

**A STUDY ON YARSAGUMBA COLLECTION
IN DOLPA DISTRICT OF NEPAL**

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LETTER OF RECOMMENDATION

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LETTER OF APPROVAL

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ABBREVIATIONS/ACRONYMS

ANSAB	Asia Network for Sustainable and Agriculture Bio-resources
ASL	Above Sea Level
BPP	Biodiversity Profiles Project
BS	Bikram Sambat
CBOs	Community Based Organizations
CBS	Central Bureau of Statistics
CEDECON	Central Department of Economics
CF	Community Forest
CFUG	Community Forest User Group
DDC	District Development Committee
DFO	District Forest Office
FY	Fiscal Year
GDP	Gross Domestic Product
GO	Government Organization
HMGN	His Majesty Government of Nepal
INGO	International Non-Government Organization
Kg	Kilogram
KIS	Key Information Survey
MAP	Medical and Aromatic Plant
MFSC	Ministry of Forrest and Soil Conservation
NBS	Nepal Biodiversity Strategy
NTFPNN	Non-Timber Forest Product Network of Nepal
NGO	Non-Government Organization
NTFP	Non Timber Forest Product
YG	Yarsagumba
WWF	World Wild Life Fund

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

More than 65% Nepalese are actively engaged in farming activities for meeting basic needs (CBS, 2012). Being an agrarian country, forest resources play an important role in the rural community livelihood in Nepal. Besides fulfilling basic needs, forest and its product generate income and employment in rural community. If rural people are made aware the important of forest and forest resources, and the forest resources are mobilized, they will be self-reliant in forest products. They could as well enter a new era of forestry for rural development.

Forest is one of the important natural resources of Nepal that is directly related to the livelihood of rural people. The country comprises around 41 million hectares of fertile which is 27.89% of total land area, 58.28 million hectares of forest which is 39.60% of total land area, 17.66 million hectares of grassland (12% of total land area), 30.91 million hectares of farmland (21% of total land area), and about 10.30 million hectares of uncultivated inclusions (7% of total land area) (HMGN, 2013).

Livelihood mountain people largely depend on the collection and trade of medicinal and aromatic plants (MAPS) and other non-timber forest products (NTFPS). Importance of Nepali MAPS can be manifested by three ways. Firstly, wild medicinal plants are an important part of local health care system due to poor access to modern health amenities. Secondly, trade of MAPS as raw and processed material to medicine producers and the perfume industry crucial income to rural collectors. Thirdly, MAPS are an important part of the species richness of Nepal. Nepal has revealed that more than 50% of the household in every village are involved in collection of MAPS for sale since last 15 years, there is growing interest to study medicinal plants in search of new medicines backing up to traditional practice (Ojha, 2000).

The Himalayan inhabitants have used plants since many hundreds of years. Medicinal plants are found wherever in Nepal. NTFPs are crucial for the rural livelihood and for their contribution for government or national treasury. It is also source of folklore medicines or unique method of health care of almost 90% of population in remote and rural area. The usage of many more national products in day-to-day life of public shares its importance in Nepalese economy (Lintel, 2000).

Yarsagumba is one of the high value low volume organic Himalayan medicinal herbs with increasing international market thereby contributing significantly in the local economies of the mountain people. First discovered by yak herders in the Himalaya of ancient Tibet and Nepal Yarsagumba has been or mysterious creature with appearance of half-caterpillar half-mushroom. Yarsagumba is rare but highly valuable medicinal plant Yarsagumba more especially (sinsness) is the top most valuable non timber forest product of Nepal Himalaya. It is highly demanded in national and international market and fetches the highest price running from NRs.150000 to NRs.500000 lakhs per kg. Yarsagumba is a costly medicine commonly used in China. Chinese used for life aging tonic and to treat, kidney, lung and heart ailments, male and female sexual dysfunction, fatigue, headache, toothache, cancer, hiccups and serious injury to relieve pain and the symptoms of tuberculosis and hemorrhoids to restore general and appetite and to promote longevity (DFO of Dolpa, 2067)

Yarsagumba is endemic to Tibet plants are including the adjoining high altitude are of central and east Himalayan (Nepal, Bhutan and India such as Sikkim, Uttarakhand, Himachal, and Uttanchal Pradesh). It's generally habitant is considered in countries of central Himalayan such as: India, Nepal, Bhutan, Tibet, China etc. The species famous as the gold rush of Nepal has its niche at alpine meadows/pasture above 3500m altitude. Its distribution is limited areas with an average annual precipitation above 3500-4500m. In general it is not found in below 3000m area. Secondary sources reveal that Yarsagumba is available mostly in central

and western Himalayan of Nepal. Especially in Dolpa, Darchula, Mugu, Jumla, Rukum, Bajhang, Dhading and Rasuwa districts (Dhakal, 2063).

Some of the eastern Himalayan districts of Nepal stricken with acute poverty may also owe the potential for commercial extraction of Yarsagumba however exploration of availability of the species is still warranted. Since the last few years Yarsagumba has become a significant source of livelihood of mountain people especially in western region of Nepal. From various sources has completed that trade of Yarsagumba has reached to almost NRs.8 million from along in 2063 BS. Scientific management for sustainable collection and marketing of this product is now felt necessary for livelihood importance of mountain people recognizing its high value in term of international marketing additional properties and contribution to local socio economics. Nepal Government has shown commitment for the resource management through legal reformation. This study with a review to explore the recourse statues collection potential marketing trade channel indigenous uses and to list out management or utilization problem including legal constant to put forth policy recommendation for sustainable management of the resources. Particularly, Dolpa district has been a top most collection center in the country. Most of the area of Dolpa has been covered by sedimentary rock, mica schist, grass land, snow and *bhir*. This district is known as Trans-Himalayan Zone and Cold Desert. The geographical feature of this district is the Country of Rolling Hills and Cosmic Activities Free. Though the area of plants and grass lands occupy less than 10% of the total land, Dolpa district has provided an important measure of herbal resources (Dhakal, 2063).

Series of Himalayas of Nepal, a country rich with biological diversity, considered to be famous in the world many kind of rare/scarce and important herbs from the ancient time. The main income source of local people of hilly and mountain region is collection and selling of herbs that have important contribution in rural and national economic development. Yarsagumba is an important herb among the herb, which have high trade in Nepal. The living cost of the mountain people of Himalayan region, where Yarsagumba is found, to from the

collection in and selling of Yarsagumba. Among the total of revenue NRs.1695592 collection from the selling of the herbs of forest product in Darchula. But only selling of Yarsagumba, NRs.929500 revenue was collected in fiscal year 2063-64, which was 54.82% of total revenue. Ape and Nampa are the famous Himal of this district (Devkota, 2011).

The main income source of local people of hilly and mountain region is collection and selling of herbs that have important contribution in rural and national economic development. Yarsagumba is an important among the available herbs which has got cumulative transaction in Nepal. The living cost of the mountain people of Himalayan region where Yarsagumba is found, to from the collection in and selling of Yarsagumba. The revenue from Yarsagumba has been increasing extremely recent past years which is proved by the actual occurred revenue is NRs.8720000 in 2009. NRs.29732346 was collected from the selling of the herbs of forest product in Dolpa for last 10 years which is so much low income comparatively (Devkota, 2068)

Cordyceps sinensis is the scientific name of the Yarsagumba, a medicinal herbs. The Tibetan name of Yarsagumba is (dbyar rtswa dgun bu) literally means “summer grass winter warm”. Yarsa means semi animal and Gumba means semi herb. Yarsagumba has been known by various names such as Yartsa Gunbu in Tibet, Dong Chong Xia Cao in China, Caterpillar fungus in English, *Cordyceps* in Botanical Term, Totus kasu, Tochukasu in Japanese.

1.2 Statement of the Problem

Developing countries in the world including Nepal are affected by vicious circle of poverty. More than 65% Nepalese are engaged in agricultural sectors and income level of such people is declining. So to break down such type of vicious circle of poverty, of country has to raise the income level of the people. There is no any dilemma that the Yarsagumba has been playing crucial role for the economic process. However, the main occupation of people in Dolpa is agriculture which is hardly sufficient for 3 to 6 months in an average. Besides the income source from agriculture, Yarsagumba is the main alternative source of income.

Since the last few years, Yarsagumba has become a significant source of livelihood of the mountain people especially people of the central and western Himalayan of Nepal. People of Dolpa call the medicinal herb as Yarsagumba, Kira, Jara, Jeevanbuti etc. commercial collection of Yarsagumba in Dolpa has been started from 1987 A.D. (2044 B.S.). Yarsagumba is the one of the high value organic Himalayan medicinal herb. It is one of the major exposable cash productions of the mountain area. There is high demand of Yarsagumba in international market.

There is no predicament that Yarsagumba is one of the main livelihoods for Dolpali people. There are some researches works done by DFO Dolpa, and other different researcher in different time. Most of these literature talk about its ecology, development, life cycle, availability, collection trend, trade and economic value, etc. But there were not talk about the contribution of Yarsagumba in household welfare with likening collectors and non-collector household in terms of their socio-economic status, household level participation status, their collection and trading status in different years, and their annual income and expenditure pattern, etc.

The research presented here addressing some issues of Yarsagumba collection. In Dolpa district, almost 90% households are participating Yarsagumba collection in every year. But, remaining around 10% households are not participating in Yarsagumba due to their low human resource, lack of knowledge, awareness, poor economy, local level barriers etc. The study tries to analyze the socio-economic variation between collectors and non-collector household by analyzing their annual income pattern from different sources and expenditure patterns in different sectors. The Yarsagumba collectors and non-collectors households welfare measured in terms of local uses of Yarsagumba for medicine and other, their annual income from YG and other sectors, their expenditure patterns like education, health/treatment, food purchasing, clothing, purchasing for fix assets (solar system, ornament, house, land) etc.

1.3 Objectives of the study

The general objective of the study is to show the contribution of Yarsagumba in Dolpa district of Nepal. The specific objectives include:

1. To study the socio-economic status of local people who are engaged in Yarsagumba collection.
2. To find out the impacts of Yarsagumba collection on the rural livelihood in Dolpa district.
3. To study the collection trend of Yarsagumba, market chain and participation status of local people in collection of Yarsagumba.

1.4 Significance of the study

Nepal has been trying to achieve sustainable development through conservation and sustainable use of the natural resources. The forestry sector has been always receiving priority in every national level plan during last four decades. Since the last decade, the “Master Plan for the Forestry Sector 1988” has been implemented by HMGN to meet the people’s need of forestry based products. Keeping in view the conservation aspect, land productivity and biodiversity, and promotion of medicinal and aromatic plants processing (HMGN, 2007).

Nepal has a great potential in the development of medicinal plants like Yarsagumba is an economically valuable species of country with the potential to contribute to national economy and uplift the economic condition of the rural people. However, forest managers and policy makers still know little about the production, processing and marketing of this valuable product. Although Yarsagumba has been used in China traditionally as medicine for past 2000 years but in Nepal it has been collected and sold in mountain districts people for only last 15 years (Gurung, 2003).

Yarsagumba is species out of 30 national prioritized species decided by Medicinal Plants and NTFP Coordination Committee on 14 March 2003. The ecological area of Yarsagumba lies in high mountain zone between 3500-5500m asl. The physiographic and climate of this zone in

Nepal is very harsh. Little or no attention has been paid by government official for its proper management of by the resources for its study. Yarsagumba gets frequent publicity in many newspaper and publications but a systematic study of Yarsagumba in Nepal is lacking. The present study is important to access the role of Yarsagumba in rural livelihood from income of Yarsagumba trading and consequences to forest diversity due to Yarsagumba accumulation. The study has accessed the understanding of local people in ecological aspects of Yarsagumba, the trend of participation of rural people in Yarsagumba accumulation, the trend of accumulation amount of Yarsagumba. The trend price of obtained by accumulators since 1998-2008 and price of Yarsagumba at different stake holder levels was also recorded the present market channel of Yarsagumba Dolpa was determined with active participation of accumulators and local traders. The role of Yarsagumba in rural livelihood has been accessed in different livelihood assets especially physical and economical. The consequences to forest diversity due to Yarsagumba collection was based on experiences of the collectors.

This study will help to understand the basic thing as below:

1. The role of Yarsagumba in increasing income in rural areas and national income.
2. The future prospects of Yarsagumba collection, trade and its sustainability.
3. The facilities to be promoted to Yarsagumbacollectors by government and other CBOs.
4. The significant relationship between total production and export of Yarsagumba in Nepal.

1.5 Limitations of the study

There was very limited time for the present study and the study site is located in very remote district of Nepal. The accessibility to Yarsagumba accumulation site was very poor and duration of availability was very short. In national context, Dolpa district falls under poorest districts of Nepal, so wealth ranking class, i.e. rich, medium and poor considered for this study may not be representative in the national context.

The limitation of this study are as below:

1. This study is concerned with collection activities of Yarsagumba in Nepal especially in Dolpa District and the result may not be generalizable to other parts of the country.
2. Since the non-collectors household were very limited in number, a study area with better representation of the both types of household would be better. But due to the limited resources and time, this study is limited to five village development committees of Dolpa.
3. Data analysis regarding the market price in the current year is based on the last year's market price.

1.6 Organization of the Study

The present study is divided into five chapters the first chapter deals with introduction of subject matter. The second chapter deals with the research review of literature. Third highlights the research methodology. Fourth chapter includes the analysis and interpretation and finally summary, conclusion and recommendation are dealt in fifth chapter.

CHAPTER-TWO

REVIEW OF LITERATURE

2.1 Theoretical Literature Review

Non timber forest products (NTFPs) are defined as biological resources of plant and animal origin, harvested from natural forests, plantations, wooded land and trees outside forests. NTFPs are also classified as minor, secondary, and non-wood forest products, signifying a variety of wild, produced as (semi-) domesticated plants in plantations and agroforestry systems, or in distinguishes NTFPs from agricultural products is the wild or semi-domesticated mode of production.

The official forest sector has perceived NTFPs as commodities with marginal economic contribution and their significance in all aspects of forest management had been neglected. However, global attention to NTFPs has recently increased, mainly due to two factors: 1) their compatibility with environmental objectives, including the conservation of biological diversity and 2) their contribution, not only to household economies and food security but to national economies as well

An indication of the socio-economic importance of NTFPs is the fact that 80% of the developing world population meets health and nutritional needs by using NTFPs. Several million households world-wide depends on NTFPs for subsistence consumption and / or income. NTFPs provides raw materials for large-scale industrial processing including raw materials for medicines, paints and polishes. There are at least 150 NTFPs that contribute substantially to international trade, including honey, gum arabic, rattan and bamboo shoots, cork, forest nuts and mushrooms, oleoresins, essential oils, and plant or animal parts for pharmaceutical product (FAO, 2013).

Current high international profile and demand of Yarsagumba developed only sometime in 1993 when many Chinese long distance runners broke world records. There was the initial suspicion of the use of performance enhancing drugs but this was unfounded. The Chinese

instead boasted of taking Cordyceps, and it was then “presented in the popular press as a “wonder herbal”, and the last ten years has seen an increase in its market”. There has been extensive research undertaken on all aspects of the species, particularly identifying, isolating and culturing active compounds and running clinical tests. Yarsagumba is consumed mixed with rice flour in boil milk. Traditionally, it has been consumed with a variety of meats of chicken, duck and pork in the form of a medicinal soup; it also used as honey and cow’s milk for tonic and aphrodisiac.

The health efficacies of Yarsagumba are observed and tested in asthma, allergic rhinitis, poor renal function, renal injuries, coughing, poor resistance of respiratory tract, regulating blood pressure (high and low blood pressure), anti-aging, weakness, the declining of sex drive, lowering raised blood lipid levels, strengthening the body’s immunity, poor function of lungs and kidneys and in irregular menstruation (Zhu et. al., 1998).

The trade in Medicinal and Aromatic plants. Every year 10,000 to 15,000 tons of NTFPs are harvested from forestland in Central Himalayan Region of Nepal and traded to India. A limited trade of Yarsagumba flows from the High Himalayan of Nepal into Tibet and China and is extremely valuable throughout the south and central Asia (Edwards, 1996).

Non-Timber Forest Products (NTFPs) are being increasingly recognized for their role in rural livelihoods, biodiversity conservation and export values. The market of NTFPs is expanding, and this is an opportunity and challenge for a more sustainable, efficient and equitable use of NTFPs resources. However, unsustainable harvesting, inequitable benefits distribution and overall economic inefficiencies are the problems of the current NTFPs practices (Ojha, 2000).

The historical background of YG, which was discovered about 1500 years ago in Tibet by herdsmen who observed that their livestock became energetic after eating a certain mushroom. About 1000 years after, the Emperor’s physicians in the Ming Dynasty learned about this Tibetan wonder and used this knowledge with their own wisdom to develop powerful

and potent medicine. Initial records of Cordyceps as medicine date from the Qing Dynasty in China in 1757 (Sharma, 2004).

Yarsagumba found in high mountains and hilly areas, which is a major source of rural people. The study is an attempt to various aspects related with Yarsagumba and analysis the effects of Yarsagumba bring on the economic status of local people. The book about Yarsagumba collectors, traders and its average product of Darchula. Study also deal about processing, harvest and its market chain in Darchula. Yarsagumba is main source rural mountain people; about of 21022 households 4500 households are involved in collection of Yarsagumba in 2008. The study focus on among the total revenue collected from the sailing of herb and forest product 54% revenue was collection by sailing from Yarsagumba in Darchula. The study also describe about the impact of Yarsagumba in rural livelihood. Besides them, the study deal its collection problem and its likely prospects are offered in conclusion and suggestion (DFO of Darchula, 2008).

Government of Nepal tries to control the illegal trade by enforcing Nepal Gazette and Regulation at different times. The medicinal and aromatic plants are highly exploited in the mountains and traders take advantage of poverty of local people. The Department of Forest tries to control illegal trade and allows sustainable harvesting of some species with special permits (HMGN, 2002).

Nepal Biodiversity Strategy Ministry of Forest and Soil Conservation published the main principle of Nepal Biodiversity Strategy (NBS) for poverty alleviation, economic and social development in to develop an effective mechanism for the sustainable use of biological resources and the conservation of biodiversity in rural areas of Nepal. The forest products have to be utilized in forest-based enterprise without depleting the forest in relation to biodiversity conservation and sustainable resource management (HMGN, 2002).

The fungus was banned for export in crude form. Processed products could be exported after proper certification and permission from the Department of Forest (HMGN, 2002). At

present as per the Ministry of forest and Soil conservation notification Nepal Gazette vol. 54, section 3, no. 25 dated BS 2061/6/18 (Oct 4th, 2004) there is no requirement of processing (steaming and packaging) for export of Yarsagumba. The HMGN present royalty rate for YG is NRs.20,000 per kg. Due to high royalty rate and lengthy legal procedure, the valuable product is traded illegally. To control the illegal trade of this product, action has been taken to decrease royalty of the product. Remote Area Development Committee has submitted, their suggestions to decrease royalty rate by the respective authority. The proposed royalty rate is NRs.5,000/- per kg. But the approval is awaited. Under the Forest Act, 1993 YG is considered as an endangered species, though it is not yet included as an endangered species by the IUCN, CITES and BPP (HMGN, 2004).

