CLIMATE CHANGES AND ITS EFFECT ON YARTSAGUNBU COLLECTORS IN THE HIMALAYAN REGION OF NORTH-WESTERN NEPAL

Jag Bahadur Budha
PhD Scholar, Tribhuvan University
Corresponding email: jagbudhamagar@gmail.com

Abstract

This paper explores the effects of climate change on the distribution of Yartsagunbu based on local people's experiences. Yartsagunbu (Ophiocordyceps Sinensis) is a high-valued fungus that is understood as a stamina enhancer and endoparasitic complex of the parasitic fungus. It is found in the alpine and subalpine grasslands of the Himalayas and the Tibetan Plateau, at 3,000–5,200 meters above sea level. Yartsagunbu has been a significant livelihood resource and generates significant income for the collectors in rural Dolpa, Mugu, Jumla, Bajhang, and Manang of Nepal. This paper has explored climate change and its effects on the Yartsagunbu collectionin the Dolpa district. This brings out the Tarali people's local experiences and perceptions of climate change and its effect on Yartsagunbu. Data and information for the study were collected from multiple fieldworks during the period 2019, 2020, and 2021. Furthermore, it is supported by personal experience of Yartsagunbu harvesting from the years 2001 to 2005. Present and past trends of Yartsagunbu harvesting experience and perception are collected by interviews with Yartsagunbu collectors, traders, and senior citizens. The finding of the study reveals that climate change is affecting the Yartsaguubu abundance and livelihood of Yartsagunbu collectors.

Keywords: *Yartsagunbu, climate change, Dolpa, Tarali people*

Introduction

Indigenous peoples have depended on a wide variety of native fungi, plant and animal species for food, medicine, ceremonies, community and economic health for countless generations (Lynn et al., 2013). In recent decade that Climate change stands to impact the species and ecosystems culture, economy and traditional ways of life. According to the United Nations Framework Convention on Climate Change (UNFCCC), defines climate change as "a change in climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to

natural climate variability observed over comparable periods of time" (UNFCCC, 1992). Climate change's catastrophic impacts on marine, freshwater, and terrestrial life, from plankton and corals to fishes and forests, have been projected and also already started to be experienced (Gills & Morgan, 2020; IPCC 2018; IPCC 2019; Ripple et al., 2019). Climate change is already occurring in the Greater Himalayas (Beniston 2003; Cruz et al. 2007). Climate change impact not remain untouched in Nepal and Himalayas. Some Nepali anthropologists (Devkota, 2013; Sherpa, 2014; Poudel, 2016, 2020; Khattri & Pandey 2021) have studied perception, knowledge, and responses to climate change in the Upper Mustang, Manang, and Everest regions of Nepal. In the Himalayan regions, climate change is gradually disturbing and disrupting the socio-ecological systems including the rhythms of physical seasonality and sociality that are co-produced by the Himalayan dwellers through close attachment with ecology (Poudel, 2020)

Climate change projections for the Nepal Himalaya predict that average annual temperatures will increase by 3.0–6.3°C (mean 4.7°C) by the 2090s and that the warming would be greater in higher elevation regions—habitats of the Chinese caterpillar fungus (Shrestha & Bawa, 2013). The Chinese caterpillar fungus is an endoparasitic complex formed by the parasitic fungus Ophiocordyceps Sinensis and its host caterpillar of Thitarodes moth species (Winkler, 2009). It occurs in the alpine and subalpine grasslands of the Himalayas and the Tibetan Plateau, at 3,000–5,200 m (Shrestha 2014). The sustainability of the caterpillar fungus ecology and economy is threatened by the combined pressures of climate change and over-exploitation for traditional medicine (Hopping et al, 2018). Climate change is the major factor affecting on Yartsagunbu harvesting and market value affects the selling of Yartsagunbu. The temperature and humidity play important role in the abundance and formation of Yartsagunbu (Singh et al., 2020). The prior research on climate change by anthropologists is focused on the overall climate change perception, knowledge, and responses of local people. However, there are no specific studies on climate change and its impact on Yartsagunbu. Moreover, the prior study on climate change and its impact on Yartsagunbu harvesting are more especially techno-scientific approaches and quantities in nature. With this concurring gap, this study focused on the socio-cultural dimensions of climate change and its impact on Yartsagunbu harvesting.

