

Institutional Perspective of Yarsagumba (*Ophiocordyceps sinensis*) Collection in Kailash Sacred Landscape, Nepal and India

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Abstract

Ophiocordyceps sinensis (Yarsagumba) is a valuable non-timber forest product found in between 3000-5000 m elevation range throughout the Hindu-Kush Himalayan range. Kailash Sacred Landscape, Darchula of Nepal and Dharchula of India are good habitats of this species. People have been involving in collection and selling activities due to its high economic value. Governments of both countries also recognize its high value so that the royalty of Yarsagumba is assigned the highest one among all forest products for same quantity. However, due to its habitat in remote areas as well as diverse people involved in collection, there are several challenges in collection and trading within the site. Moreover, having two different set of rules for different countries but same eco-cultural landscape in collection and royalty payments, regulations on collection and trading has further increased the challenges. This paper tried to explore the opportunities and challenges in Yarsagumba collection and onsite trading in Darchula district of Nepal and Pithauragadh district of India from institutional perspective.

Keywords: Collection challenges, Management, Policy, Sustainability

Introduction

Landscape level conservation initiative in Kailash Sacred Landscape (KSL) was started in 2009. Program lunched since 2012 in first phase. Area coverage by the landscape is in largest proportion in Nepal (13289 sq. km), followed by China (10873 sq. km) and remaining parts in India (International Centre for Integrated Mountain Development [ICIMOD], 2019). Four district of Nepal (Humla, Bajhang, Baitadi and Darchula) and Pithauragadh district of India fall in the landscape. Biodiversity is an important resource in the Kailash Sacred Landscape. It provides numerous ecosystem services, ranging from the provision of food, fuel and shelter to cultural service including religious pilgrimages and tourism for other purpose (ICIMOD, 2019). The landscape is habitat to numerous species of plants, including many valuable medicinal plants such as Panchaule (*Dactylorhiza hatagirea*), Jatamansi (*Nardostachys grandiflora*), Kutki (*Neopicrorhiza scrophulariiflora*) and Yarsagumba (*Ophiocordyceps sinensis*) (Api-Nampa Conservation Area [ANCA], 2018).

Yarsagumba (*Ophiocordyceps sinensis*) is a caterpillar fungus that grows naturally in the northern

alpine grassland of Bhutan, India, Nepal and the Tibetan plateau of China at an altitude of 3000 to 5000 m (Zhang et al., 2009). However, Yarsagumba is distributed around 4000 m to 5500 m altitude in high-altitude grassland and on sloppy land in Darchula district in and around Bhagawati, Ghunsha, Byas and Rapla areas (Uprety et al., 2016). Recognized for its medicinal value (Gupta & Manvitha, 2017), it provides high economic returns to mountain communities living in subsistence economy (Shrestha & Bawa, 2014). As a result, Yarsagumba trade has become an important economic activity in the Kailash Sacred Landscape with its major market in China. A number of researchers found that it has a number of benefits. Researches range from medicinal effects (Shiao et al., 1997; Koh et al., 2003), chemical composition (Li et al., 2001; Shiao et al., 2002; Li et al., 2003), structural features (Kiho et al., 1999), quality control for quality products (Koh et al., 2002; Li et al., 2006) to the scientific rediscovery of Yarsagumba (Zhu et al., 1998) in the researcher field. But no research yet focus on the collection challenges on same eco-cultural landscape.

Sustainable harvesting, environmental management and its trade across the border have become pertinent

trans-boundary issues of concern in the KSL. Conservation salvage of *Ophiocordyceps sinensis* collection in the Himalayan mountains is neglected (Zhu et al., 1998). The ever-increasing harvesting pressure raises the question of sustainability. The fact that *Ophiocordyceps* has been collected for centuries and is still common argues for its resilience, but the lack of harvest studies for *O. sinensis* precludes a definite answer as to whether the harvest can be sustained at its current level (Winkler, 2008). National governments within the landscape are introducing guidelines and policies for sustainable harvesting and management practices, but policies and regulations for collection and trade of Yarsagumba differ from Nepal to India. This result will be very useful for the governments from where the Yarsagumba is collected and traded. Thus, this research aimed to identify the status of Yarsagumba management in two countries and to explore major challenges in Yarsagumba management and find out the possible way out. Therefore, this paper tries to explore the policy differences between two countries, because of this reason; are there any issues and challenges in collection of Yarsagumba in the same eco-cultural landscape? And suggest out the possible solutions for those issues raised during collection and trading (district level) at site level.