The Chinese attribute the athletes' success to their intense training schedules rather than to their dietary supplements, the possible stress-relieving properties of the record track performances by Chinese women runners rocked the track world and received considerable press coverage in the U.S. and elsewhere. The Chinese coach attributed his athletes' success to hard work and drinking large portions of an expensive potion made from the rare dong chong xia chao (Yarsagumba). It strengthens the lungs and enhances the power of virility (Pegler et al., 1994).

Yartsa Gunbu defines as *Cordyceps sinensis* is a fungus parasitizing the larvae of a moth of the genus which lives in alpine grasslands of the Tibetan Plateau. Collection and trade of the caterpillar fungus is one of the most important sources of income for pastoral Tibetan communities. Tibetans know the fungus as “Yartsa Gunbu”, “summer grass-winter worm”, and of the derive over 50% of their annual income from its collection in spring and summer. Written records in Tibet data back at least 500 years, but the market is driven by Chinese consumers, who know it as chongcao (dongchong xiacao), a highly valued tonic in Traditional Chinese Medicine (Winkler, 2005).

At the collection time of Yarsagumba, local people take the permission for collection from concerned authorities, i.e. Community Forest user Groups by paying royalty NRs.200/- as entry fee. Traders pay NRs.5,000/- royalty for per kg. YG and collects YG from local people. The market price of YG is NRs. 1 to 1.5 lakh per kg. There was a loss of millions of royalty to government of Nepal due to illegal trading of YG. The trading of YG was being done at very low price in Darchula district (Dhami, 2004).

During the collection period, household members go for collection, only child and elder people live in villages. Most members of household camp out at the pasturelands, turning the hunt into a joyful event. In addition, some people go to collection site to serve double purpose of trading grocery items and participation in collection. At that time school are closed informally (Giri, Kosheli 2008, 2004).

2.2 Empirical Literature Review

There are different kinds of Mushroom species situated in Nepal. The Nepalese mycodiversity includes 80 families, 585 genera, 18822 species, 2 new genes and 150 new species. The fungus cordyceps sinensis (YG) is known as walking herb. The parasite fungus grows on the head of caterpillar commonly distributed in the central Himalayan region in the sub alpine regions between 4000-4500m (Adhikari, 2000).

Nepal has a wealth of biodiversity in non-timber forest products (NTFPs) because of its various altitudinal zones and diverse ecosystems. They are harvested not only from forest, but also pasture areas, grasslands and fallow fields. For the marginalized farmers, the biodiversity of the non-farm environment has vast utility consisting of not only timber for building, and fodder for livestock, but also many valuable nutritional, medicinal, economic (subsistence and cash), religious and cultural resources (Daniggelis, 1994).

The biodiversity is often different to value in monetary terms because we still do not know all the parts that may be useful to us. Biodiversity provides directly and indirectly the material basis of human life. The optional value of biodiversity can be grouped under three

value of biodiversity can be grouped under three broad categories, utility, function and beauty (Beattie, 1995).

There were no plants have been used by the Himalayan inhabitants since many hundreds years. Medicinal plants are founded wherever people live. The number of those plants is very large; about 10 percent of the plants all over the world or 30,000 species were considered medicinal ones. Plants produce many kinds of organic compounds as secondary metabolites, which have been used as medicines and as useful chemicals for our daily life (Watanable, 2000).

The Forest Act, 1993 and Forest Regulation, 1995 provide regulatory framework for NTFP trade in Nepal. In Community Forest, there is the provision that CFUGs can manage and utilize forest products including NTFPs in accordance with an approved operational plan. The steps for the collection and trade as given in figure 2 look quite simple but are very difficult to follow in practice. A lot of bureaucratic harassments are faced at every step, such as during checking and endorsement, issuing release order, during transportation etc. (Luintel, 2000).

According to the World Health Organization (WHO) report about 80 percent people who are living in the remotest area of the country are still dependent on the traditional medical treatment practices. YG is a non-toxic medicinal plant used as tonic and aphrodisiac and is generally collected for trade. YG helps in secretion of sexual hormone; there for, the ancient medical practitioners recommended this fungus. It also founded effective in reducing the aging effect in human beings (Lama et al, 2001).

The Asia Network for Sustainable Agriculture and Bioresearches (ANSAB)'s assessment of YG in 2003 has stated that the annual production possibility of YG in Darchula district is more than 1000kg. there might be possibility of increment in production rate annually. The annual collection of YG was 500 kg in Dolpa, 300 kg in Jumla, 200 kg in Humla, 200 kg in Kalikot and 250 kg in Darchula (Regmi, 2003).

Yarsagumba in year 2001, collectors got NRs. 18 per price of YG, which was later sold by local traders at the rate of NRs.120,000,00 per kg, i.e. NRs.34.28 per piece. While collectors got an average of NRs. 22.5 and 24.5 per piece of YG in year 2002 and 2003, respectively, the local trader sold it at a rate of NRs.90,000 and 1,05,000 per kg, in year 2002 and 2003, respectively. According to the trader, in 2002 they had lost more than four lakh rupees due to lack of proper packing resulting in slight damage of about 4 kg of this valuable product and consequently reduced the price. However, in year 2003 the Tibetan Traders called Khamba arrived in Manang and bought all the products (Gurung, 2003).

The economic status of mountain people is vulnerable. In Nepal, where there is food scarcity and poverty, the caterpillar fungus (YG) plays important role in the enlistment of communities. This fungus is a valuable source of income in mountain districts of Nepal (Gautam and Karki, 2003).

Yarsagumba is an association of fungus (*Cordyceps Sinensis* (Brek) Sacc.). In addition, insect larva of *Hepialus armoricanus obertheimeri*. The larva hibernates underground in winter and the spore of the fungus enters the body of the larva, feeds on it, and cause its death. The spore of the fungus grows out from the anterior end of the larva and comes out of the ground like a little grass during the monsoon period. It is club-shaped with dark brown fructification and yellowish white stalk. YG is an interesting fungus, which resembles a worm, was discovered 2000 years ago in the Tibetan mountain pasture by Chinese herdsmen has been used as medicine in the Far East. YG Chinese practitioners were able to develop a powerful medicine using YG. They found that it has a sweetish taste and a warm character (Gurung, 2003).

Yarsagumba has a good international market and is an important source of foreign exchange. Initially the collection of this product was totally banned under the forest Regulation, 1995 and forest Act, 1993. The initial royalty rate was NRs.500 per piece and only processed product could be exported. The collector had to pay NRs.15000000 to 20000000 per kg of caterpillar fungus to the forest department as royalty. The forest regulation stipulated that only

the processed YG could be exported. However, the form of processing in this regard was not clear at all (Kanel, 2003).

Yarsagumbo is distributed in temperature to alpine regions of the central and western part of Nepal between 3000-6000 m. It is commonly found in Karnali zone of Nepal; this zone includes Dolpa, Jumla, Humla and Kalikot districts. In 1952, the members of British Museum of London first collected it from Jumla during their vegetation collection and research period. Apart from this, other districts such as Darchula, Bajhang, Bajura, Doti, Manang, Jajarkot, Rukum, Gorkha, Rasuwa, Sindhupalchowk, Solukhumbu, and Taplejung also have their distribution. YG is usually collected in the month of May and June before yak and sheep herb graze over the places (Chaudhary, 2004).

The Yarsagumba is the main source of mountain people. Its demand was increasing international market there by contributing significantly the local economies of the mountain people in Darchula. The study focuses on the market chain of Darchula, wherever it is the main supply center of YG. It is concluded that sustainable production and trading of YG has become instrumental part for the socio-economic enlistment of rural community as well as country. YG is an economic species, which is contributing a significant amount in nation economy of Nepal. The main objective of this study was to assess the impact of YG income on rural livelihood and consequences on forest biodiversity due to YG collection.

Yarsagumba, an insect born fungus, results from parasitism of the fungus *Cordyceps Sinensis* (Brek) Sacc, non-larva of moth of Hepialidae. These moths quest for mating partners during blossoming, lay eggs in the soil after courtship and die. Approximately a month later the eggs hatch to white and freshly larva, which feels hungry and eats many green grasses. During this process, *Cordyceps* fungus parasite finds its way inside the body of the larva and hibernates. During monsoon, the fungus bursts out of spore sac of fructification of the YG. As winter comes near larva covers its body surface with a thin white layer of substances to prevent from cold in winter. During late spring or early summer of the following year, the external

appearance of the larva remains unchanged though the parasitic fungus consumes all nutrients and starts to grow in larva's abdomen. As the white larva bodies changes into yellow color and then when his changed color cover the whole body, the fructification comes out from the anterior end of the larva and late from the ground like grasses. Till the fructification sprouts out, the larva remains alive and can move within the soil (Chhetry, 2005).

The Yarsagumbais important component of rural livelihood, as they play critical role in natural economy and help sustain livelihood of many rural households that include socially and economically disadvantaged groups. Most of the people in these groups collect and sell forest products to meet their hand to mouth. The explain about uses practice, harvesting methods, harvesting techniques and impact of over grazing, soil analysis, and, YG collection and its socio-economic impact in Dolpa district (Devkota and Anil, 2006).

It is concluded that Nepal has wide altitudinal variation and diverse climatic conditions within a small areas made the physiographic of the country interesting and attractive in the world. Therefore, it has a wealth of biodiversity in NTFP because of its various altitudinal zones and diverse ecosystems. It is very difficult to value in monetary term, because we do not know all the parts that may be useful to us.

Plants have been used by the Himalayan inhabitants since many hundreds years. The usage of many more natural products in day-to day life of public shares its importance in Nepalese economy. Since the last few years, YG has become a significant source of livelihood of mountain people, especially in the central and western Himalaya of Nepal. Scientific management for sustainable collection and marketing of this product is now felt necessary for livelihood improvements of mountain people. Recognizing its high value in terms of international market demand, medicinal properties and contribution to local socio-economy. Government of Nepal has shown commitment for the resource management through legal reformulation.

Theoretical study focuses the historical background of YG. In China it's used many years ago. It had been used in different disease Mountain areas, where there are food scarcity and poverty, YG play important role in the enlistment of communities. Yarsagumba is valuable source of income in mountain districts. Yarsagumba collected in the month of May and June before yak and sheep herb graze over place.

There are some studies about Yarsagmba done in various viewpoints. But this kind of study has not done yet specially in Dolpa district in socio-economic perspective of YG in local communities. District represents one of the poorest and disadvantaged communities of Nepal. The study site is best suited for assessment of the impact of YG on the livelihood of rural people. This district is recognized as a very fertile district for the YG production (among the total 23 VDCs, 18 VDCs are YG fertile) and this district representative of the mountain districts of Nepal. Local people have experiences of more than 7 years in YG collection and trading. A recording of their experiences would be beneficial for all the stakeholders for further improvement and development of the YG collection in systematic way. So this study also plays the crucial role to know the socio-economic status of local people. And find out the impact of Yarsagumba of rural livelihood, collection trained, market chain, price variation and participation status etc. in Dolpa district.

CHAPTER-THREE

DATA AND METHODOLOGY

3.1 Research Design

The study is exploratory and participatory in nature. Firstly, I've designed the questionnaire with the help of Prof. Mr. Mani Kumar Nepal and visit the HHs of the district. The research work has been carried out with active participation of the local people of Dolpa district. The criteria for respondent person were prepared with the active participation of different HHs of 5 VDCs (namely; Tripurakot, Liku, Pahada, Sarmi and Narku) of the district. This study describes the socio economic status of collectors and non-collectors households, the past and present status of YG collected/ harvested quantity, social and environmental impact of the collection, status of the market and market chain. This study has also assessed and explored the role of YG in rural livelihood. The after effect on forest biodiversity due to the collection of YG has also been assessed.

3.2 Nature and Source of Data

3.2.1 Nature of Data

Both quantitative and qualitative data were collected for the purpose of this study. This study successfully accomplished with the help of primary and secondary data; interview with different qualitative and quantitative questionnaires and articles, publication, journals and other websites

3.2.2 Source of Data

The primary data required for this study were taken from YG collectors non-collectors using a questionnaire survey at household level. Other information was obtained from, Tripurakot, Liku, Pahada, Sarmi, Kalika and other VDCs in Dolpa, DDC of Dolpa, DFO of Dolpa, local traders, porters, social workers, key informants, NGOs and GOs.

The secondary data were taken from different publications, such as Yarsagumba collection and management in Dolpa this of DFO Dolpa, Employment Generation and

Economic Up-scaling from Collection and Trade of Yarsagumba (*Ophiocordyceps sinensis* Berk.) in Nepal (A Case of Dolpa District), this of Raju Chhetri and Bharat Gotame, Yarsagumba and Darchula, this of Raju Chetri, Shiva Devkota and Anil Shrestha, WWF annual reports in Dolpa district, Kantipur Koshali, Yarsagumba Parichaya published by Prakashan Griha, different publication like as progress reports of DFO Dolpa, other published and unpublished journals, articles, conference papers, research papers, websites and other sources.

3.3 Sampling Procedures

Household has been taken as the unit for the present study and the information has been collecting at household level, each of the total households randomly 300 households were selected. From those household there are 265HH were from collectors and remaining 35HH were from non-collectors. The information was gathered from Interviewer, DFO Dolpa, WWF, local traders and NGOs and CBOs during field studies.

The 300 households were selected during a transect walk in 5 VDCs of Dolpa district. During the transect walk using the questionnaire, the interviewee was picked up from people who were involved or not involved in the collection.

3.4 Data Analysis

The numerical data were analyzed in STATA and excel spreadsheet. Each and every household data was maintained separately. Using STATA program different statistical tools like mean/average, percentage, t-test and level of significance, etc. were calculated for collectors and non-collectors households. The output of the analysis has been presented in relevant tables and figures.

3.5 Introduction of Study Area

3.5.1 Nepal

Nepal, the Himalayan Kingdom, is relatively small landlocked country situated between two large countries India and China. Within a narrow belt from north to south possesses a nche

for different bioclimatic zones with varied habitats and ecosystems, which leads to the changes in the floristic composition within the country. The land diversity especially higher plants have been explored and studied intensively.

Nepal is situated on the southern slope of the central Himalayan and occupies a total area of 147181km². The country is located between latitudes 26°22” and 30°27”N and longitudes 8012E. The average length of the country is 885km from east to west and the width varies from 145km to 241km with a mean of 193km north to south. The altitude varies from 60m above mean sea level in Terai to Mount Everest at 8848m, the height point in the world. Nepal has the richest biodiversity due to its unique geographical features, particularly altitudinal variation from Tarai to High Mountains.

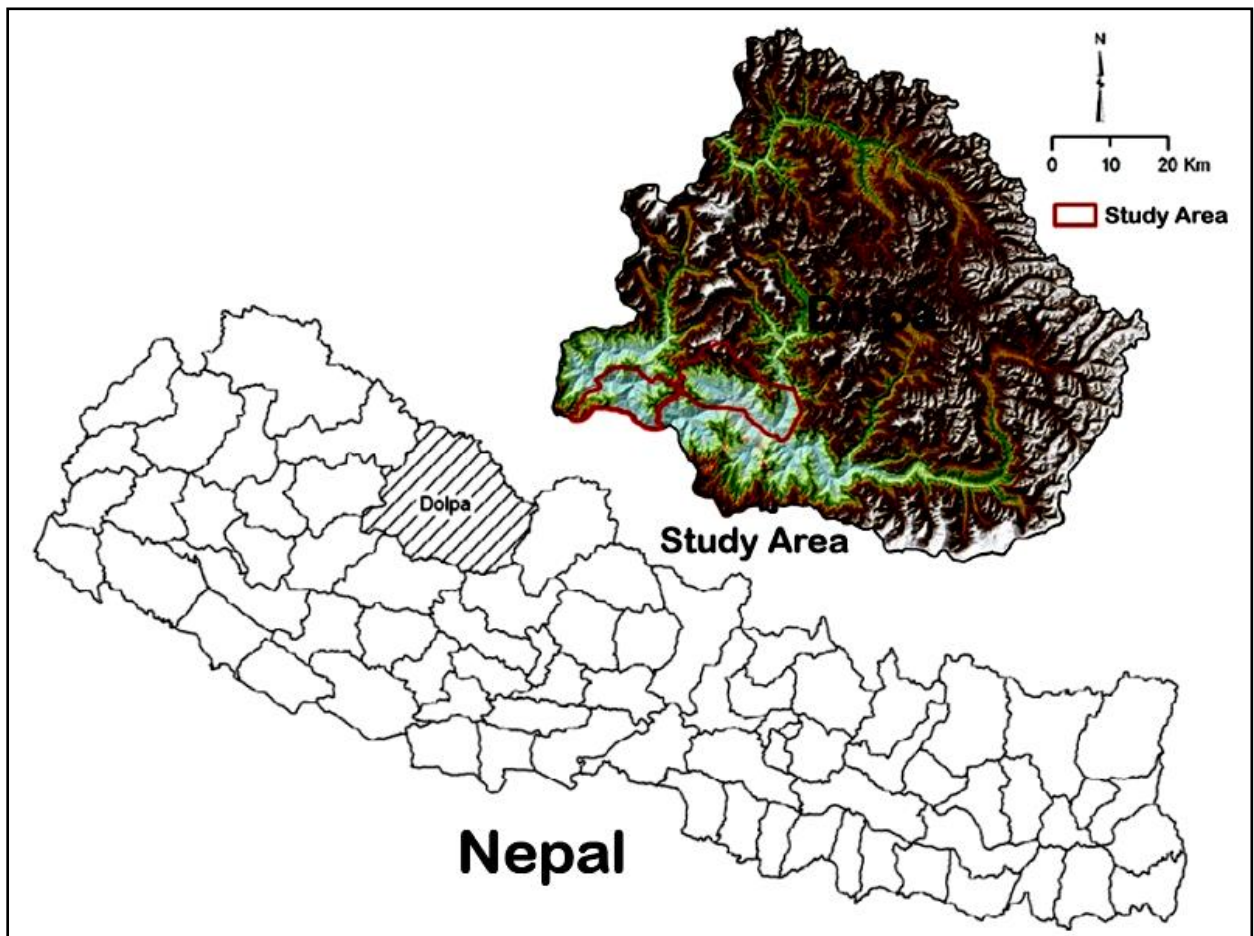


Figure 3.1: Map of Study Area

3.5.2 Dolpa

The study was carried out in Dolpa District. Dolpa is one of the five districts of the Karnali Zone of Nepal it extends over 7,889 km² (3.046 sq mi) of the Midwestern region of the country. Dolpa is the largest district of Nepal covering 5.36% of the total landmass of the country. Located 28°24' N - 29°43' N latitude, and 82°24'E - 83°38'E longitude, the elevation in Dolpa ranges from 1,525 to 7,754 m (5,003 to 25,016 ft.) above sea level. The district borders Tibet (China) on the north and northeast, Junmla and Mugu district of Karnali on the west, Myagdi, Jajarkot and Rukum on the south and Mustang on the east. The mean annual rainfall of the district is 499 mlt. and the mean minimum and maximum temperatures are 10° and 22° Celsius, respectively.