Dolpa is one of the largest districts of Nepal and it is popular for having high-altitude Himalayan medicinal and aromatic plants in Nepal also has indigenous knowledge related to the management and use of medicinal plants, exemplified by the presence of more than 50 or so amchis (Tibetan medical doctor) in particular who are actively involved in providing health care services to the local communities (Lama & Thomas, 2002). My ethnographic study explores current distribution status of caterpillar fungus (Ophiocordyceps sinensis) and Taralis's experience and perception of climate change

and its consequences on the distribution of Yartsagunbu. In addition, it explores how climate changes are perceived by Tarali people and how they experience in their lives.

Methodology

This study has adopted an ethnographic approach. The anthropological fieldwork, participant observation or "being there" (phrase used by Roncoli et al., 2009) was employed as the key method of data collection. In addition, as a researcher is from the study area, the 'emic approach', an insider and native views was also incorporated in the study. It is based on multiple visits in Gumbatara and Shahartara villages in between 2019 to 2022 AD. Data and information were collected on the different occasions of a fieldwork to Gumbatara and Shahartara from 2019 to 2022 AD. The semi-structure interviews and key informant interview along with some personal reflection of researcher have been used to find out the comparative pattern of Yartsagunbu distribution in the past and the present. Moreover, it examines the reason for the change in Yarstagumba distribution. Furthermore, interviews were carried out in Dunai and Kathmandu with Yartsagunbu traders. Furthermore, I went sometimes to collect Yartsagunbu from the year 2002 to 2007. This study also compares the Yartsagunbu distribution in 2002 AD and 2022 AD. The comparison of Yartsagunbu distribution was done based on the self-experience of the Yartsagunbu collection, and other collectors' and traders' experiences.

Study area

Tichurong valley is located in the Karnali province of Dolpa district. Formerly Tichurong valley consists of two Village Development Committees (VDC), Lawan and Shahartara. Under the federal structure of Nepal, Tichurong valley became Kaike Rural Municipality, by combining two VDCS. There are 21 villages in Tichurong valley. The population in Tuchurong valley is majorly Tarali people. Tarali people are ethnically Magar ethnic group. They speak two distinct languages Magar Kaike and Tichurong Poike. They practicing, Tibetan Buddhism, Bon and Masto tradition. Life-cycle rituals name-giving at birth and funerals are Buddhist. Local deities are also worshiped all year round. Tarali people in Tichurong valley depend on agriculture and household income is heavily supplemented by Yartsagunbu (Budha, 2015).In very recent years they have been well-positioned to harvest Yartsagunbu ('summer plant winter insect' is the literal Tibetan translation)from the high pastureland located 3000 meter to 5000 meter, just three hours above their villages, regarded by the Chinese as a potent aphrodisiac (and sometimes referred to in English as organic Viagra),is vastly more lucrative than they could have dreamt of previously.

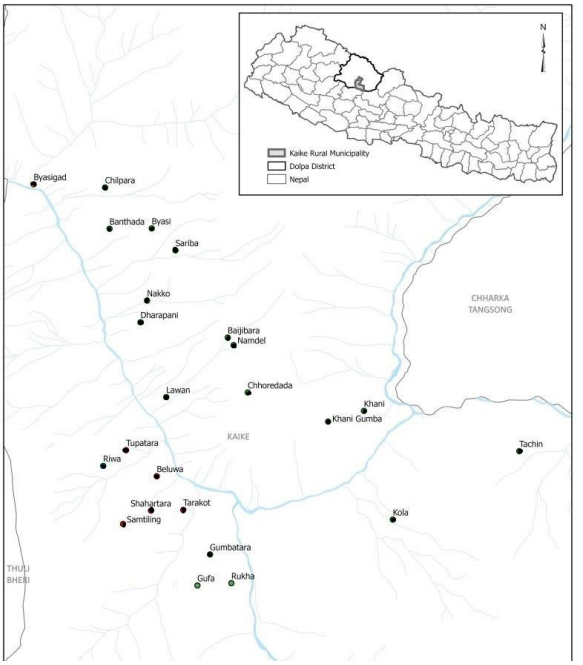

Fig 1. Map of Nepal showing Dolpa district and Tichurong valley.
Map © 2021 Maya Daurio