Materials and Methods

An embedded case study approach (Scholz & Tietje, 2002) was followed to carry out this study in a natural setting using a variety of methods as suggested by Collis & Hussey (2009) and Gerring (2007). Further, this study relied upon multiple sources of evidence using both qualitative and quantitative techniques (Yin, 2014). The study was based on descriptive and explorative social science research design. As suggested by Maxwell & Miller (2008) and Maxwell (2009), a single case study was deemed appropriate here, as phenomena about which little is known were studied in the case. Moreover, it is only such kind of forest management paradigm in the Karnali and Sudurpaschim Province of Nepal. This article is based on archival records of management plans, group-operating guideline, reports, meeting minutes and other official documents, together with focused

interviews, interaction program, direct field observation and participant observation (Kawulich, 2005). The findings were further substantiated and validated through a wide range of stakeholders who were directly or indirectly involved in Yarsagumba collection, trading, collectors' security personnel and the forestry staffs who are involved in the processes.

The primary information was collected through the semi-structured interview-schedule for key-informants based on their experience along with content analysis of archive (documents and reports) and direct field observation. Personal interviews were arranged with members of Management council of Api Nampa Conservation Area (ANCA), officials from ANCA, general users, Non Timber Forest Products (NTFP) and Medicinal and Aromatic Plants (MAP) concessionaires/contractors, local units (government) and Non Government Organization (NGO) personnel. Moreover, information and views of different stakeholders were collected during focus group discussion, key informant interviews, general assembly, interaction program and monthly meetings.

Further, the secondary data were obtained from various published and unpublished information sources i.e., relevant literatures, library study, research reports, annual reports, official documents, journals, magazines, newspapers, online sources, books, archival records of Api-Nampa Conservation Area.

Quality standard and credibility of the research

Qualitative inquiry is becoming more popular (Anney, 2014), where trustworthiness with reliability and credibility are considered as vital factors. To accomplish this, as suggested by Anney, (2014) some criteria as: (a) credibility (in preference to internal validity); (b) transferability (in preference to external validity/generalizability); (c) dependability (in preference to reliability) and (d) conformability (in preference to objectivity) were incorporated during each and every step for the study. Considering this, the following methods were employed in every step of data collection and analysis throughout the study to increase the quality standards and credibility of the research.

1. Un-obstructive measures (for triangulation)
2. In-depth interview (as an overall strategy)
3. Observational checklist (just not "hanging out")
4. Participant observation (involving in social world: meeting, office, field work/operation)
5. Elite interview (with conceptualization of the problem through thoughtful questioning).

involved with their sheep herds during Yarsagumba collection that deteriorate the resource. In Fiscal year 2073/074, around 3500 people involved in Yarsagumba collection (formal record). In Nepal side, only Nepali can enter and collect the Yarsagumba. They need to have a citizenship card (age above 16 years). Problem is that school remained closed during the season. Around 10-15 years school children are involved in the collection activity. They have full eye-sight to find a Yarsagumba. Village Development Committees (VDCs) also impose to charge entry fees for the collectors in this system, collector need to pay double fees. Difficult to regulate, very remote for

Results and Discussion

Status of Yarsagumba collection

Official record of the Division Forest Offices showed that around 3500 people were involved in Yarsagumba collection in the KSL area. People

Table 1: Perceptions of different stakeholders

Stakeholder	Perceptions
Political parties / local bodies	<ul style="list-style-type: none"> • Council and committees should be punished if they did wrong activities. • Local right synchronizes by council and Api-Nampa CA. • Permission and insurance program should be lunched effectively. • Local people should be provided with enough information on collection time and procedure • Local people focused program should be implemented, even orientation about the Yarsagumba, collection period, its importance etc. • There should be involvement of local bodies in Yarsagumba regulation. • Management committee and ANCA need to coordinate with local bodies while regulation the Yarsagumba.
Warden	<ul style="list-style-type: none"> • Yarsagumba collection area is the habitat of Red panda, Snow leopard, Kasturi etc. • In BS 2074-1-8, collection directives come into enforcement. • Almost 7 quintals of Yarsagumba per year is collected. • Collection time is around one month. • Directives enforce only inside the protected areas. • Pits are needed for waste management. • Ownership development is needed in the local people. • Sustainable development of ANCA is required • There is some place where local level and ANCA have some confrontation. • Transparency of budget is required. • Changing working and collaboration willingness is necessary.
Api-Nampa Conservation Area Management Council	<ul style="list-style-type: none"> • Heavily soil digging by collectors that threats to its sustainable management. • Large and remote areas hindering its monitoring. • Better to issue collection license to the local people as they are responsible to their local environment, thereby ensuring its sustainable management. • Awareness rising to collectors and traders. • Developing sustainable harvesting / collection (management) practice ensuring its sustainability. • Women and children are heavily involved (50% or more some places) in collection but get little benefit (not property rights) • Children are good collector as they easily see Yarsagumba than older or matured persons. • Problem of plastic and other bottle pollution • Problem of grazing (sheep, goat and mull) and their dung is also harmful for Yarsagumba production, which seems chemically harmful so that reducing its production day by day.