A large portion of the district is protected by Shey Phoksundo National Park. The name is derived from the 12th century Shey Monastery and the deepest lake in Nepal, the Phoksundo Lake, both of which lie in the district. The park protects endangered animals like the snow leopard, musk deer and the Tibetan wolf and other natural resources. Shey Phoksundo is the largest and the only trans-Himalayan National Park in Nepal. It is also one of the two districts that lie beyond the Himalayan or the Trans-Himalaya, Mustang being the other.

The district distances an altitudinal range of over 5,000 m (16,000 ft) from a little over 1,500 m (4,900 ft) at Tribeni in Kalika VDC to 7,381 m (24,216 ft) meters at the peak of Churen Himal. Kanjiroba (6,221 m (20,410 ft)), Mukot (6,638 m (21,778 ft)) and Putha Hiunchuli (7,246 m (23,773 ft)) are other renowned peaks.

Physiographical the smaller ranges of the Great Himalayas comprise the southern border of the district. Between these and the border mountain ranges of Gautam Himal and Kanti Himal to the north, Dolpa district is a labyrinth of often wide glacial valleys and ridges. Kanjiroba Himal and Kagmara Lekh running northwest to southeast separate the valleys of the Jagdula in the west from the rest of the district.

Out of the total area of 7,889 sq. km, 60% of the area contain sttped and rock land. There are 23 VDCs in Dolpa. Namely Juphal, Majhphal, Chharka, Dho, Saldang, Lawan,

Bhijer, Tinje, Shahartara, Phoksundo, Rimi, Pahada, Raha, Liku, Tripurakot, Mukot, Shun, Lhan, Narku, Kalika, Kaigaun and Sarmi. Among them all VDCs are fertile for Yarsagumba except Sarmi, Narku, Kalika, Lhan and Liku VDCs. From the district headquarters, all VDCs are distanced from 5 – 70 Kosh.

Winter snowfall is common in Dolpa study site. The study was mainly focused on the Tripurakot, Pahada, Liku, Kalika and Narku VDCs of Dolpa.

3.5.3 Distribution

In Nepal, Yarsagumba occurrence is reported from 3540-5050m (Devkota, 2009) from 24 different districts namely Dolpa, Darchula, Jumla, Bajura, Kalikot, Mugu, Humla, Rukum, Jajarkot, Bajhang, Mustangm Mygdi, Kaski, Manang, Gorkha, Lamjung, Dhading, Rasuwa, Ramachaap, Dolakha, Sindhupalchowk, Solukhumbu, Sankhuwasabha, and Taplejung from eastern to far-western Nepal. It is interesting to note that, Cannon et. Al. (2009) reported Yarsagumba distribution range between 4200-5200m from Bhutan which is a quite highest range than reported from Nepal. As the name Yarsagumba is common for alike Cordycepid fungi, among Nepalese people, the species which occur in eastern part may be different species from western part. Newspapers and different medias are also using the term Yarsagumba while making reports from these areas. A detail inventory and taxonomic identification are necessary. Zang and Kinjo (1998) reported Yarsagumba from Kangchanjunga (4300m), eastern Nepal and from market centers of capital city Kathmandu. Their finding indicates the occurrence of other species including Yarsagumba I eastern part.

3.5.4 Legal Mechanism for Yarsagumba

Nepal's Forest Act 1993 and Forest Regulations 1995 are the main legislations to protect medicinal plants including Yarsagumba (*Cordyceps Sinensis*). For the last 25 years, people of Nepal recognized the commercial importance of such high value product *Cordyceps Sinensis* (Devkota, 2008). Since then, it is used to be sold in the high price in voluminous amount by

mountainous inhabitants' districts like Dolpa, Darchula and Jumla while the much collection mounted up from different districts.

Even though the trade of Yarsagumba started in Dolpa district since 1988, Government of Nepal has legally banned the collection, transport, trade and use in Nepal until 2001 and imposed a penalty of NRs. 500 per piece to control its collection and trade. In 2001, the government lifted the ban on collection, trade and use but, controlled trade with the restriction over export of unprocessed product and charging high royalty rate of NRs. 20,000 per kg, which encouraged local traders to smuggle via upper open border to Tibet. As processing was not clear, the government defined it as cleaning and steaming. In 2006, the legal provision of processing for export was removed and the high royalty rate was also reduced to NRs. 10,000 per kg. the legal scenario for Yarsagumba management is presented in Table 3.1.

Table 3.1: Legal Scenario for Yarsagumba

S.N.	Acts and Regulations	Legal Scenario
1	Forest Act, 1993 (2049 BS)	Totally banned for collection, marketing and distributions, carriage and export
2	Forest Regulation, 1995 (2051 BS)	Royalty/Penalty rate: NRs. 500 per piece
3	Nepal Gazette, 2001 (2058/09/16 BS)	Could be traded abroad in processed form only on the approval of Department of forest
		Royalty rate: NRs. 20,000/kg
4	Nepal Gazette, 2004 (2061/06/18 BS)	No requirements of processing for trade and transit
		Royalty rate: NRs. 20,000/kg
5	Nepal Gazette, 2006 (2063/06/10 BS)	Royalty rate: NRs. 10,000/kg

Source: HMG, 2070

CHAPTER-FOUR

ANALYSIS AND INTERPRETATION

4.1.1 Life Form or Ecology of Yarsagumba

Yarsagumba is a combination of caterpillar and fungus. In direct observation, it looks partly like animal and partly like plant. It is locally known as Kira, meaning insect. From this study it was clear that the majority of people believe that it is an insect.

In field, size of the Yarsagumba was measured with the help of the rulers, Yarsagumba Larva part remain under the soil and Mushroom part or hyphae part remain outside the soil. Larva part lying in the soil is more or less longitudinal in shape below 2 to 5.6 cm from the top surface of the soil. Some time, larva part remain is vertical shape also. If the soil surface is loose the larva goes depth of the soil, if not, larva remain up surface of the soil.

4.1.2 Life Cycle of Yarsagumba

Ascospores which are related from stomata from *Cordyceps sinensis* are sexual spores. But, when ascospores fall down in ground or infect host, then they produce conidia which are sexual spores, both ascospores and conidia can infect their hosts (Namgyel, 2003). It is an entomogenous fungus, the spores of which in millions are widely dispersed by wind and water in autumn. Some of the spores fall, germinate and penetrate into the caterpillar larva of *Hepialis* spp. of the Lepidoptera order of insects (moths). The infected caterpillars are killed by spring, when the fungal fruiting body protrudes from the caterpillar larvae head and the whole internal body of the insect has become hardened medicinal mycelium. The uninfected caterpillars pupate into relatively large primitive moths and take two years to complete life cycle (Namgyel, 2003). The caterpillars live in vertical tunnels in the soil and emerge at night to field on roots and aerial parts of plants. Some species are reported to be serious pests of pastures. The fluctuations in *Cordyceps* populations are related to weather condition (Zhou et.al. 1998, Anonymous n.d.). *Cordyceps militaris* is one of the other species which also grow in the pupae of Lepidoptera order moth. When the Lepidoptera pupae are inoculated by introducing conidia into the body

cavity, death follows within the 5 days, Mature fruit-bodies can develop within 45-60 days of infection (Webster, 1980)

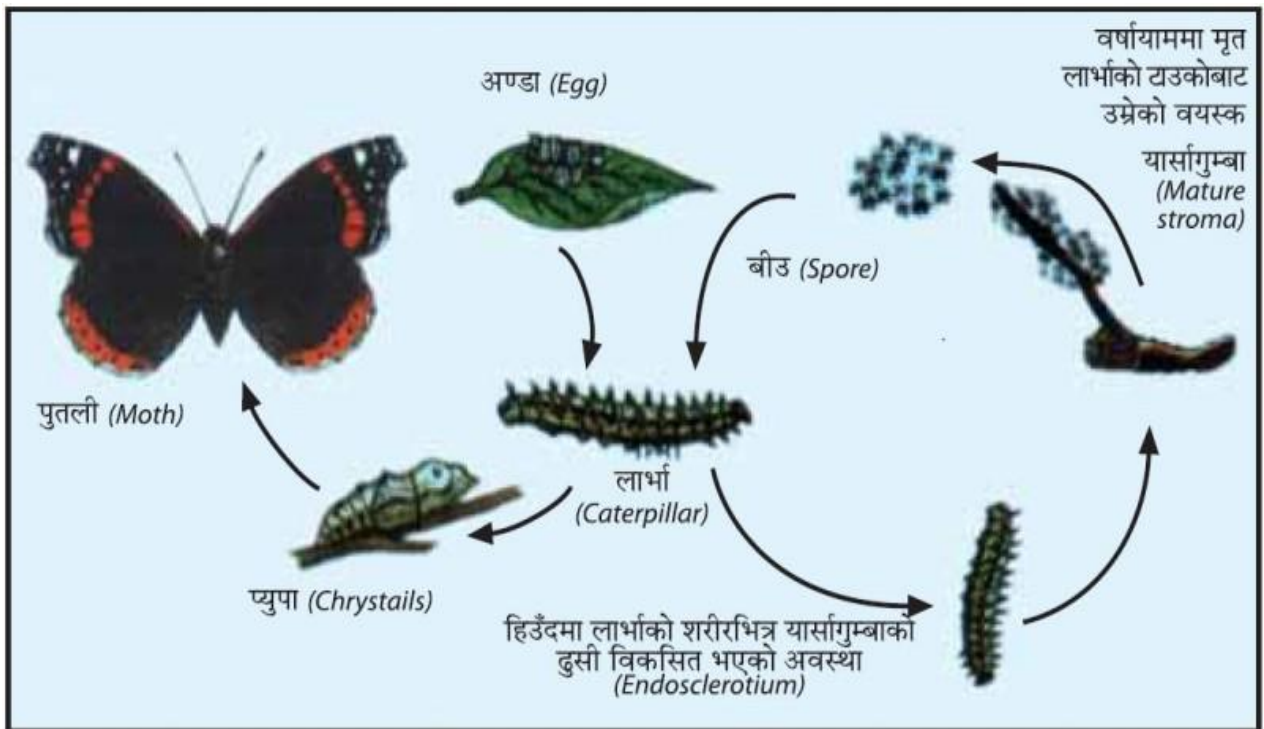


Figure 4.1: Life Cycle of Yarsagumba

Source: DFO Dolpa, 2067 BS

4.1.3 Altitudinal Level of Availability

Availability of YG varies from 3000-5000m als. Only 28% of the respondents had an idea about the altitudinal range of YG availability. The collectors had an idea on the places of the YG availability, but do not have any idea about the altitudinal ranges. The quality of YG available in 4000m was considered of best quality based on taste and experience of the collectors. YG available between 3000-4000m is of good quality and below 3000m it was black colored and considered as useless.

4.1.4 Time of Snowfall and Snowmelt

In this area out of twelve months, nine months were covered with snow. Early snowfall was found best suited for the growth and development of the YG. Out of the total respondents, 80% considered early snowfall, as the best because early snowfall would also melt earlier and facilitate the proper collection. Generally, YG collection time starts from 3rd week of May and

ends by June 15. In the study year (2012/13) collection started from last week May (Jestha 10-15), in Dolpa.

4.2 Socio-Economic Situation of Dolpa

Due to geographical complexities, the Dolpa district is still facing the problems of food scarcity, transportation, communication and literacy. According to the indicators developed by the International Centre for Integrated Mountain Development (ICIMODE) Dolpa is a latest developed district of the country. The economic opportunities of the people residing Dolpa are livestock, farming NTFP trade, fruit cultivation and tourism, etc.

Table 4.1: Demographic and Other Information of the District

S.No.	Characteristics	Quantity
1	Population, % contribution	36,700
	Male	49.70
	Female	50.30
2	Household number	7488
3	Household size (Average)	4.90
4	Literacy rate (%) of the district	54.3
	Women	40.6
	Man	67.9
5	Occupation %	
	Agriculture	70.80
	Non Agriculture	29.20
6	Population density (per sq. km)	5 per sq.km
7	Agriculture description	
	Farming Land	2479.2 hectares
	Irrigation	14.65 hectares
8	Population growth rate	1.67

Source: National Population and Housing Census, 2011

As table 4.1, Out of 36,700, the total population of district Dolpa, 49.70% is male and 50.30% female. Average household size is 4.90 people. The population density is 5 in per sq.km

and literacy rate is 54.3%. Population growth rate is 1.67. The main occupation is agriculture 70.80% and non-agriculture is 29.20%.

Though the population density is lower the pressure on the resources (as indicated by low per capita agriculture land) is high; his mainly due to less agricultural land. Again, the productivity of the land is less and thus people always depend on the external sources for food grain. The forest plays a significant role for the sustenance of the rural people. A major indicator of the socio-economic character of the farmer is the landholding.

Table 4.2: Land Use Pattern in Dolpa

S.No.	Land Used for Various Purposes	Percent and Heaters
1	Total district area	7932.3 sq.km. (5.36% of Nepal)
2	Forest covered land	63875 hectares (8.05% of district)
3	Pasture covered land	31.48%
4	Hard Rocked/Steeped dry, covered land	59.29%
5	Agriculture covered land	1.18%
6	Community Forest covered land	22911.39 hectares (12 VDCs)
7	Kabuliyati Forest covered land	300.01 hectares (8 VDCs)
8	Personal Ownership forest covered land	2.53 hectares
9	Shey-Phoksundho National Park	30%
10	Ranges from Sea Level	1525 -7754 miter
11	Yarsagumba fertile area	3540-5050m height 350-400 mm rainfall 4.8-5.7ph humus soil

Source: DFO Dolpa (data), 2012

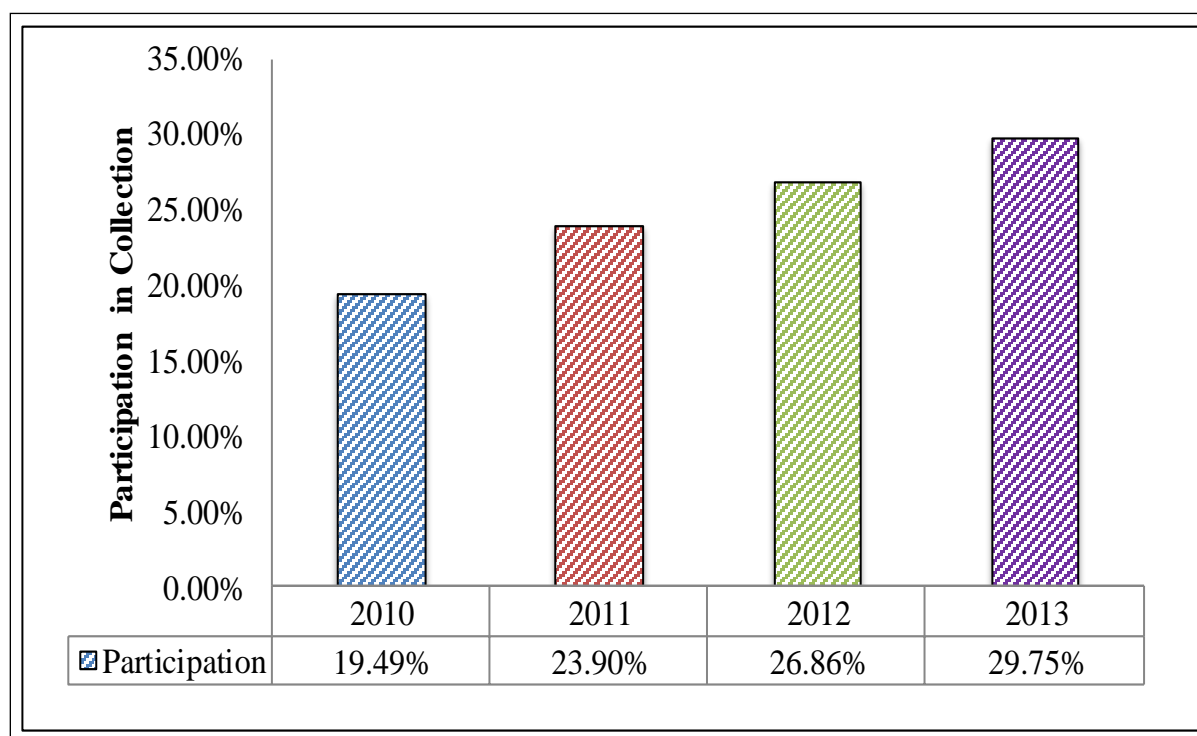
Dolpa district is the biggest district of our country. As Table 3, out of the total area of Nepal 5.36% (7932.3 sq. km) area represents by Dolpa district. The district ranges from 1525 to 7754 meters from sea level. Out of total land, forest covered land 8.05%, pasture land covered

31.48%, agriculture covered land 1.18%, hard rocked/steeped dry land covered 59.29%, Shey Phoksundho National Park covered 30%, community forest covered land 22911.39 hectares, kabuliyati forest covered land 300.01 hectares, and personal ownership forest covered land 2.53 hectares.

Usually, 6 months snow to and 6 months snow melting snow cooler climes bright sun for around 3,000 to 55,000m roofing area (Ghase Maidan) Yarsagumba in this dwelling. Yarsagumba researcher Shiva Devkota (Dolpa, 2064), according to the survey year 3540 to 5050m ‘Patan’ this herb can be found through the area. 350 to 400mm average rainfall and 4.8 to 5.7ph humus soil Yarsagumba also found to be far too bright not found little difference between the arch way. According to local people, medium and snow inevitably Yarsagumba grow quickly enough good. This found among with Sunbuki (*Jancus thomsonii*) and Nimbu/Nyarkri (*Bistora macrophylla*).

