever	a) Wounds, eye problem (Manandhar, 1986a) b) Rheumatic, skin diseases (Joshi and Edington, 1990)
60	<i>Solena heterophylla</i> Lour.	Fever, intestinal worm	Throat pain (Bhattarri, 2000)
61	<i>Swertia chirayita</i> (Roxb.ex Fleming) Karst.	Cold and cough, fever, abdominal pain	a) Tonic, dyspepsia (Anonymous, 1997b) b) Malaria, pneumonia, fever, abdominal pain (Devkota, 2003)
62	<i>Taxus wallichiana</i> Zucc	Skin cracks, fissures, anti-cancer	a) Anti-tumor, anti-cancer (Malla et.al, 1998) b) Antispasmodic, asthma, bronchitis, bows (Bhattacharjee, 1998)
63	<i>Thallictrum foliossum</i> DC	Stomach problem	a) Intestinal worm (Devkota, 2003) b) Ophthalmic, febrifuge, diuretic, purgative, earache, boils and pimples (Manandhar, 2002)
64	<i>Urtica dioica</i> L.	Mental disorder, fever, stomach disorder	a) Hand and foot sprain, skin allergy (Devkota, 2003) b) Uterine bleeding (Joshi and Edington, 1990) c) Anthelmintic (Mannandhar, 1995)
65	<i>Viola pilosa</i> Blume	Boils	Boils, abdominal pain, ringworm

			(Devkota, 2003)
66	<i>Zanthoxylum armatum</i> DC	Gastritis, headache, indigestion, appetite	a) Vomiting, bloat and tympanites, gastritis (Gurung, 2002) b) Stomach disorders, cholera (Joshi and Edington, 1990) c) Digestive (Chettri, 1999) d) Anthelmintic (Manandhar, 1993)

Appendix-VI
Photographs

Photo plate no. 1: Some important NTFPs available in the Sikles Area



1. *Aconitum gammiei*



2. *Allium wallichii*



3. *Arisaema tortuosum*



4. *Asparagus racemosus*



5. *Bergenia ciliata*



6. *Betula utilis*



7. *Dactylorhiza hatagirea*



8. *Dioscorea bulbifera*

Photo plate no. 2: Some important NTFPs available in the Sikles Area



1. *Nardostachys grandiflora*



2. *Paris polyphylla*



3. *Pedicularis scullyana*



4. *Rhus javanica*



5. *Rubia manjith*



6. *Swertia chirayita*

Plate no. 3: Some NTFPs products



1. Janto (*Handle-Taxus wallichiana*)



2. Dhiki (made from *Prunus cerasoides* & *Quercus glauca*)



3. Agricultural implements



4. Local making a traditional plough
(made from *Elaeagnus latifolia*)

Photo plate no.4:

***Nigalo*: Types**



1. Arundinaria maling (Malingo Nigalo)



2. Drepanostachyum intermedium (Tite Nigalo)



3. Thamnocalamus aristatus (Ghunde Nigalo)

Photo plate no.5:

***Nigalo*: Processing**



1. Local doing Nigalo work (Stripping)



2. Local weaving Nigalo fence



3. Local weaving *Syakhu* (Nigalo umbrella)



4. Local weaving *Doko*



5. Local weaving *Bhakari*



6. Local weaving *Mandro*

Photo plate no.6:

Nigalo: Products



1. Nigalo roof



2. Nigalo products (*Doko, Dalo, Thunse, Raage, Mandro, fence*)



3. *Dalo* (Basket)



→ *Syakhu*

→ *Bhangro*

4. Local with *Syakhu* (*Nigalo* product) & *Bhangro* (*Allo* product)

Photo plate no: 7
Allo: Plant sp, Processing



1. *Girardinia diversifolia*



2. Beating and washing for obtaining fibre from the plant



3. Sun drying of the fibre

Photo plate no: 8
Allo: Processing



1. Fibre teased apart



2. Spinning



3. Woman using a lightweight hand-spindle for weaving