Socio-economic history of Tichurong Valley

Taralis are primarily dependent on subsistence agricultural production for sustenance. Cash is generated in two ways: men trade in sheep and goats primarily in the central Middle Hills town of Pokhara, and there is the relatively new phenomenon of income generation through the harvest of yartsagunbu. In the past, conduct long distance trade travelling across Thange Lek a range with a pass of over 14,000 feet, to Baglung, Palpa, and Gulmiregions and sometimes even to the Terai and such Indian towns as Darjeeling, Kalimpong, and Kanpur. The main bases of the trade between Dolpo and Tichurong were the salt to which only Bhotiyas of Dolpo had access and which people of Tichurong needed both for their own consumption and for resale to the population of middle ranges (Haimendorf, 1975). Tarali of Tichurong valley were the trans-Himalayan traders. Once after the decline of the salt market, brought about by a variety of local and international causes, Taranguprian resulted in switching from the grain-salt-rice circuit to a second circuit both the movement of manufactured commodities against animals and the introduction of cash. They sell their animals and woolen products in the middle hills, use the cash proceeds to finance the purchase of manufactured commodities in Terai or India carry them north again in the spring when the passes of Tichurong are no longer blocked with the snow of the next and ice, sell them Khasan and Bhot use the profits to buy more animals wool, thus the beginning sequence of next season's trading all over again (Fisher, 1987). But, 'in very recent years they have been well-positioned

to harvest yartsagunbu ('summer plant winter insect' is the literal Tibetan translation) from the high pass located just three hours above their villages, regarded by the Chinese as a potent aphrodisiac (and sometimes referred to in English as organic Viagra),is vastly more lucrative than they could have dreamt of previously. In a month or two a family might gather enough yartsagunbu (one or two kilograms to earn two or three hundred thousand rupees, a cash income far in excess of what they could have earned before (Fisher, 2011). The main crops grown in the valley are maize, millet, proso millet, black beans, naked barley, buckwheat, wheat, and potatoes. However, the growing of crops has been difficult due to climate change. Today, all Tarali depend upon Yartsagunbu as a major source of income. Taralis are engaged as yartsagunbu harvesters and traders.

Historical context of Yartsagunbu

The first written history of yartsagunbu dates back to 620 AD in the time of the Tang Dynasty. The text refers to the caterpillar fungus as a wonderful creature whose existence changes supernaturally from insect (caterpillar) to plant (fungus) in the rainy season and back to insect (caterpillar) in the winter season. Around the 14th century, Nyamnyi Dorje (1439–1475 AD), a Tibetan lama and physician, was the first to mention the most desired of Yartsagunbu's properties in his book An Ocean of Aphrodisiac Qualities (Gupta & Karkala, 2017). Later, during the Ming Dynasty (1368-1644), physicians studied Yartsagunbu and developed a potent medicine, which continued to be used up until 1757, until the time of the Qing Dynasty. However, the current global market demand and international image of Yartsagunbu was aroused after Chinese long-distance marathon runners broke international records in 1993. It was confirmed that the reason behind the success of the Chinese long-distance marathon runner was Yartsagunbu. Then the demand for Yartsagunbu and its international publicity suddenly skyrocketed (Steinkraus &Whitfield, 1994).