4.3.1 Participation of Yarsagumba Collection in different years

Figure 4.2: Percentage of Households Members Participated in Yarsagumba Collection in different years



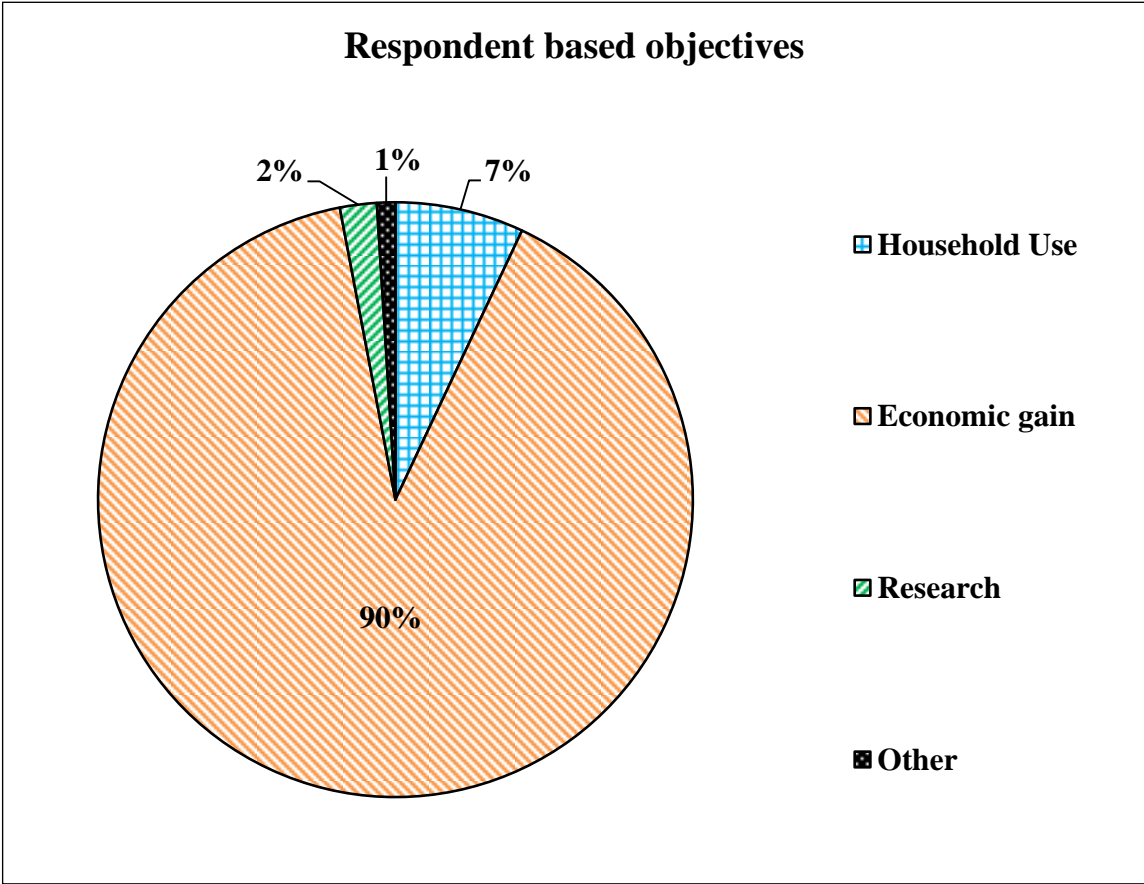
Source: Based on the field survey, 2013

As figure 4.2, participation of households in Yarsagumba collection was found to increase over the years. 19.49% in 2010, 23.90% in 2011, 26.86% in 2012 and in 2013, 29.75% people participated in Yarsagumba collection. This study shows that the ratio of household's members' participation in YG collection has been raising over the year from 2010. According to key-informants, this has happened because of the low productivity of farming and increasing monetary value of YG etc.

4.3.2 Participation Based on Objectives

This study shows that most of rural livelihood were participated for the purpose of economic gain. Some households were not participating because the insufficiency of family members, heavy workload, health problem, employed and others. The study on participation based on objective of involvement has been illustrated with the help of following figure.

Figure 4.3: Distribution of respondents based on objectives of participation



Source: Based on the field survey, 2013

As Figure 4.3, the study on participation based on objective of involvement had shown that out of total participants/respondents in Yarsagumba collection, 90% households had participated for their economic gain for their household expenses like as in education, treatment, Fooding, clothing, return debt, etc., 7% households had participated for the household use of Yarsagumba, 2% for research work and 1% for other purpose. Most of the rural livelihood are participating in this business for only source of economic gain to meet their basic needs.

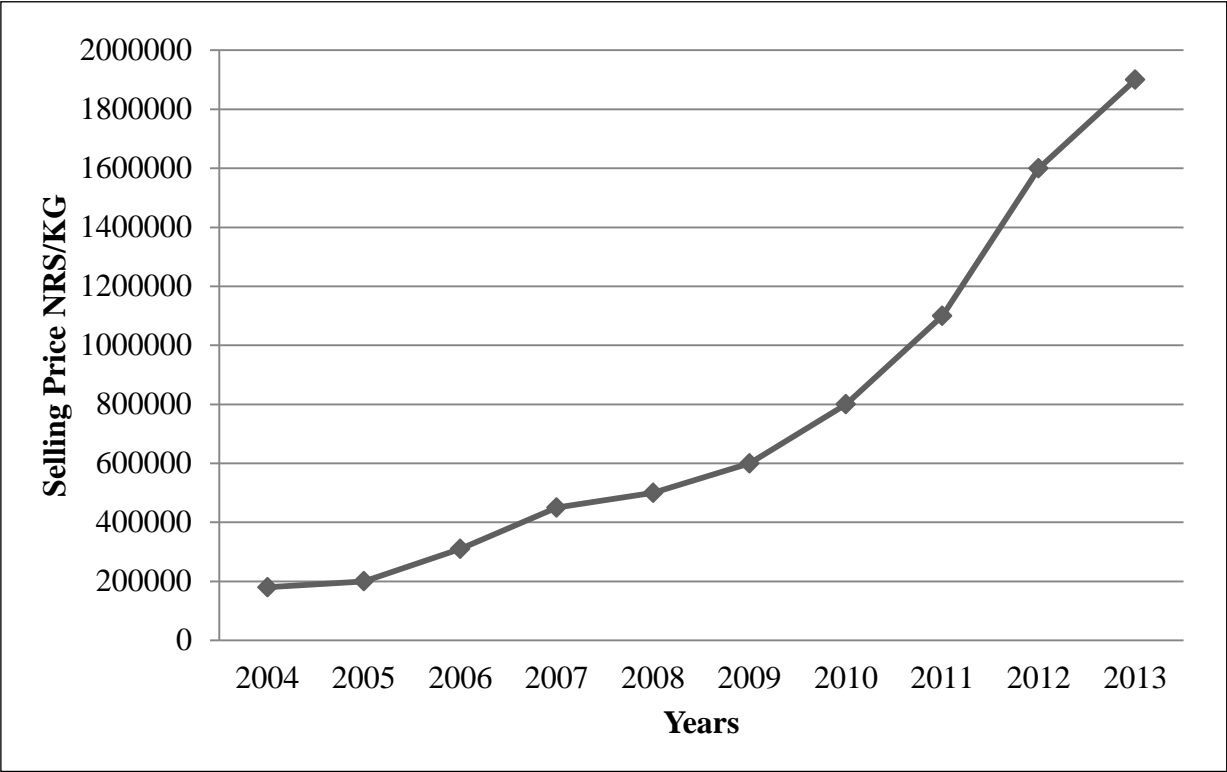
4.4 Market Price and Market Chain

4.4.1 Market Trend of Dolpa

In Dolpa district, marketing of Yarsagumba started since 1986. Before that, local people did not have any idea about Yarsagumba's price and the value of the product. Basically, local people came to know about this product from the Japanese study team and NTFP traders. As per trader's experience, the main market of this product is in China, Japan, Korea, Burma, Thailand and Singapore. Nowadays its use has become common also in western countries.

For the proper marketing of this product high royalty rate and length legal procedure has become a barrier. In Dolpa district no trader collector came to the District Forest Office to take permission for the collection, transportation and export of Yarsagumba in the before years, but, nowadays it is necessary that, every collector and traders must have to take permission and pay some entrance fee for participation. Collectors of within the district have to pay NRs.500 – 1500 per head and collectors from out of the district have to pay minimum NRs. 5000 per head before the participation. The price trend of Yarsagumba since 2004 to till 2013 has shown with the help a figure 4.4 below.

Figure 4.4: Price trend of Yarsagumba (2004-2013)



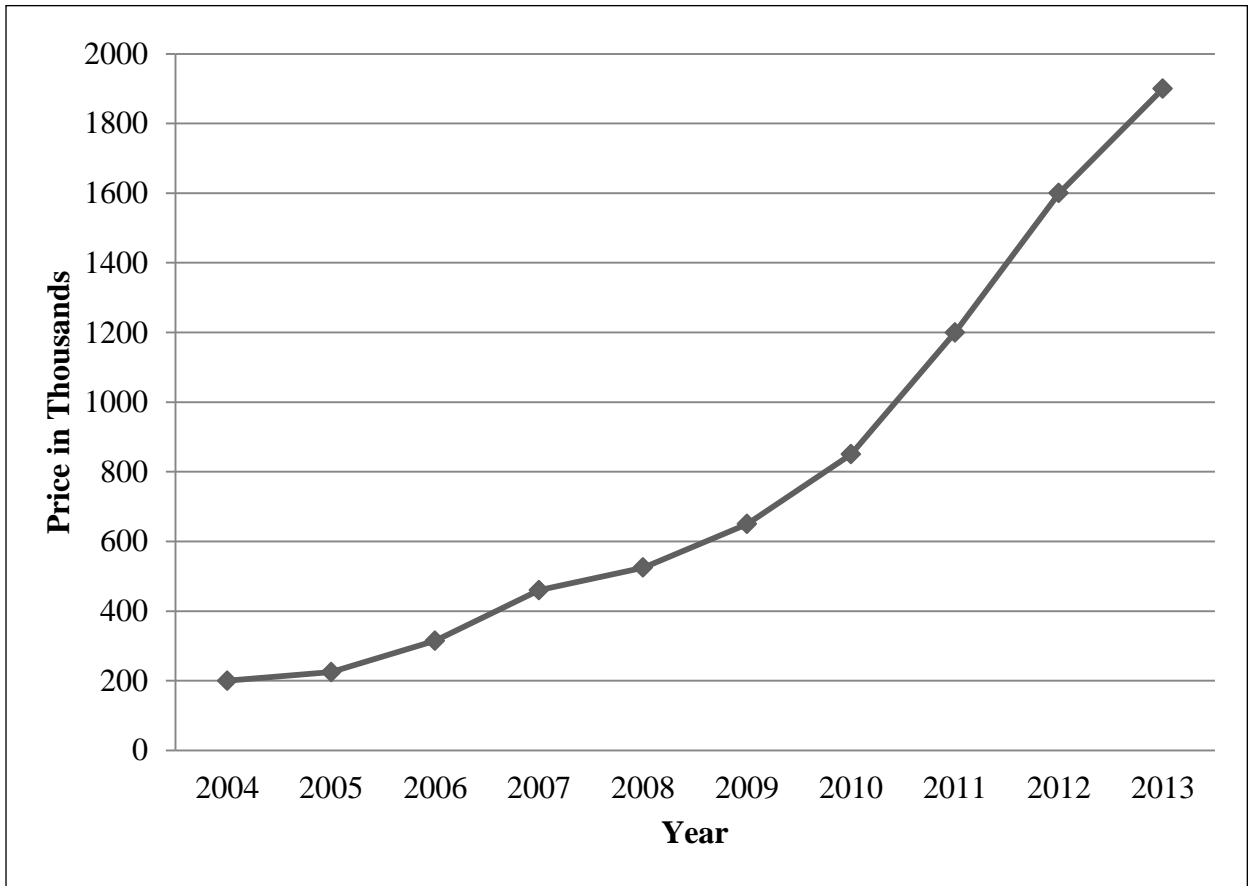
Source: Based on the Field Survey, 2013

In 2004 its price was NRs.180,000/kg, the pressure in its collections increased since 2008, its market demand was high. Due to high demand its price was rapidly high. In 2009 its price was NRs. 600,000/kg. And from 2010 its price rapidly increases. Atthe end of 2013 its price reached NRs.1, 900,000/kg. The average total Yarsagumba traded from the Dolpa district in 2013 was 350kg.The price of YG increases over the years because the demand increasing but its collection is decreasing in every year.

4.4.2 Market Price Changes in Dolpa

The information aboutYarsagumba priceschangesfrom 2004 to 2013. It was collected from local collectors, traders, DFO Dolpa record, and key informants. On the basis of these various sources the trend of market price is given below:

Figure 4.5: Change in Market Price of Yarsagumba in Dolpa district from 2004 to 2013



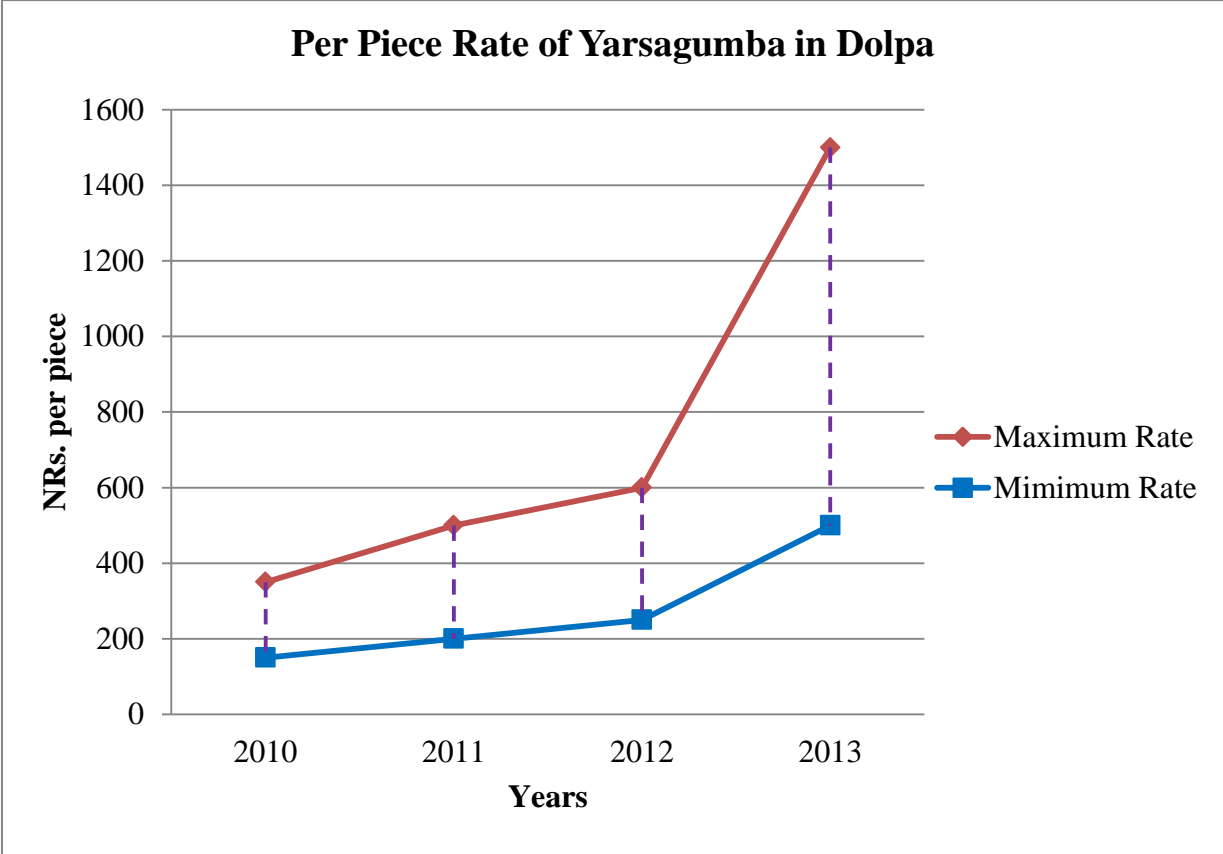
Source: DFO, Dolpa and the Field Survey, 2013

The market price at a collector's level increased gradually from 2004 to 2013 except in 2005. In 2005, very few traders came to buy this product and they fixed low rates for the product. As the collectors did not have any alternative, they were forced to sell the product at a very low price. Since 2005, there is much competition among the traders to buy this product, as a result, there was a rapid increase in the price of Yarsagumba from 2005 to 2013, which was from NRs. 225 thousand per kg in 2005 to increase to NRs. 1200 thousand per kg in 2011. In 2013 it was increased 1900 thousands per kg.

Yarsagumba is highly praised for its medicinal and trade value. The species had no official contribution in the Nepalese national economy till 2001 since its collection, use, sale, distribution, transportation and export was banded by the government of Nepal (Forest Act 1993, Forest Regulation 1995). With the lift of ban from this species in 2005, Yarsagumba has become one of the significant market commodities in the herbal sector of Nepal. Presently,

Yarsagumba is traded at Rs. 1.5-1.9 million per kg in Dolpa. The trade, mostly in unprocessed form, is increasing exponentially and the government is earning substantial revenue (Rs. 5.1 million in 2068/069). As per the forest rule, an individual has to pay Rs. 10,000 per kg as a royalty to the Government of Nepal. Thus, Yarsagumba is providing an economic benefit to the local people as well as to the Government of Nepal.

Figure 4.6: Change in prices of Yarsagumba in Dolpa district from 2010 to 2013



Sources: Based on the Field Survey, 2013

After the study, collection amount of Yarsagumba was decreasing from 2009. But the price of Yarsagumba has increased dramatically. Virtually no monetary value existed in 1987-1988; Yarsagumba was traded for cigarettes, noodles, and other goods not easily available in the village (unpublished data). By 2001, Dolpa harvesters sold Yarsagumba for NRs. 20-25 per piece, but they received NRs. 150-350 per piece in 2010. Similarly NRs. 200 to 500 in 2011, NRs. 250 to 600 in 2012 and NRs. 500 to 1500 in 2013. However, local market prices are erratic and large fluctuation is common, influenced by market demand, timing and location of trading.