Table 2: Comparisons of existing institutional arrangements and policies between Nepal and India

	Nepal	India
Legislative provision	According to the Forest Act, 2019 the right to issue the license for collecting the Non-Timber Forest Products (NTFPs) including Yarsagumba is vested with divisional Forest Officer. Likewise, National Parks and Wildlife Conservation Act, 1973 provide right to Warden for issuing NTFPs collection license.	Central government has right to issue the permits for collection.
Policy objectives	Forest policy, 2019 and Forestry Sector Strategy (2016-2025) emphasize on sustainable management of NTFPs resources.	There is no specific plan for collection. There is no limitation for collection of the Yarsagumba.
Institutional arrangement	Interested traders need to register an application in DFO in case of outside protected area and in Warden office if the collection area is located inside the protected area. DFO and Warden grant the license for collecting Yarsagumba after completing necessary steps not exceeding the amount specified in the District Forest and Protected Area Management Plan.	Interested traders need to register in officials of central government only.
Collection and trading practices	Local people collect Yarsagumba from forest and sell to local traders. Local traders sell to regional and national traders. Local level can make separate rules.	All interested people throughout the country get permission for collections throughout the country.
Strength	Harvesting based on annual allowable harvest. Due process is followed.	There is free trade system throughout country. Even a single letter permits to carry throughout the country.
Weakness	Blanket approach of collection rule in all areas. Ecologically unsustainable collection. Traders have monopoly in Yarsagumba collection and trading.	There is no tracking system during the collection and trade. Due to open border towards Nepal, people can enter into Nepal throughout the border.

supervisors and officials to stay all the time in Yarsagumba collection areas.

Horse, donkey, mule, goat, sheepgrazing degrade the site and hinder the regeneration of Yarsagumba. Illegal shops are established inside collection area, which also damage the plants. The illegal harvesting of the forest products also deteriorates the population of Yarsagumba. Double budgeting system, duplication of works between the different government agencies are also causes of destruction of Yarsagumba populations.

Institutional arrangement for Yarsagumba collection

According to the Forest Act, 2019, the right to issue the license for collecting the Non-Timber Forest Products (NTFPs) including Yarsagumba is vested with Divisional Forest Officer (DFO). Likewise, National Parks and Wildlife Conservation Act, 1973,

provided right to warden for issuing NTFPs collection license within the protected areas system. Based on these legislative provisions, DFO and Warden used to grant the license for collecting Yarsagumba after completing necessary steps. DFO can grant permission for collection not exceeding the amount specified in the five-year forest management plan, whereas warden also grant collection license not exceeding the amount specified in the management plan of protected area.

Interested traders need to register an application in DFO in case of outside protected area and in Warden Office if the collection area is located inside the protected area.

Major issues explored for Nepal

Despite having the provision in Yarsagumba Management (Collection and Trade) Directives, 2073 B.S. brought into practice by Government of

Nepal, Department of National Parks and Wildlife Conservation, the major issues raised by the stakeholder during data collection in institutional aspect for Nepalese side were following highlights.

- In sufficient regulatory enforcement and supervision despite the guidance in place.
- Pollution in the collection side and deforestation for fuel wood purpose.
- Different level of treatment in entry fees implies by buffer zone management committee and local units for same nationals - Nepalese (within the local unit - NRs 500.00, with in the same district - NRs. 2000.00 and rest of all Nepalese - NRs. 3000.00)
- The operational plan of CFUGs inside the Api-Nampa Conservation Area need to be revised considering the updated context and provisions.
- Very short period of collection in Nepal where, collection allows only for one month.