However, in Nepal when did Yartsagunbu has been introduced or came to know is unknown. According to Budha (2021) firstly, the Tibetans might have told the Himalayan community about the medicinal properties of Yartsagunbu, since Tibetan and Chinese were using it for many years ago. Secondly, in the 1950s, when the autonomous region of Tibet was annexed by the People's Republic of China, thousands of Tibetans, including the Dalai Lama, fled their homeland through the Himalayas of Nepal. Some Tibetans took shelter in the mountains of Nepal. They might have explained the importance of Yartsagunbu and it is known to the people of Nepalese Himalaya. Thirdly, Chhakka Bahadur Lama said that he had first introduced the trade of Yartsagunbu. And it was accepted by the first Yartsagunbu trader of Dolpa Mr. Purna Budha. He said, "I am the first yarsa trader in Dolpa. The first person I sold Yartsagunbu to be a friend of mine from Humla. Later, in 1989 A. D., I met a Tibetan trader in Kathmandu and he asked me

to bring Yartsagunbu. And I came to Tichurong Dolpa and collected 120kg Yartsagunbu and I transported it to Dang." This narrative gives that when and how Yartsagunbu is introduced in Nepal.

Findings and discussion

Yartsagunbu as a Livelihood Source

Yarstagunbu is major source of livelihood to Tarali people. Tarali people relies on Yartsagunbu for everything children's' education, clothing, and purchasing foodstuffs. According to Tamba Budha:

> Yartsagunbu is very important for Tarali people. People buy food, and clothing, and other necessary stuffs only from the income of Yarstagunbu. There is no other source of income rather than Yarstagunbu harvesting. No people been to abroad for foreign employment and also no more people employed in government and other private jobs. All peoples' income depends on Yarstagunbu only. So, it is like a lifeblood for everyone household in the village.

This statement explains that, Yarstagunbu is very important for the Tarali people. Without the Yartsagunbu Taralis' life could be more difficulty. As Benedict Colombi, (2009) states "without the salmon, say local people the river would die". Similarly, for Taralis without Yartsagunbu their life could lead to difficulty. The Climate change impact had affected on weather pattern in Himalayas and as the weather pattern is changed it affected on distribution of Yartsagunbu.

'Yul Jomje' customary practice for Yartsagunbu Pasture Management

'Yul Jomje' is customary institution which manages the Yartsagunbu pasture. Literally, 'Yul' means village and 'Jomje' means meeting. The harvesting date of Yarsagunbu are decided upon the villagers meeting called 'Yul Jomje'. On the day of 'Yul Jomje', there must be a representative person from every household. The household unable to participate had to pay penalty.

In the year 2000, the 'Yul Jomje' was led by two local leaders called then 'Thalus' while in the year 2022, the 'Yul Jomje' was led by ward Chairperson Mr. Raju Budha and Community Forest Chairman Mr. Bhim Prasad Budha. It was on May 3rd, 2022 around 1 o'clock there were about 95 people gathered in a ground located in the middle of village of Gumbatara. There were majority of people were men. The meeting agendas were, (1) setting of Yartsagunbu collection date and (2) Escorting of Yarsagunbu pasture. As per village meeting 'Yul Jomje' decision on agenda (1), they came to resolution to escort

the pasture for 10 days. To escorting of pasture villagers made a two groups, one group for Chhyukarbo pastureland and one group for Sworkhola pasture. On the agenda (2) they set the Yartsagunbu collection date and other agenda was on swearing 'nakelje'. On swearing 'nakelje' process all the household participants had to be swearing in monastery by promising not to steal Yartsagunbu before collection date. Once, the meeting agendas and decision were came to resolution, villagers went to nearby Digong monastery and every individual person of household representative went insides to the room of Mahakala diety, Mheme Kosung and everyone went one by one near the Mahakala, Mheme Kosung and bow down the head and sworn by promising word, 'our family member would not go to collect Yartsagunbu before collecting date, if gone then destroy us', 'nge payara bu la syuje lai tangla bu thuru dorang mido, pui na mita syuwa'. In year 2022, villagers decided to go to pasture on May 6th, 2022.

In regards the changes on time of 'Yul Jomje' and pasture escort Om Budha said that;

> In the past, 'Yul Jomje' was used to take place on May 19 or 20 and villagers used to escort the pasture only for 2-3 days, because of snow on the pasture remains until end of May and there was less chance of stealing Yartsagunbu by outsiders. But now snow melts fast and there is more chances of stealing of Yartsagunbu and the villagers have to escort the Yartsagunbu pastures for 10 days.

This statement declares that there is something changes on the pastures. Snow melts faster than past. As a result, villagers heading to pasture earlier than past and they escort the pasture longer days than past.