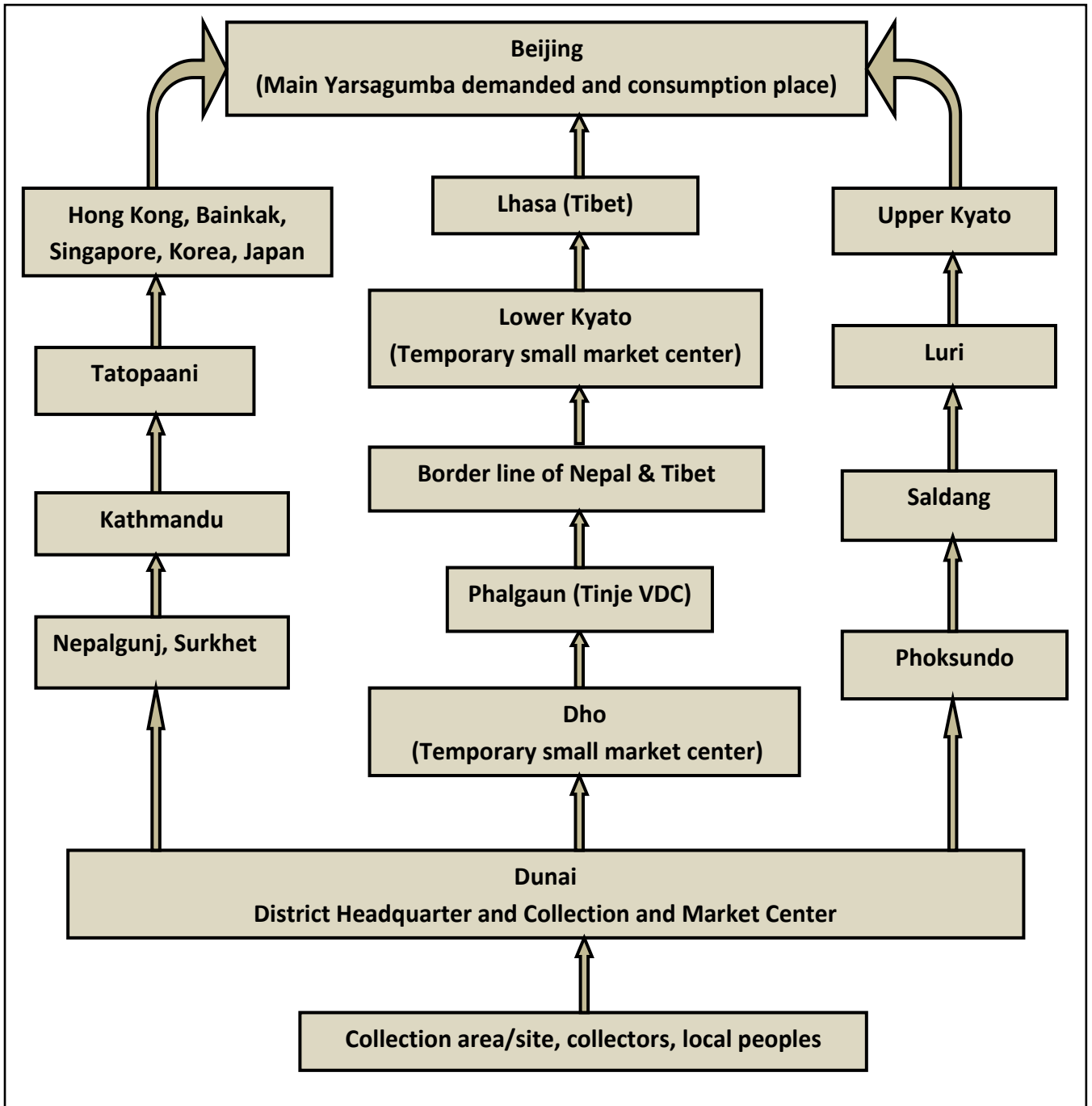
4.4.3 Present Market Chain of Yarsagumba in Dolpa

The trend of distributing pre-payment to poor collectors by traders either in terms of cash benefit or other necessary goods is common practices in Nepal. The advance payment is usually provided to the collectors during festival periods whereby collectors on the one hand celebrates festivals and on the other hand local traders get the product assurance for business with retailers or outside traders. The flow of the Yarsagumba is usually from collection site to village level traders, regional traders and to the trades from Kathmandu and Tibet.

Collectors from local village collect Yarsagumba from the pasture (locally called as Patans) and sell to the local/primary traders. The secondary traders/intermediaries in the marketing chain obtain permission from Department of Forest to take Yarsagumba to other district after paying royalties. The intermediaries take Yarsagumba directly to Nepalgunj or Kathmandu through Jupal and Masinechaur airports of Dolpa. Traders also come directly from Kathmandu and Tibet and other parts of Nepal and India. Main traders in Dolpa were mainly from Dolpa, Kathmandu, Jajarkot, Jumla, Rolpa and Humla and some from China. In the year 2006, Maoist graded traders as A, B and C depending on the trading capacity. Traders undertaking transaction up to 5-20 kg and above 20 kg are respectively graded as A, B and C.

There was an organized way of trading, but there was no involvement of NGO, INGO and the DFO office in the trading process. The main market of Yarsagumba is China, Korea, Japan, Burma, Thailand and Singapore. There was a gradual increase in price of Yarsagumba at different levels of market chain.

Figure 4.7: Present market Chain of Dolpa District



Source: DFO, Dolpa (2010)

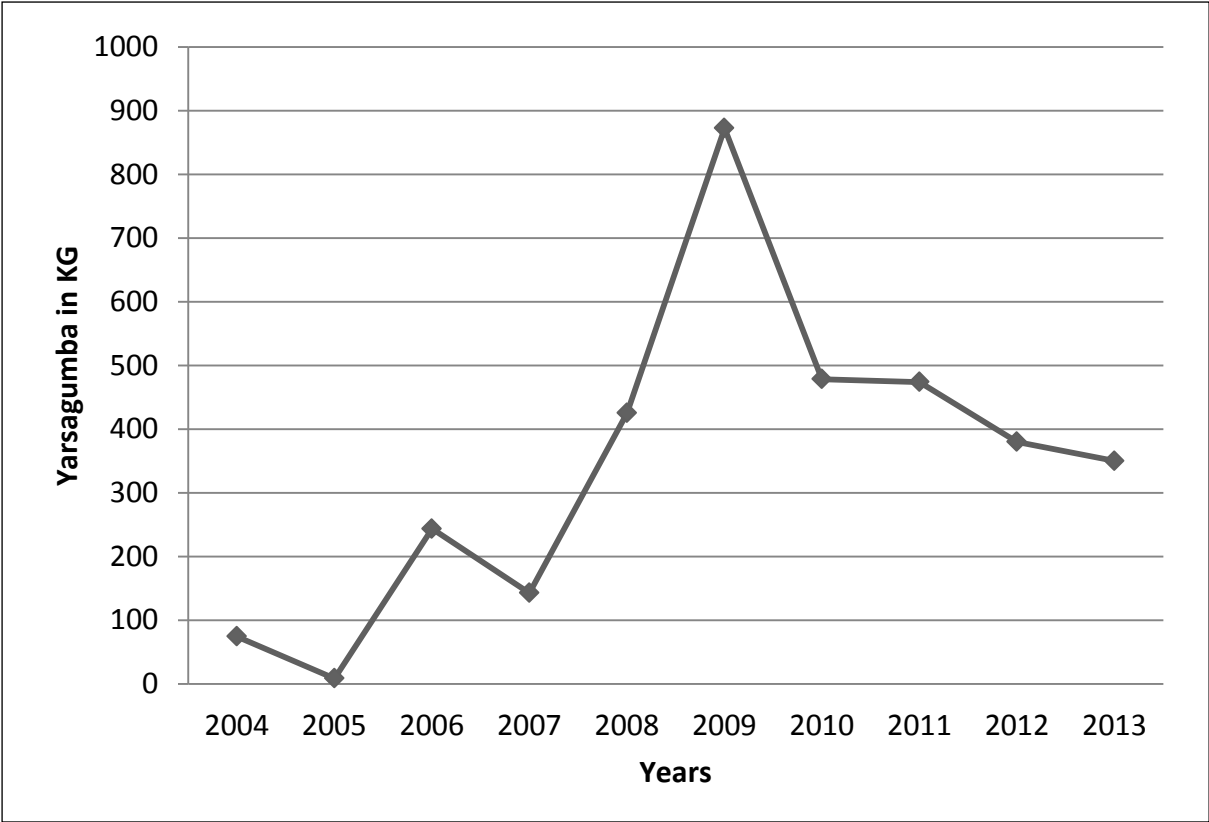
4.5 Amount and Trend of Yarsagumba Collection

4.5.1 Trend of Yarsagumba Collection

The collection and trading of Yarsagumba in the study area started in 1995. The Yarsagumba collection period is very short; generally, it starts from 1st June and ends by 15 July in 2008. Yarsagumba collection started May 10 due to early melting of snow and early growth of Yarsagumba.

According to the collectors, the amount of Yarsagumba collection depends on collectors experience and sincerity. An experienced person would be well aware of the area of Yarsagumba availability. At the same area some collectors get many Yarsagumba but some do not that depend on collector’s sincerity. The collectors also believed that availability of Yarsagumba depends on the luck of a collector. After sincere observation of the ground when collectors notice brown to black tip of the fruiting body, they pluck it out by fingers or a wooden peg. After extracting the first piece, they offer prayers to God. As per collector’s experience, when they notice one piece of Yarsagumba it is assumed that there would be greater chances of availability of other pieces as well. After a whole day of collection, collected pieces have to be kept one day in dry-condition, then the next evening the pieces are cleaned by brush, and the following morning, they are kept in a cloth bag (there is a greater chance of decay if kept in a polyethylene bag).

Figure 4.8: Yearly trends of YarsagumbaCollection in Dolpa



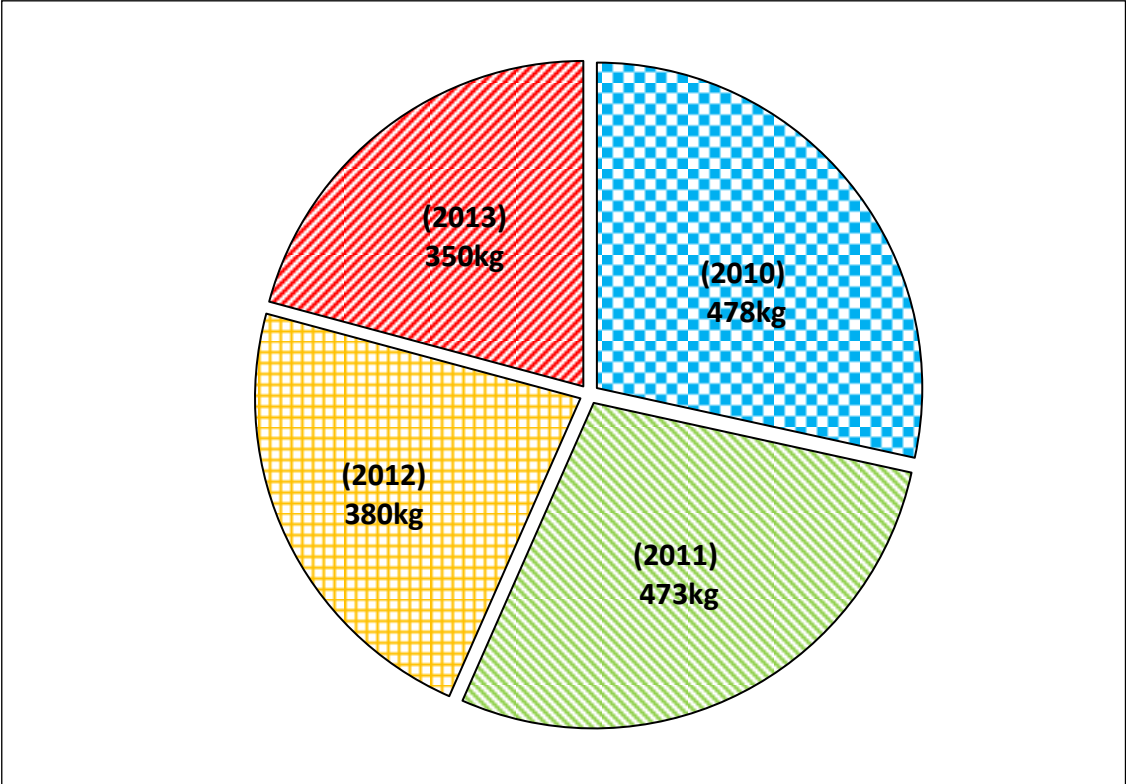
Source: DFO Dolpa (data) and Field Survey, 2013

The study of annual collection trend has shown that there was variation. In 2004 there was 74.5kg, but in 2005 it decreases and reached 8.60kg only. In 2006, again it increases and reached 243.53kg and again it decreases in 2007 and reached 142.86kg. from 2008, the collected amount started to increased 425.09kg in 2008, 872.40kg in 2009. But it again started to decreased the collection ratio from 2010. 478.40kg in 2010, 473.854kg in 2011, 380kg in 2012, 350kg in 2013. As per collectors’ experience, the reason behind the least amount of availability was heavy snowfall during collection time.

4.5.2 Collection Amount of Yarsagumba

The present study has estimated that the total amount of Yarsagumba collected was 350kg from the study site. The total collection of Yarsagumba was comparatively low in 2013.

Figure 4.9: Average collection amount of Yarsagumba from 2010 to 2013



Sources: Based on the field survey, 2013

As Figure 4.9, the total amount of the collection was 478kg. in2010, 473kg in 2011, 380kg in 2012 and 350kg in 2013. From this, it is clear that the Yarsagumbe collection amount was decreasing in rate.

Dolpa district is rich in herbal resources like Yarsagumba and the life is sustained by income from these herbal resources, but due to lack of knowledge and technology the amount of herbal collection decreasing days by day in every year. Proper care should be given on the sustainable management and consumption of herbal resources. This approach is much more important for rare and threatened species.

4.5.3 Some Reasons for Decreasing the Collection Quantity of Yarsagumba

Yarsagumba is traditionally harvested by poorest of the poor living in the high mountains regions of the Himalayas during May-July. The current harvesting practice almost certainly impedes the timely release of spores into the soil, inhabiting reproduction. Most of the respondents were aware of these problems and consider current harvesting practice unsustainable.

District forest office of Dolpa estimates that about 50,000 people were involved in harvesting of caterpillar fungus during the 2010 season in Dolpa (DFO Dolpa, 2010). Therefore, the intensity of the harvest and pressure on the resource due to this large number of collectors can be easily anticipated. Although it is not possible to attribute this decline to a single cases, over-harvesting and premature harvesting are likely to be important factors.

Apart from over-harvesting and harvesting of immature individuals, other factors may be contributing to the decline of population. These include (a) decrease in moth and larva populations due to less or degradation of host plant resources for moths and larva; (b) modification of the soil microhabitats congenial to fungal spores by the harvesters; (c) increased grazing intensity in high-altitude pastures as local harvesters take their cattle with them; and (d) climate changes (Shrestha & Bawa, 2013).

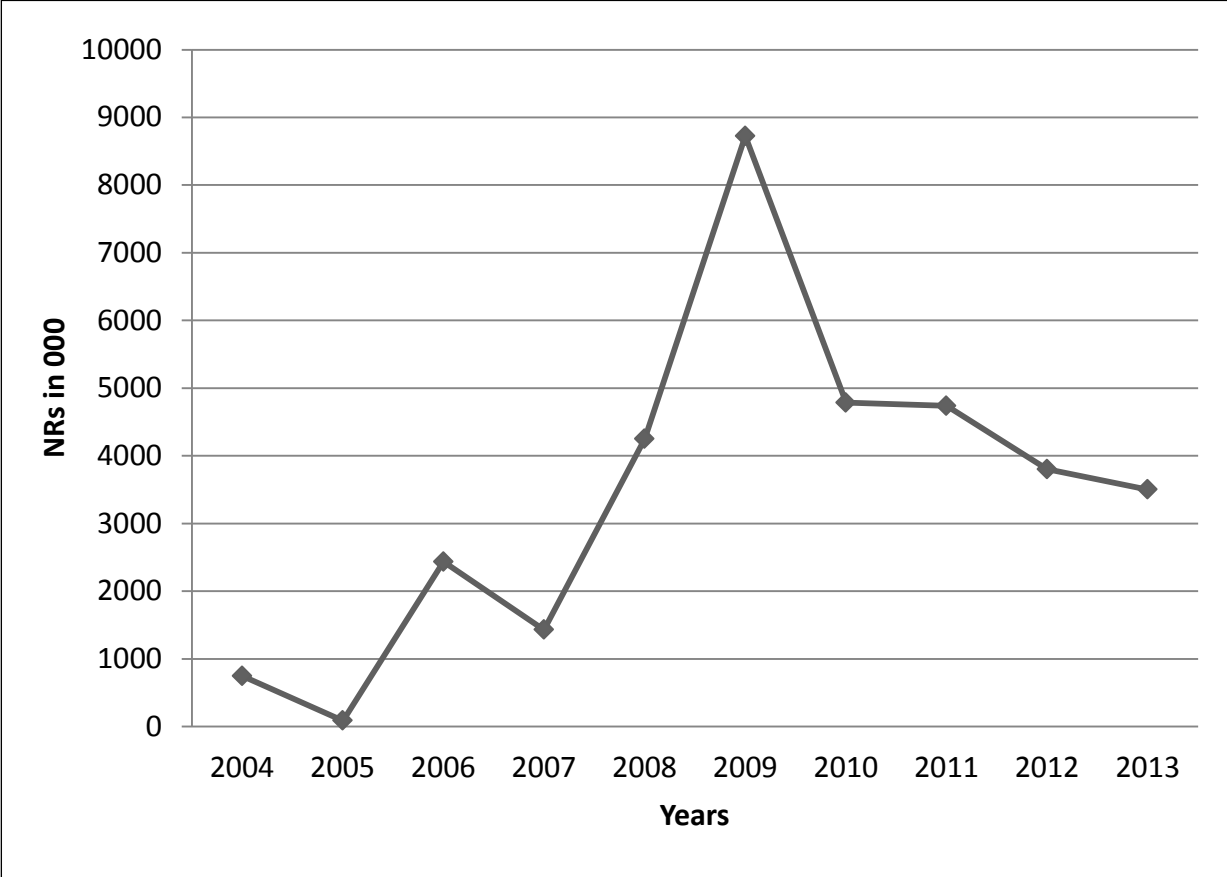
Sunpati (a types of local grass) is main indicator species of the Yarsabumba mostly Yarsagumba was surrounded by the Sunpati and the rough stone provided the habitat of the moth, and the moth's larvae prefer the Sunpati leaves mostly as their diet. More the number of Sunpati more is the number of Yarsagumba. More the no of halhale, primula, khar (types of

local grass) less is the Yersagumba, i.e. with increasing vegetation composition of its associate number of Yarsagumba decrease (Aryal et al., 2004).

4.5.4 Revenue collects from royalty

During the time of insurgency in Nepal, the trade of Yarsagumba was fully under the control insurgents; there was their own “revolution tax” equal to government royalty (Chhetri 2005). The record of DFO Dolpa shows that legal trade of Yarsagumba in Dolpa district was started since F.Y. 2002/03. The legally traded amount of Yarsagumba was 3.10kg in 2002, which gradually increased to 872kg in 2009. In 2002, royalty collection from trade of Yarsagumba was NRs. 62,000, which gradually increased to NRs. 8,723,000 in 2009, but from 2010 it again started to decrease up to 2013, Figure 9, shows the state of royalty collection from the trade of Yarsagumba in Dolpa district.

Figure 4.10:Trends of Royalty collection for Yarsagumba



Source: DFO Dolpa (data) and Field Survey, 2013

4.5.5 Medicinal Use of Yarsagumba

Yarsabumba is a powerful tonic and can help to restore normal functioning of the body, stimulate immune response, increase energy, vitality, and longevity. Recent research has shown that YG can improve sports performance and muscle-building capability. Yarsagumba is a rare species of plant widely used in clinical use and as a household remedy. It is a good and natural medicine for sexual intercourse, who are unable to have sex. For the following points it is used:

1. Yarsagumba is considered to be potent at strengthening lung and kidneys, increasing energy and vitality, stopping hemorrhage decreasing phlegm.
2. It has traditionally been used for impotence, backache, to increase sperm production and to increase blood. It is used specifically for excess of tiredness, impotence, debility, anemia, to build the bone marrow.
3. It is taken for shortness of breath, emission soreness of ions and knees, dizziness and tinnitus.
4. It is used specially for excess tiredness, chronic cough and asthma, debility, liver and anemia
5. It is used for strengthening the immune system.
6. It may help to improve libido and quality of life in men and women experiencing sexual frustration.