Major issues explored for India

There are a number of provisions in Indian guidelines that create implications in legalization in Yarsagumba collection for the Kailash region, which are as follows:

- Low royalty rate in India than in Nepal as Rs. 10,000.00 Indian Currency for per Kg whereas Nepal assigned for same quantity to NRs. 30,000.00
- Long period of collection in India i.e. more than 3 months.
- Total volume production might be increased thereby lowering down the market price of Yarsagumba in international market due to high rate of collection potentiality but without considering the perspective of sustainability.
- Issues of trans-boundary in and out flow of Yarsagumba.
- Due to long period of collection regulatory allowance and framework deteriorate the sustainability of Yarsagumba rotation for natural growth and maturity, sprouting and sporting for next generation.

Common understanding between stakeholders of Nepal and India

There were several points that the both side Yarsagumba stakeholders come in conclusion but till the date, no more initiation were made for commonality in collection and trade, institutional management issues regarding Yarsagumba.

- Resource inventory program for Yarsagumba is immediate need. This would help to increase the value of commercialization and value addition.
- Governance and institutional aspect of Yarsagumba management need to be strengthened. These would help to manage site specific Api-Nampa Conservation Area own guideline is needed for collection and permit. Indian is also allowed to collect the Yarsagumba but Nepali (local) people are banned in some area inside Nepal. Such system should be revised and eliminate the discriminatory portion for equality to all citizens of Nepal.

There is also lack of monitoring from Api-Nampa Conservation Area Council because of their limited capacity (technical, human and other resources). Also, there is lack of coordination among stakeholders due to different perception of different stakeholders. Cultural degradation alcohol consumption, cards playing in cash or kind (Yarsagumba), loud speakers (film), noise pollution. These situations also increased the quarrelling and fighting in collection time/place. Moreover, poaching and unsustainable and unscientific collection of other medicinal and aromatic plant together with Yarsagumba like Wild onion, Satuwa, Jatamansi are also being threatened.

Conclusion

Stakeholders are agreed on cooperation and collaborative work including cross border issues and sectors working in KSL area. However, until and unless the prevailing policies can not be harmonized for commonly shared resources and ecological region, it would not translate well into practice. Local units in coordination with Buffer zone management coordinating committee and Api-Nampa Management

Authorities need to work very closely. For security reasons, fines-penalties and rewards, entry permits, social crimes controlling and gender related issues, sanitary and waste management, reducing deforestation and reforestation, among many other issues during Yarsagumba collection areas and along the route for sustainability of its production is to be considered simultaneously. Collective and collaborative efforts could synergize the action one after others. It has been found that production of Yarsagumba is decreasing each year.

Participation, gender equity and social inclusions are needed for the proper harvesting management of Yarsagumba. Gender equality dimension of Yarsagumba and its value chain engendering of gender (in terms of benefit of Yarsagumba to the women) is to be highly considered. Women violence increased due to workload, monitory work load, social disorders, alcoholism, vandalism, playing cards in collection site. Such activities should be discouraged by initiating innovative policies, programs and activities through collective and integrated approaches.

Other negative implication of Yarsagumba (e.g. cultural deterioration and harmony, antisocial activities, poaching, unsustainable/unscientific collection of other MAP species), hampering on the education of the student, heavily dependent only on Yarsagumba collection that threat to long term sustainability of their livelihoods and socio-cultural scenarios. For socio-economic issues resolution as aforementioned, respective strategies and strategic actions to be taken from local level to the national. Assurance of market of collected Yarsagumba is immediate action to be taken.

Future research areas

The following major recommendations are made from this study.

Policy: Government of Nepal needs to coordinate with Government of India to harmonize the similar policy in Yarsagumba collection especially royalty and time length- duration of collection.

Management: Entry fees and other regulating sustainability for sustain production to be left some

areas - left uncollected in alternative years.

Sustainability: Life-cycle and its ecology are to be duly studied in reference to rotation of Yarsagumba.

Contribution: Livelihoods and poverty alleviation contribution carried out by Yarsagumba is another field for contributing national goals and sustainable development agendas.

Production: Quality production of Yarsagumba in relation to sites, collection seasons, and districts is to be explored.

Constituents: Dietary components of various field's Yarsagumba in Nepalese case is to be an area for doing research.

Security: A security check post of armed police force should be established in border site between Nepal, India and China to control illegal collection and transportation of all sorts of NTFPs including Yarsagumba.

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