The health benefits of Yarsagumba are that, It is believe to relieve exhaustion and fatigue, decreases stress, strengthen kidneys, strengthen stamina, strengthen lungs, increase libido of both men and women, increases semen, strengthen the immune system, strengthen muscles and body strength, relive phlegm congestion and enhance calmness and sense of balance.

4.5.6 Using Methods of Yarsagumba

It is very easy to use, just put it in boiling water or it can be boiled with water, then sipping the liquid as tea, coffee milk or honey. It can be bitten and swallowed simply in the way

of tasting like liquorice. Nowadays, many companies and pharmacy using as powder and making capsule, tablet, and mixing in our hygienic food, but it is better to use it in a natural way which can be very useful or our health. It is still popular aphrodisiac for men.

4.6 Income from Yarsagumba Collection and its Impact on Rural Livelihood

4.6.1 Contribution of Different Sources in Total Annual Income.

The contribution of different source such as business, carpet, agriculture, livestock, forest product, civil service and daily wages in total income are shows by the tabulation and figure as below:

Table 4.3: Income details of Collectors and Non-collectors households

Resources	Collectors Households		Non-Collectors Households		T Value	P Value
	Mean	Percent	Mean	Percent		
Agriculture	13177.74	13.81	40171.43	36.17	-4.2431	0.0001
Livestock	9019.62	9.45	7000	6.30	0.5619	0.5746
Government Services	28762.26	30.13	25028.57	22.53	0.1571	0.8753
Forest Product	5829.06	6.11	2000	1.80	1.0527	0.1467
Daily Labor	8183.02	8.57	11142.86	10.03	-1.5584	0.1202
Business	14192.45	14.87	7857.14	7.07	1.1221	0.1314
Others	16281.13	17.06	17871.43	16.09	-0.5526	0.5809
Total	95445.30	100	111071.40	100		

Source: Based on the Field Survey, 2013

As Table4.3, the average agriculture income of collectors and non-collectors households are 13177.74 and 40171.43 respectively. This shows that t-value for agriculture income between collectors and non-collectors is -4.2431 and p-value is 0.0000, this implies that the difference in agriculture income between collectors and non-collectors is extremely significantly different at less than 1%.

The average income from forest product of collectors and non-collectors households are 5829.06 and 2000 respectively. This shows that t-value for forest product income between

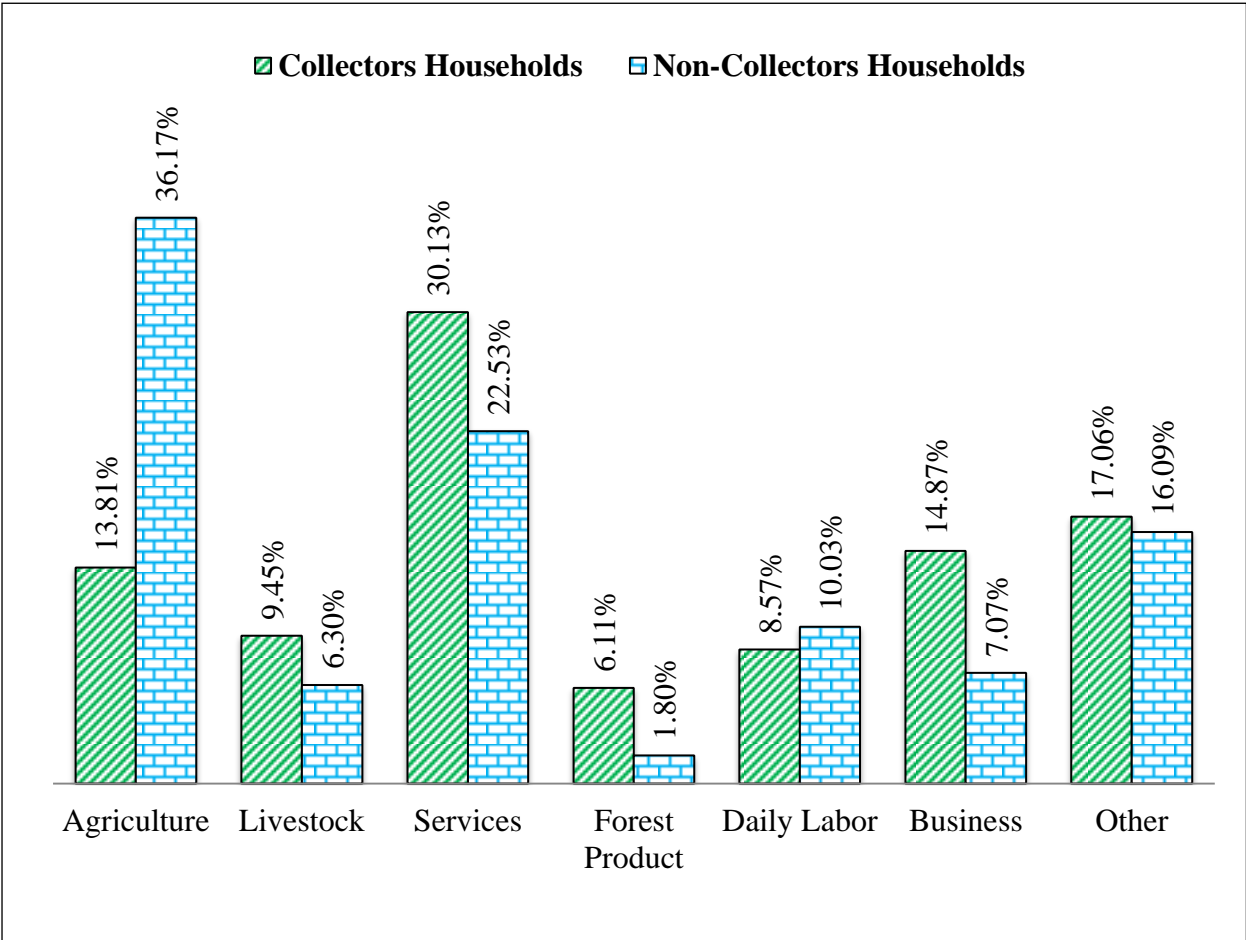
collectors and non-collectors is 1.0527 and p-value is equal to 0.1467 which is not significant at greater than 10%, this implies that the difference in income from forest product between collectors and non-collectors is not statistically significant.

The average income from daily labor of collectors and non-collectors households are 8183.02 and 11142.86 respectively. This shows that t-value for daily labor income between collectors and non-collectors is -1.5584 and p-value is equal to 0.1202 which is not significant at greater than 10%, this implies that the difference in income from daily labor between collectors and non-collectors is not statistically significant.

The average income from business of collectors and non-collectors households are 14192.45 and 7857.14 respectively. This shows that t-value for business income between collectors and non-collectors is 1.1221 and p-value is equal to 0.1314 which is not significant at greater than 10%, this implies that the difference in income from business between collectors and non-collectors is not statistically significant.

The study shows that, the income gain from services, livestock and other economic activities are not different between collector and non-collector household. This is no statistically significant.

Figure 4.11: Contribution of Different Income sources of collectors and non-collectors households



Source: Field Survey, 2013

As Figure 4.11, the forest products contributed the amount (6%) of collectors and (2%) of non-collectors to the total annual income of collectors and non-collectors; it was followed by civil service (30%) and (23%), agriculture (14%) and (36%), daily wages (9%) and (10%), livestock(9%) and (6%), business (15%) and (7%) and others (17%) and (16%) respectively. This shows that the non-collectors households more depends on agriculture than collectors, but they are less depends on forest product.Except the income from agriculture and daily labor wages, the income from livestock, business, services and other economic activities of collectors households is more than the non-collectors households.

4.6.2 Expenditure details in Different sectors from Annual Income of Collectors and Non-collectors.

The expenditure details in different sectors such as education, health, fooding, clothing, agriculture, livestock, return debt, travel, festival celebration and miscellaneous from total annual income are shows by the tabulation and figure as below:

Table 4.4: Expenditure details of Collectors and Non-collectors households

Items	Collectors Households		Non-Collectors Households		T Value	P Value
	Mean	Percent	Mean	Percent		
Health	14495.47	9.10	5530	7.08	1.7999	0.0364
Education	23974.53	15.05	9057.14	11.59	1.8204	0.0349
Cothes	15457.36	9.71	12085.71	15.46	2.3168	0.0106
Foods	24894.34	15.63	19942.86	25.52	2.5595	0.0055
Travell	7669.06	4.82	4514.29	5.78	1.2483	0.1065
Agriculture	1949.06	1.22	1954.29	2.50	-0.0109	0.5044
Livestocks	4476.23	2.81	914.29	1.17	1.9954	0.0235
Festival	13971.70	8.77	9900	12.67	2.9016	0.0020
Return Debt	38781.13	24.35	7454.29	9.54	5.3253	0.0000
Miscellaneous	13584.15	8.53	6800	8.70	3.6537	0.0002
Total	159253	100	78152.87	100		

Source: Based on the Field Survey, 2013

Table 4.4 indicates that the YG collector households expances on health, education and food are much higher than non-collector household. The average health expenditure of collectors and non-collectors households are 14495.47 and 5530 respectively. This shows that t-value for health expenditure between collectors and non-collectors is 1.7999 and p-value is equals to 0.0364 which is not quite statistically significant at less than 10%, this implies that there is significant difference between collectors and non-collectors households in terms of health expenditure.

Similarly, the average education expenditure of collectors and non-collectors households are 23974.53 and 9057.14 respectively. This shows that t-value for education expenditure between collectors and non-collectors is 1.2804 and p-value is equals to 0.0349 which is not quite statistically significant at less than 10%, this implies that there is significant difference between collectors and non-collectors households in terms of education expenditure.

The average clothes expenditure of collectors and non-collectors households are 15457.36 and 12085.71 respectively. This shows that t-value for clothes expenditure between collectors and non-collectors is 2.3168 and p-value is equals to 0.0106 which is statistically significant at less than 10%, this implies that there is significant difference between collectors and non-collectors households in terms of clothes expenditure.

The average food expenditure of collectors and non-collectors households are 24894.34 and 19942.86 respectively. This shows that t-value for food expenditure between collectors and non-collectors is 2.5595 and p-value is equals to 0.0055 which is statistically significant at less than 10%, this implies that there is significant difference between collectors and non-collectors households in terms of food expenditure.

The average travel expenditure of collectors and non-collectors households are 7669.06 and 4514.29 respectively. This shows that t-value for travel expenditure between collectors and non-collectors is 1.2483 and p-value is equals to 0.1065 which is not statistically significant at greater than 10%, this implies that there is not statically significant difference between collectors and non-collectors households in terms of travel expenditure.

The average livestock expenditure of collectors and non-collectors households are 4476.23 and 914.29 respectively. This shows that t-value for livestock expenditure between collectors and non-collectors is 1.9954 and p-value is equals to 0.0235 which is statistically significant at less than 10%, this implies that there is significant difference between collectors and non-collectors households in terms of livestock expenditure.

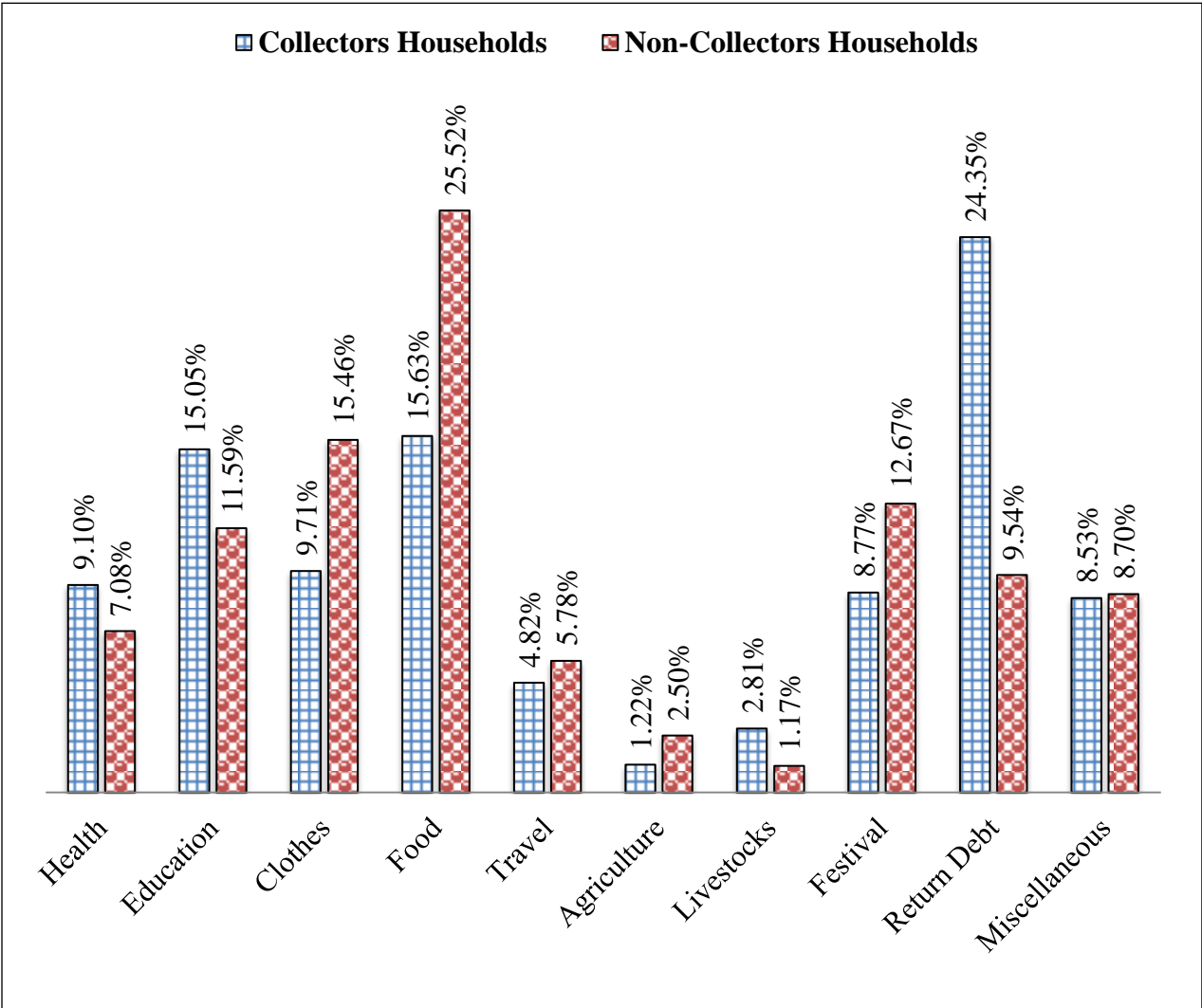
The average festival expenditure of collectors and non-collectors households are 13971.70 and 9900 respectively. This shows that t-value for festival expenditure between collectors and non-collectors is 2.9016 and p-value is equals to 0.0020 which is statistically significant at less than 10%, this implies that there is significant difference between collectors and non-collectors households in terms of festival celebration expenditure.

The average return debt expenditure of collectors and non-collectors households are 38781.13 and 7454.29 respectively. This shows that t-value for return debt expenditure between collectors and non-collectors is 5.3253 and p-value is equals to 0.0000 which is extremely statistically significant at less than 10%, this implies that there is extremely statistically significant difference between collectors and non-collectors households in terms of return debt expenditure.

The average miscellaneous expenditure of collectors and non-collectors households are 13584.15 and 6800 respectively. This shows that t-value for miscellaneous expenditure between collectors and non-collectors is 3.6537 and p-value is equals to 0.0002 which is extremely statistically significant at less than 10%, this implies that there is extremely statistically significant difference between collectors and non-collectors households in terms of miscellaneous expenditure.

According to the study, the expanses on agricultural activities of collector and non-collector households are not different. This is not statistically significant.

Figure 4.12: Expenditure details of Collectors and Non-Collectors households



Source: Based on the Field Survey, 2013

The above figure 4.12, shows that the expenditure trend of collectors and non-collectors household was different. In education expenditure, collectors households (15.46%) and non-collectors households (11.59%) of their annual income. Likewise, in health 9.10% and 7.08%, in clothes 9.71% and 15.46%, in food 15.63% and 25.52%, in travel 4.82% and 5.78%, in agriculture 1.22% and 2.50%, in livestock 2.81% and 1.17%, in festival celebrations 8.77% and 12.67%, in return debt 24.35% and 9.54% and in miscellaneous 8.53% and 8.70% respectively for collectors and non-collectors households.

This shows that the non-collectors households expenditure is less in education, health, livestock and other economic activities than the collectors households. But the expenditure in food, clothes, travel, agriculture, festival is more than the collectors households. We conclude

that the income from YG collection invest in productive sectors. So it shows that the Yarsagumba collection shows the positive impact on local people in Dolpa.

4.6.3 Average Collected Amount and Income of Yarsagumba of the Households from 2010-2013

In Dolpa district the Yarsagumba collection for income gain is common. It plays the crucial role for Dolpali people. The average household collection pieces and income in different years are shown by the tabulation and figure as below:

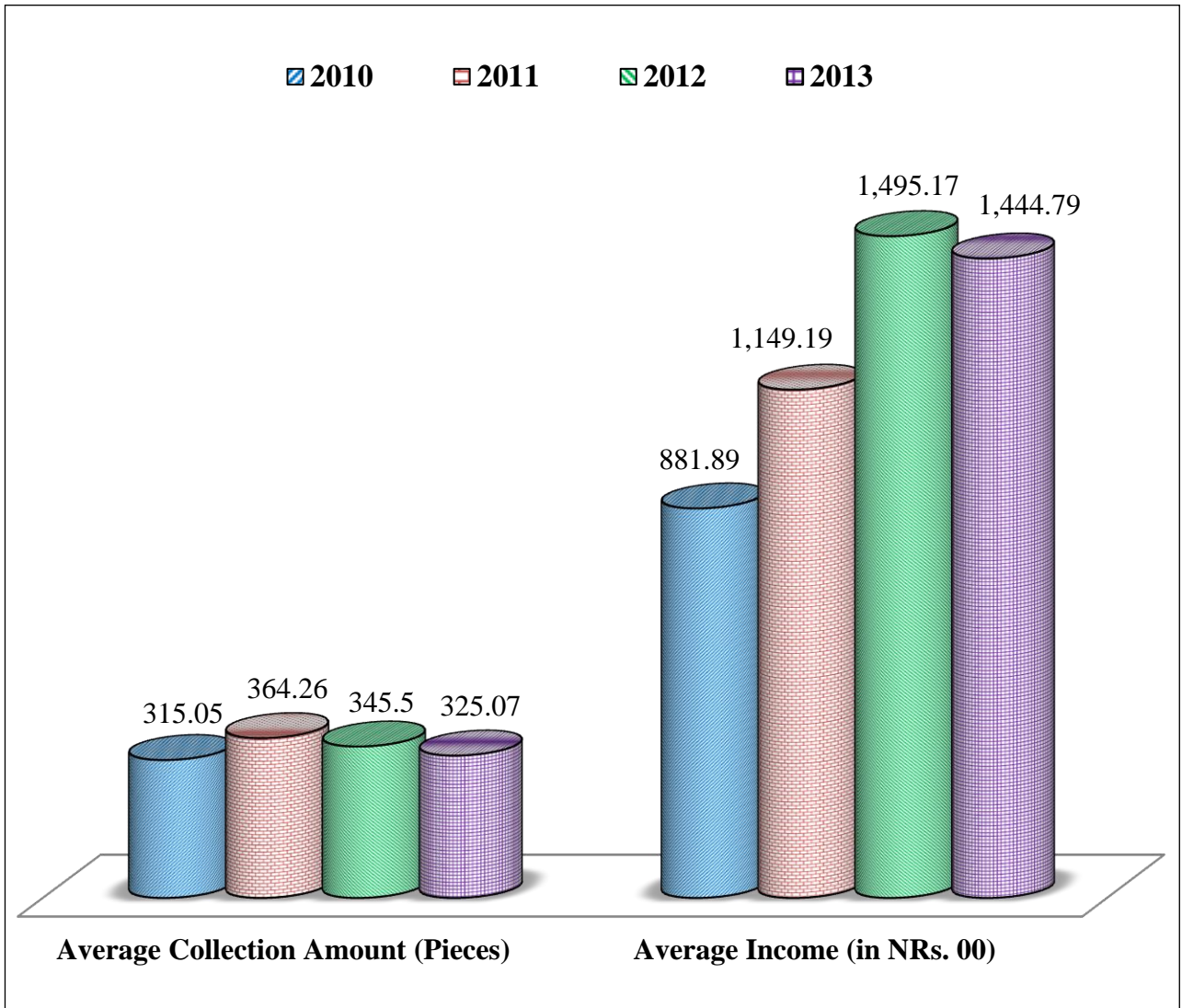
Table 4.5: Average Collected Amount and Income from Yarsagumba of the households from 2010 to 2013

Year	Average Collection (Pieces)	Average Annual Income (NRs.)
2010	315.05	88,189.13
2011	364.26	114,919.20
2012	345.50	149,516.70
2013	325.07	144,478.90
Total	1349.89	497,103.93

Sources: Based on the Field Survey, 2013.

As the above table 4.5, the average household collection was found to increase from 2010 to 2011. 315.05 pieces in 2010 and 364.26 pieces in 2011. From 2012, the average household collection was started to decrease. 345.50 pieces in 2012 and 325.07 pieces in 2013. The average household income from Yarsagumba was found to increase over the year due to its increasing demand and decreasing the collection amount. In 2010 the average household income was NRs. 88,189.13, in 2011 NRs. 114,919.20, in 2012 NRs. 149,516.70, and in 2013 NRs. 144,478.90. This study shows that the ratio of the household collection amount was decreasing and the ratio of income from YG was increasing over the year.

Figure 4.13: Average Household Collection Amount and Income (2010-2013)



Sources: Based on the Field Survey, 2013

As the above figure 4.13, the household's average collection amount increase from 2010 to 2011 from 315.05 to 364.26 pieces. From the 2012, it begins to decreases. But the household's average income from Yarsagumba gradually increasing in rate from 2010 to 2012 and slightly decrease in 2013. According to the local people, traders, key informants this is happening because of high demand and low collection amount of YG. From the last some years the amount of YG was decreasing because of higher participation, lack of preservation, immaturity collection of YG, lack of awareness, knowledge about YG, and proper rules and regulation, etc.

4.6.4 Expenditure details in Different sectors from the income of Yarsagumba

The rural livelihood of Dolpa were highly depends on income from Yarsagumba collection. It is a main income source of them. Around the 75% of households expenditure depends on income from Yarsagumba. The average expenditure details in different sectors such as education, health, fooding, clothing, agriculture, livestock, return debt, travel, festival celebration and miscellaneous from total annual income of Yarsagumba are shows by the tabulation and figure as below:

Table 4.6: Average Expenditure details of Collectors Households

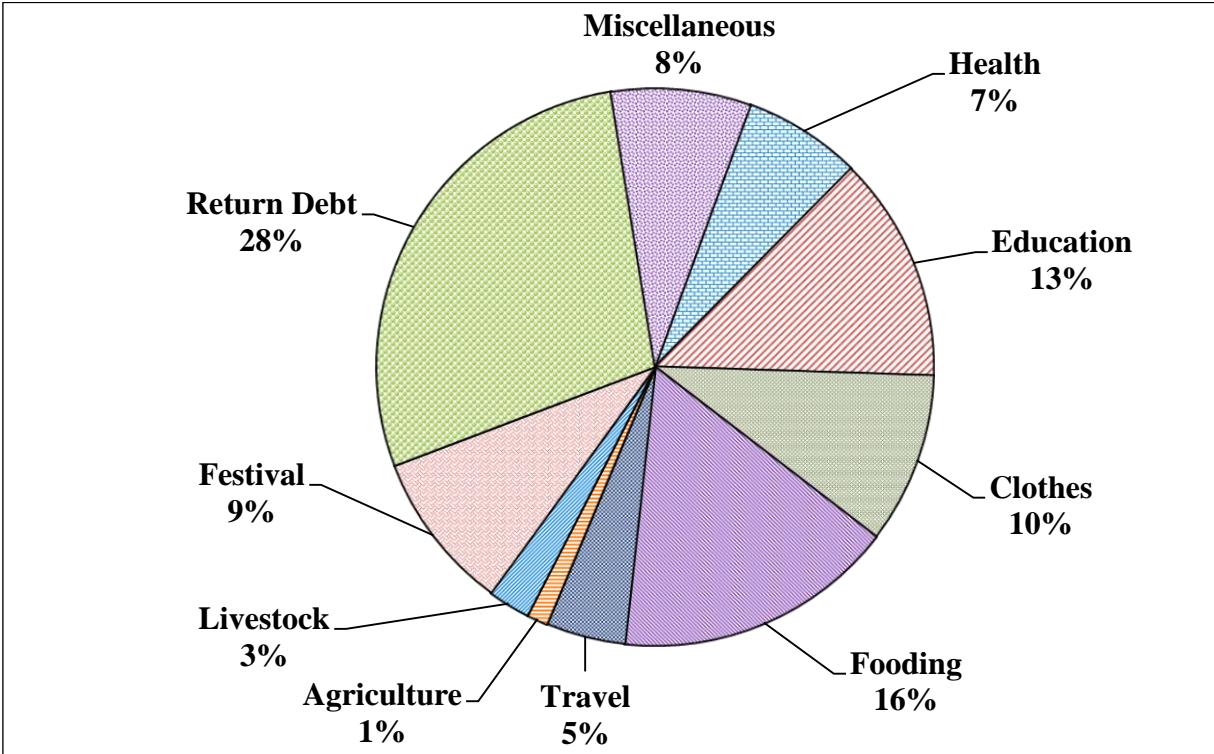
Items	Average Expenditure Details of Yarsagumba Income	
	Average Expenditure (NRs)	Percentage (%)
Health/Treatmen	9,096.23	6.85
Education	17,403.96	13.10
Cothes	13,196.60	9.93
Foods	21,641.51	16.29
Travel	6,073.21	4.57
Agriculture	1,633.21	1.23
Livestocks	3,306.79	2.49
Festival	12,226.42	9.20
Return Debt	37,514.34	28.24
Miscellaneous	10,747.17	8.09
Total	132,839.44	100

Sources: Based on the Field Survey, 2013

As the above table 4.6, shows that the household average total expenditure of the Yarsagumba income was 132,839.44 in the last year. Out of this total expenditure, NRs.9,096.23 (6.85%) of health, NRs.17,403.96 (13.10%) of education NRs.13,196.60 (9.93%) of clothes, NRs.21,641.51 (16.29) of fooding, NRs.6,073.21 (4.57%) of travel, NRs.1,633.21

(1.23) of agriculture, NRs.3,306.79 (2.49%) of livestock, NRs.12,226.42 (9.20%) of festival, NRs.37,514.34 (28.24%) of return debt, and NRs.10,747.17 (8.09%) of miscellaneous expenditure respectively.

Figure 4.14: Distribution of Income from Yarsagumba of the Households



Source: Based on the Field Survey, 2013

As the above figure 4.14 shows that the highest amount of expenditure was in return debt (28%), followed by food purchasing (16%), education (13%), clothes (10%), festival (9%), miscellaneous (8%), health/treatment (7%), travel (5%), livestock (3%) and the last expenditure agriculture (1%). This shows that the highest purchasing of the households was on return debt (28%), food purchasing (16%), education (13%) and clothes (10%) of the collector household's income from Yarsagumba.

4.6.5 Changes in Livelihood Assets

The livelihood framework identifies five core asset categories. Which human capital, social capital, natural capital, physical capital, financial capital. This study focused on changes in physical and financial assets between after 2000 due to income of YG.

There was a significant change in the physical assets of the rural commodity from the income of YG. Out of total respondents, 50% built new houses, purchase land and other physical assets. The major contribution of funds to house construction was from YG income. There was a significant change in access to medical treatment, school and college because of the revenue gained by the respondents. And also significant changes were seen that installation of the solar system, purchasing Fooding, clothing and other basic needs. From this study, overall shows that the villagers' livelihood changes positively expect some negative.

4.6.6 Positive Impacts

Yarsagumba has become a major income source with the contribution 25 percent of annual income of HHs in rural in Dolpa. In the past time, most of the households were unable to send their children to school and college at District headquarters, Nepalgunj, Surkhet, Kathmandu and different part of India and other country but now a days most of the households are now able to send their children to district headquarter and the major cities like Kathmandu, Nepalgunj and Surkhet for better education opportunities. The majority of the local people are aware of health care and able to manage the cost of modern treatment and visiting the hospitals in Nepalgunj and Kathmandu. Majority of the households are able to manage their basic needs including the food and for the whole year. Female collectors have utilized the money earned from the Yarsagumba trade in buying gold and ornaments.

The significant change was in acquiring infrastructure like solar energy system and communication and entertainment items like TV, CD/DVD players. Some of the school and college students became independent in their educational expenses from the income gained from the collection of Yarsagumba. The Yarsagumba trade has significantly contributed to uplift the socio-economic condition of local people in the study areas. The collectors locally organized to some extent to bargain to the price of their product and are sharing ideas and knowledge among themselves. Awareness of local people on education and health care is building due to frequent interaction with knowledgeable persons.

4.6.7 Negative Impacts

During the YG collection season, local schools are informally closed because the teachers and students go for YG collection. The people have changed their habits slightly to the use of more expensive and luxurious goods, which is a good signal of development but if the income is not sustainable, the impact will be harmful. In some cases, youths are prone to the bad habits of alcoholism and gambling, which reduce the productivity of youths, and make them lazy and luxurious. People are careless in agriculture activities as the collection of Yarsagumba is an easy way of earning money, and it does not need the hard work the whole year. Youth and energetic people have to leave home in the search of YG as the result small body and old persons find less care. Prices of market commodities rise very high during the collection season of YG. Sometimes accidents caused the loss of life of collectors as the collection sites are really dangerous due to the harsh terrain, their geographical structure and the climate is uncertain. Unsustainable harvesting of Yarsagumba may decline the income of local community in the future.

4.7 Yarsagumba Collection Practices, Problem and Measures

4.7.1 Collection Practices of Yarsagumba in Dolpa

People mainly involved in Yarsagumba collection due to lacking of the alternative income sources and high market demand collection during herding and for personal expenses are other reasons for Yarsagumbba collection.

The peak-harvesting season in Dolpa is from mid-May to mid-July. This year the collection started from 24th May and people from all VDCs participated in the collection.

Collectors from Yarsagumba fertile VDCs were seen more participating in the venture. Most of the collectors were from near VDCs like Shahartara, Raha, Majhphal, Tripurakot, Kaigaun, Dunai, Pahada, Liku, Juphal, Phoksundh, Dho, Bhijer, Saldang, Tinje, Chharka, Rimi. Also the people from Nepalgunj, Kathmandu, Other and neighbors district participated (more

than 20 district). Beside that local employee in Dolpa, teachers, students, almost family members took part in the collection.

A mass gathering of Yarsagumba requires an intensive but extensive search. The grassland possessing Yarsagumba are vast but the visible part of the fungus is very small often no longer than 2.5cm. It can be spotted only with a close look. The daily harvest quantity of Yarsagumba varied from a few specimens to several dozens, collectors on an average gathered 10 to 50 specimens in a day. After digging the first piece, collectors usually offer a pray to the God. The amount of collection in a season depends on past experience of the collectors and dedication for the collection. They also believed that the availability of this treasure depends on luck of a collector. Recognizing lucrative benefits receiving from the business of Yarsagumba, people mainly focused on the mass gathering of the product during the collection season and keeping other activities aside. Normally schools used to be closed each year during the collection season for 15 to 30 days and students participated for collection. People mainly focus on the mass gathering of the peak season of Yarsagumba collection and trade in May-July. It is difficult to carry out labor intensive project community and government infrastructure project such as local route construction come to half finding, local level also become difficult.

During the collection period of household members go for collection and only child and elder people live in the village, most member of household come out at the pastureland, turning the hunt into a joyful event. In addition some people go to collection site to serve double purpose of trading grocery items and participate in collection themselves. Locally Yarsagumba also serves as money substitutes and people exchange substance goods with it.

DFO of Nepal Government holds the legal right to grant collection permit by charging royalty of NRs.10,000per kg. and from these year every participants must have to keep permission from DFO, Dolpa. Among the district people, there were 500 to 1500 and for the out of district participant, there were minimum 5000 rupees have to pay before the participation.

According to the local information the participation of collectors is increasing year by year but the total amount of collectors have not increased significantly. Average harvesting quantity of Yarsagumba per collector has hence decreased.

People from all ethnic and religious backgrounds were participated for Yarsagumba collection. Collectors of both sex and from the lowest of age seven to the highest age of seventy-six were seen taking part in collection. Local key informants have said that about 75% of total population, including children and elderly people go for Yarsagumba collection; only disabled children, women (such as pregnant) and old people remain in the villages. However, child born cases were also found in the pastures. Some people were there to serve dual purpose of trading grocery items and also to participate in collection themselves. Locally, it was also observed that Yarsagumba served as money substitute and people exchange subsistence goods with it.

4.7.2 Collecting Method

The study has revealed that Yarsagumba collectors in dolpa used the similar techniques prevalent in other part of Himalaya. The harvesting procedure itself was simple; collector usually carried small sole (locally called “Khurma” or “Kutto”) or used their knife to lift caterpillar fungus out of the fertile mud rich dark brown topsoil. The common practices were uprooting, picking and gathering. This was done carefully, since the breaking of the larva reduces the value. The larva is dug out with a pointed digger that is common tool for digging. Cotton bags are mostly used to storage and product.

Presently the function of medicinal plant collector in Dolpa is more focused on Yarsagumba. People mostly consulted on collecting Yarsagumba and keeping less preference to other herbs because of a better income. Some collectors have been noticed to be involved in collecting other medicinal herbs.

4.7.3 Cleaning Process

As Yarsagumba is highly priced and delicate product, its care is necessary for storage. Collectors after day-long collection come to the camp at the collection site and in the same evening brush, individual Yarsagumba pieces with an old toothbrush and then dry in the shade in cotton sacks. The brushing is done to remove the outer thin membrane and earthy materials. The products are kept away from moisture/water as far as possible. Normally it takes 7-10 days to air dry the product. A fresh mass of Yarsagumba when dried for 10 days shows sixty percent less weight than its original weight.

The collectors avoid plastic bag for the product storage and instead used cotton sack to keep it a long time. Regular care and brushing is necessary to maintain the good quality of product.

4.7.4 Problems

Yarsagumba is very difficult to collect due to cold, sun shine, and lack of thing like gloves digging equipment, warm shoes, clothes which are used in cold and snow areas. Besides those problems, other problems in collection are due to terrible and narrow trail, poor quality of food, insufficient clothes and shoes, lack of fuel and wood, health problem as diarrhea, vomiting, jaundice, facial skin cracks etc. Another problem is that it takes five days walk to reach the district headquarter so as to know the price of Yarsagumba and 76% of market price is taken by brokers and 24% by collectors, thus here we can say there is no market access.

There are many problems in Yarsagumba collection. Some problems in points as follows:

4.7.4.1 Transportation

Due to lack of transportation, difficult and steep hills covered with snow, the traveling to the place of YG is very risky. As everything, including tent, foodstuffs, and clothes and cooking utensils must be taken with themselves for many days, the YG collection is expensive and difficult.

4.7.4.2 Health Problem

It takes long time to collect YG. It is a very cold place where YG are found. Due to unfavorable climatic condition, people are affected of various kinds of sickness. As they hardly bath, it creates skin diseases as well as in case of serious. Such as diarrhea, vomiting, eyes problem, joint-ache, facial skin crack. Insufficient and poor quality of food stuff for collectors, insufficient cloths and shoes, inappropriate camping material for the harassing high altitude, insufficient fuel woods is the case of diseases.

4.7.4.3 Advance Investment/Poverty

The food grains produced in this area can last from 3 to 6 months to feed the people of this area. So far, the basic needs like food, clothes and other necessary things for the remaining time is concerned, they take loan from the local businessman in the condition that they would provide YG Tibetan businessman invest for YG in advance through their agents. Loan in advance has drawn back that they are liable to sell their product in relatively cheaper price. As the people are poor they cannot wait for a reasonable price, to fulfill their daily requirement, they are selling their products in cheaper price.

4.7.4.4 Quality and Grading

Quality of YG depends on how they have refined, that is cleaned and dried YG.

The YG properly cleaned and dried get a reasonable price.

It is necessary to know about the grading of YG. For example, properly cleaned and dried YG get higher price, whereas mixed YG get relatively lower price.

4.7.4.5 Pollution

As the people who go to collect YG, take a lot of foodstuffs, like biscuit, noodles, etc. they throw the plastic, plastic bags, papers and other waste materials everywhere every year. Thus, the area is being polluted.

4.7.4.6 Conflict

Like previous years, the people from other area also come to collect YG in this area. However, the local people do not allow them to come to collect YG why it has created the situation of conflict in YG collection. Likewise there are so many conflicts occur during the collection period and have to face the human and property losses.

4.7.4.7 Accident

It is very risky and difficult to collect YG. Sometime they have to cross very difficult snowy mountains, which sometimes takes the life of people. Because of terrible and the narrow foot trail, some persons lost their lives passing through the difficult trail.

4.7.4.8 Low Price

As people are collecting YG, which is not mature, and lack quality, they do necessary to protect and pressure the areas where YG are abandoning. The government must make rules and regulation regarding YG collection also, so that the YG grow continually in sufficient amount not get a reasonable price as the people, do not get enough information about the market prices, it lacks the bargaining power of the YG collectors. Collectors get only 30% price of international prices.

4.7.4.9 Natural Problem

Numbers of people go to collect YG. They required wood for cooking food and keep themselves warm from cold. They are cutting trees in unmanaged way, which has a negative impact on the forest. Firing is easy to fond YG, after firing on the grassland, but it can have negative impact on the growth of YG. Poaching is another problem. While collecting YG, they are hunting the wild animals. Therefore this type of poaching of wild animals, it is necessary to have pressure

of Government offices. As the people set fire on the grassland, cut trees, shrubs and plants, throw wastes like plastic bags, it is destroying the natural habitat of that area. As the place where YG are found is mostly covered by grass and snow, it is difficult to find firewood for cooking food and warmth.

4.8.5 Measures

Following advices have been obtained to solve problems that arise during YG collection, from household surveys, informed discussion, group discussion and various interactive programs with the various people.

1. Construction of road or an accessible route to the region where YG found.
2. Access for all the consumers to that area. Development of technology, regards professional cultivation of YG.
3. Development of proper technique of collecting YG.
4. Increasing public awareness regarding deforestation, fire, poaching and pollution.
5. Facilities of health camp during collection.
6. Refining facilities inside our own country.
7. Provision of license for YG trade.
8. Mechanism of proper coordination among YG collectors, traders and related agencies.
9. Direct contact of YG collectors with dealers.
10. Encouraging local investment in the YG trade.
11. Proper marketing system.
12. Regular information regarding prevailing market price.
13. Apart from these, collectors should be properly trained in collection, cleaning, drying and storing techniques by the skilled trainers.

CHAPTER-FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary

Forest is one of the important natural resources in Nepal and it has direct relation to the livelihoods of the rural Nepalese people. The Non-Timber Forest Products are one of the major sources of cash income to the rural people particularly in the remote areas of Nepal.

Yarsagumba is an economic specie, which is contributing a significant amount in national economic of Nepal. Less or no attention was given by the government officials for its proper management and by researcher for study. It was lacking systematic and detailed study of Yarsagumba. The main object of this study was show the contribution of Yarsagumba in rural people. Dolpa district was selected for this study because Dolpa is recognized as a very fertile district for production of Yarsagumba and the rural people of Dolpa have more than 10 years' experience in the collection and trading of YG. Out of the total 90% households of Dolpa were found involved in collection of Yarsagumba in 2013. The total 7488 households in Dolpa district, 300 households were taken as sample for this study. Of the total 300 households were studied from different cast, class and ethnicity. From these households, 265 households were involved in the collection of Yarsagumba and 35 households were not involved in the collection of Yarsagumba. The transect walk method was used to select respondents. The questionnaire survey was carried out to get information from collectors. Secondary information was taken from different publications, journals, hands out and websites.

5.2 Conclusion

Yarsagumba collection started on May 24 and end on July 15 in Dolpa in 2013. It is concluded that sustainable production and trading of Yarsagumba has become an instrumental part for the socioeconomic enlistment of the rural community of Dolpa as well as country because Yarsagumba is being a main income source by providing different employment opportunities for rural people. Thus, income of Yarsagumba has played a significant role in

Mountain people for their livelihood. Besides this, its collection is affecting the biodiversity of forest in the region. Therefore, it can be assumed that this species are needed a sustainable development strategy so that both the forest biodiversity and Yarsagumba can remain in their natural habitat which is a great asset of nature.

This study focuses on the Yarsagumba collection technique and the trade of Yarsagumba in Dolpa. It showed that Dolpa area has exceptionally rich in availability of Yarsagumba and local people to superb knowledge regarding its business and use, the present study has been able to make the following conclusion.

- 5.2.1 In Dolpa Yarsagumba are observed from 4000-5000m altitude, high availability of the product.
- 5.2.2 People from all VDCs around 90% participate in the collection of Yarsagumba in Dolpa. During the collection period majority of household members go for collection and majority of the village become vacant by more than 40 percent. At this period almost all schools closed due to no students as well as teachers.
- 5.2.3 The maximum participation was found below 25 years age group family members.
- 5.2.4 The total collection of Yarsagumba was 350kg in 2013 and it is decreasing rate from 2010. And the trend of price changes was increasing rapidly from the beginning the collectors got very low price due to poverty and their insufficient knowledge about market
- 5.2.5 The highest proportion of expenses in education, health, food, clothing and other basic needs supply from Yarsagumba income.
- 5.2.6 The significant changes were seen in the physical assets, some built new house some installed solar system, some bought land, TV, Mobile and telephonic assets and ornaments etc.
- 5.2.7 People in Dolpa normally consider Yarsagumba as a tonic and sexual stimulants. Some also it as different type of medicine.

5.2.8 Yarsagumba is an important component of rural livelihood, as they play a critical role in natural economy and help sustain livelihoods of many rural households that include socially and economically disadvantaged groups.

5.2.9 Poverty is intimately related to natural resources. In the world, the poor have no access to non-natural resource and limited capacity to adopt. They rely more heavily on the direct exploitation of natural resource including forest resources overall. As consequences, poor people have no choice but to engage in unsustainable uses of natural resources. Most of the people in this area collect and sell Yarsagumba to meet their hand to mouth.

5.3 Recommendations

Based on the result of this study and suggestion received from local stakeholder the following recommendation has been made for the conservation and sustainable use of Yarsagumba.

5.3.1 Education on conservation and campaigns among people need to be carried out to ensure that fungi are harvested after sufficient spore dispersal, environmental impact of on unscientific collection, awareness programs on sustainable harvesting, management and utilization of Yarsagumba at the local level need to be conducted for its conversation. And there should be an awareness raising program to effect of hunting, firing, improper harvesting of plants.

5.3.2 Further study concerning iso-potential areas of Dolpa are required for the availability assessment of Yarsagumba in the areas to diversity the collection site thereby contributing in the economy of the local people.

5.3.3 Detailed scientific exploration to monitor ecological factor and regeneration pattern should be carried out in other parts of the country covering the potential area for Yarsagumba in addition to Dolpa.

- 5.3.4 There should be a clear cut guideline for the estimation of production and productivity of Yarsagumba. And a detailed international market study is required to provide maximum benefits to local collectors.
- 5.3.5 Maximum trading of Yarsagumba is in raw form, there is need of value addition to give the maximum income economy. And a step should be taken for maintaining a proper data base on yearly production, collection and trading of Yarsagumba.
- 5.3.6 The proactive initiative role should be played by the government for market promotion, e.g., cooperative, buy back. As well as strong monitoring of YG harvesting is strongly recommended at local level by GOs, NGOs, and CBOs to ensure sustainable harvesting.
- 5.3.7 The present royalty rate of Yarsagumba needs further review by the government in the global context of its market.
- 5.3.8 Plantation should be established in the forest for collection season. And overgrazing should be checked to protect the Yarsagumba.
- 5.3.9 Community ownership and mobilization should be appraised for effective management of pastures.

APPENDIX

A Study on Yarsagumba Collection in Dolpa District of Nepal

Questionnaire to the Collectors and Non-Collectors

A. General Information:

1. Name of Respondent
2. VDC Ward No. Village
3. Caste Sex Age.....
4. Main occupation:
 - a) Farmer
 - b) Social Worker
 - c) Politician
 - d) Business
 - e) Government employee
 - f) Others
5. Family Size:
6. No of animals/livestock:
 - a) Goat/Sheep
 - b) Cow/Oxen
 - c) Buffalo
 - d) Pig/Boar
 - e) Hen/Pigeon
 - f) Other
7. Education Status:
 - a) Illiterate
 - b) Literate
 - c) Years of schooling: :
8. Land Holding: Total Ropani (Irrigated and Non-irrigated.....)
9. Food sufficiency:
 - a) Below 3 Months
 - b) 3-6 Months
 - c) 6-9 Months
 - d) Year around
 - e) Surplus

B. Participation of Community Forest User Group (CFUG) in collection and uses:

10. Do your family involved in Yarsagumba collection? a) Yes b) No
11. Why do your family members go to collect Yarsagumba for?
 - a) Household use
 - b) Education
 - c) Treatment
 - d) Research
 - e) Enjoyment
 - f) Return debt

g) Others.....

12. When did you come to know about the collection and uses Yarsagumba?Years.

13. When did you start to participate in collecting Yarsagumba? Years.

14. From your family, how many members are participating for YG collection in the past?

a. 2012 b. 2011 c. 2010 d) 2013

15. How did you come to know about this product?

a) Forest technicians b) Traders c) Neighboring users
d) Radio/TV/Newspapers e) Friends f) Others

16. When did you start to participate in Yarsagumba collection?

17. Do you have to pay any amount for participating in Yarsagumba collection?

a) No b) Yes i) NRs.....per head ii) NRs..... per family.

18. Generally who took this type of fees for participating YG collection?

a) Local CBOs b) DFO c) Others.....

19. Where do you go to collect Yarsagumba?

20. How much time does it take to reach your camp/station from your residence?

21. How far you go to collect the Yarsagumba from your camp/station? hrs.

22. Have you used the Yarsagumba in your family? a) Yes b) No

23. Do you have an idea of the local use of Yarsagumba? a) Yes b) No

24. Do you know the present value of YG in the market? a) Yes b) No

25. Annually collected amount and income:

Year	Annually Collected Amount of Yarsagumba		Total Income (NRs.)
	Kilogram (kg)	Pieces	
2010			
2011			
2012			
2013			

26. How much income earned from the following sources by your family:

- | | |
|-----------------------------|-------------------------|
| a) Agriculture | b) livestock |
| c) Government service | d) Forest product |
| e) Daily labor | f) Business |
| g) Remittances | h) Others |

27. In your family generally, who take decision on use of the income?

28. How much your family does spends on the following items in 2069?

- | | |
|----------------------|------------------------|
| a) Health | b) Education |
| c) Clothes | d) Food |
| e) Travel | f) Agriculture |
| g) Livestock | h) Festivals |
| i) Return debt | j) Miscellaneous |

29. In which activity, did you spend the income gain from YG last Year?

- | | |
|----------------------|------------------------|
| a) Health | b) Education |
| c) Clothes | d) Food |
| e) Travel | f) Agriculture |
| g) Livestock | h) Festivals |
| i) Return debt | j) Miscellaneous |

30. What is the impact of YG in your community?

- | | | | |
|-------------|-------------|--------------|---------------|
| a) Positive | b) Negative | c) No Impact | d) Don't know |
|-------------|-------------|--------------|---------------|

31. Do you feel any changes in your socio-economic status from the income gain from YG?

- | | | | |
|-------------|-------------|-------------|---------------|
| a) Positive | b) Negative | c) As usual | d) Don't know |
|-------------|-------------|-------------|---------------|

32. What is the total income gain from YG in your family in 2069? Rs.

33. Have you faced any human and property losses during the collection of YG?

- | | |
|--------|-------|
| a) Yes | b) No |
|--------|-------|

34. Is YG collection suitable in the economic point of view?

- a) Yes b) No d) Don't know

35. What are the major problems during the collection of Yarsagumba?

- a)
- b)
- c)

36. Have you any suggestion?

- a)
- b)
- c)

Interviewer Name:

Date:

REFERENCES

- Adhikari, M. K. (2000). *Mushroom of Nepal*. Kathmandu, Nepal: P.U. Publisher Printer.
- Aryal, A., Dutta, I.C., & Dhungel, S.K. (2004). *Parasitic Fungal on Moth's Larvae: Yarsagumba (Cordyceps sinensis), Ecology and Local Economic Contribution in Nepal*. Pokhara, Nepal: The Biodiversity Research and Training forum (BRTF)
- Chaudhary, M. (2004). *Information of medicinal plants of Myagdi District*. Myagdi, Nepal: District Forest Office.
- Chhetri, R. (2005). Study in Collection of YG in relation to rural livelihood and forest biodiversity in Darchula District of Nepal: an unpublished M.Sc. dissertation in Forestry. Kumaun University, Nepal: Department of Forestry
- Chhetri, R. and Gotame, B. (2010). Employment generation and economic up-scaling from collection and trade of Yarsagumba (*Ophiocordyceps sinensis*) in Nepal (A case of Dolpa district) In: Forest-people Interaction (proceeding of National conference, Pokhara, Nepal, June 7 and 8, 2010) Institute of Forestry, Pokhara, Nepal. Pp 22-34
- Daniggelis, E. (1994). *Jungle Resource Use: Adaptive Strategies of Rais and Sherpas in the upper Arun Valley of eastern Nepal* in Micheal A., *Anthrology of Nepal Peoples, Problems and Processes (Eds., pp. 49-63)*. Kathmandu, Nepal: Mandala Book Point.
- Devkota, S. (2010). *Ophiocordyceps sinensis (Yarsagumba) from Nepal Himalaya: status, threats and management strategies*. Central Department of Botany, Tribhuvan University, Nepal: Author
- Devkota, S. (2006) Yarsagumba, Traditional Utilization in Dolpa District, Western Nepal. *Biological Journal RONAST*. Kathmandu, Nepal: Central Department of Botany
- Devkota, S. (2007, July). Yatra Yarsagumbba (Hunt for Yarsagumba). *Kantipur, National Daily, Kathmandu* (14.07.2007).
- Devkota, S. and Shrestha, A. (2006). *Yarsagumba and Traditional Utilization in Dolpa*. *Biological Journal of Nepal*. Kathmandu, Nepal: WWF

- Dhakal, B. (2063). *Yarsagumba Ek Parichaya*. Dillibazar, Kathmandu, Nepal: Makalu Prakashan Griha,
- Dhami, H. (2004) Yarsagumba Sankalan Garna Taskarharuko Tanti (Illegal traders are active in Yarsagumba collection). Churatimes and Rajdhani.
- DFO of Darchula.(2008). *Yarsagumba of Darchula*. District Forest Office,Darchula: Author
- DFO of Dolpa. (2067). *Dolpa Jillama Yarsagumba Sankalan Tatha Bebasthapan Ek Parichiya (An Introduction on Yarsagumba collection and management of Dolpa District)* updated version of *Prakartik Himalai Dhan: Yek Chinari-2065*. District Forest Office,Dolpa, Nepal: Author.
- DFO of Dolpa.(2009). *District Forest Office annual progress Report F.Y. 2008/2009*. District Forest Office, Dolpa, Nepal: Author.
- DOF. (2009). *Department of Forest annual progress report FY 2008/2009*. Department of Forest, Kathmandu Nepal: Author.
- Edwards, D. M. (1996). *Non-Timber Forest Products From Nepal: Aspects of the trade in Medicinal and Aromatic plants*. FORESC Monograph 1/98 FORESC, MFSC, Kathmandu: Author.
- FAO. (2013). *Forest Harvest: An Overview of Non Timber Forest Products in the Mediterranean* [Forestry Department]. Retrieved from <http://www.fao.org/docrep/x5593e/x5593e01.htm>
- Gautam, K. H. & Karki, M. (2003). *Strengthening Global Partnerships to Advance Sustainable Development of Non Wood Forest Product: Institutional and Policy Development*. World Forestry Congress Quebec Side Event: Author.
- Giri, B. (2004, August 20). Jibikako Jadi (Medicine Plant of Livelihood). *Kantipur (Kosheli Weekly)*, Kathmandu (20-08-2004).
- Gurung, R. K. (2003). *An assessment of Management and Trade Practice of YarsagumbaA case study of Annapurna, Manang District*. WWF, Kathmandu, Nepal: Author
- HMGN.(2002). *Nepal Gazette*, Vol. 3, Sestion 51, No 36, dated Jan 1, 2004.

HMGN. (2004). *Nepal Gazette*, Vol. 3, Section 54, No. 25 dated Oct 4, 2004.

HMGN.(2013).Nepal Economic Profile (IndiMundi). Retrieved from http://www.indexmundi.com/nepal/economy_profile.html

Kanel, K. R. (1999). *Analysis of policy and regulatory constraints in Development of Non-Timber Forest Product in Nepal*. WWF, Kathmandu, Nepal: Author

Lama et al., (2001), *Medicinal Plants of Dolpa Amchis Knowledge and Conservation*. Dolpa, Nepal

Luitel, H.S. (2000). *Identification of Researchable Issues and Intervention Options for NTFP Enterprises under Community Forestry. A Study of Western Himalayas of Nepal*. Indian Institute of Forest Management, Bhopal India: Author

Ministry of Forest and Soil Conservation.(2004). *Jadibuti Sankalan Samrachhen and Sanbardhan Bidi – 5 (Medicinal Plant collection, protection and management techniques)*. Ministry of Forest and Soil Conservation, HMGN, Kathmandu: Author

Ojha, H. (2000). *Current policy Issues in NTFP/MAPS Development in Nepal*. Kathmandu, Nepal: ANSAB

Pegler et al. (1994). Chinese women athletes broke a series of world records in distance event. *Steinkraus and Whitfield*, China

Regmi, D.D. (2003). *Conservation of Medicinal and Aromatic Plants for Sustainable Livelihoods in Nepal, second quarterly report for Darchula*. WWF, Kathmandu Nepal: Author.

Sharma, S. (2004). Trade of Cordyceps sinensis from high altitudes of the Indian Himalaya: Conservation and biotechnological priorities, for *Current Science, Delhi*. India: New Delhi

Shrestha, U.B. and Bawa, K. S. (2013). Trade, harvest, and conservation of caterpillar fungus (Ophiocordyceps sinensis) in the Himalayas. *Biological Conservation*. Available online February 1, 2013 from www.elsevier.com/locate/biocon database.

Wetsber, J. (1980). *Introduction of Fungi*. Cambridge, London: Cambridge University

Winkler, D. (2005). Yartsa Gunbu-Cordyceps Sinensis: economy, ecology & ethno-mycology of a fungus endemic to the Tibetan plateau. Tibet, China

Ying J., Mao X., Ma Q., Zong Y.C. & Wen H.A., (1987). *Icones of Medicinal Fungi from China*. Science Press, Beijing.

Zhu et al. (1998). The Scientific Rediscovery of an Ancient China herbal Medicine: Cordyceps Sinesis. *Journal of Alternative Complementary Medicine* Part 1 Volume4, Number3, pp.289-303. China

Glimpses of Yarsagumba in Dolpa District of Nepal



Caravan of Yarsagumba Collection (Gold Rush)



Caravan of Yarsagumba Collection (Gold Rush)



Temporary camp site and livestock at the YG site



Temporary Camp Site during YG collection



Kitchen of camp site during YG collection



A Sick woman with her daughter at camp site



A woman searching of Yarsagumba with her little baby



Yarsagumba in natural habitat



Digging Yarsagumba by local weapon 'Kutto'



Yarsagumba at the collection period



Searching of Yarsagumba



Yarsagumba collectors set up tents on the banks of a river that flows through collection sites of Dolpa district



Searching of Yarsagumba



Yarsagumba after collection



Yarsagumba after collection



Yarsagumba in different size



Yarsagumba before to selling



Measuring Yarsagumba