Tarali perception on climate change

Tarali community of study area did not understand the concept of the terms "climate change", but their understanding on changes on coldness and warmness of their locality was very clear. They felt the increasing of coldness and warmness through their clothing experience and the snow melting trends. Taralis community is observing that there are changes in heat and cold, snowfall and rainfall, and drought and dryness in their local environment. But they do not call it climate change. They called it 'sameu'. Literal meaning, the term 'sameu' means 'time' in the local language. For simplicity, while doing this study 'tangbui sameu' (past time) and 'tapchiki sameu' (present time) were taken into consideration to know the changes around them. Keith Basso (1996) argues that, that human existence is irrevocably situated in the time and space, that social life is everywhere accomplished through an exchange of symbolic forms and that "wisdom sits in place". Tarali were well aware, from their long experience with the realities of the local environment, that the time 'Sameu' is factor of change in their localities. And

the 'sameu' the past time 'tangbui sameu' and present time 'tapchiki sameu' changes is symbolically precepts as 'climate change'.

Cultural notion of Yartsagunbu

Dolpa has reported that collection of C. Sinensis started in 2044 BS (1987 AD), before that common people did not have knowledge about its uses (Devkota, 2006).But there is a cultural notion of Yartsagunbu.Tarali people locally called 'Bu' an insect or a caterpillar is not only a commodity among Tarali people but also became a cultural matter. It is growing in Chhyukarbo, Topar, and Swor Khola pasturelands areas of Gumbatara village and Hongpa, Lungkhollo, and Majhala of Shahartara village. It has been becoming a livelihood source for the Tarali people. Taralis have their own understanding and cultural meaning of Yartsagunbu. They perceived that it is connected with people's lives and is taken as a gift from God. People believe that Yartsagunbu has a mythical and legendary connection with Mahayana Buddhism's founder Guru Padmasambhava, who is also called Guru Rimpoche. A local lama Wangkya Lama explains;

> "Yartsagunbu is a gift from Guru Padmasambhava/Guru Rinpoche. During the 8th century, his holiness Guru Rinpoche traveled across the Himalayas. And he had witnessed the hardship life of the Himalayas' inhabitants. Then he sowed the seeds of Yartsagunbu to protect them from future famine and starvation. Life in the remote Himalayas is very difficult with no enough fertile land for the production of grains and food. Also, there are no sources of generating income."

Tarali Lama's this narrative presumes that Yartsagunbu is god's gift. It is sowed by Guru Rimpoche on his way to the Himalayas to prevent the starvation of the Himalayan people. There is no exact documents are available to support this narrative. But Tarali lama believes that based on their geographical condition Yartsagunbu is gifted for their subsistence. This above-mentioned myth shows that, Yartsagunbu has the religious values and belief. Furthermore, the Tarali people connect the Yartsagunbu as the basis of luck. In this regard Kali Budha said,

> 'During the collection of Yarsagumab in the pastures, those who get more Yartsagunbu are presumed to be lucky (Shorejen) people. Those who are unable to collect more Yartsagunbu they presumed unlucky (Shoremey).'

This statement illustrates that for Tarali people Yartsagunbu is much more connected with their life. Based on the harvesting capacity of Yartsagunbu person is ascribed to a lucky and unlucky person. The perception of Yartsagunbu among Tarali is deeper than its monetary value. Tarali has taken Yartsagunbu as a cultural product. Furthermore, it is not only connected with good luck and bad luck but also connected with religious

values. Lama Thinley said;

> "A man with the killer hands (Tiklak) gets more Yartsagunbu. And a man with kind hand Kewalak gets less Yartsagunbu during collection."

This statement depicts that, Yartsagunbu is not only a commodity and a thing that generates money. But also it is now connected with religiously as well as culturally with Taralis.

Changes in Yartsagubu production in the past and present

Tarali perceived that Yartsagunbu production is changing. In the past, a person can collect an average of 50 pieces per day. The Taralis of Gumbatara village experienced changes in the abundance of Yartsagunbu. In this regard Mr. Surya Rokaya shared his experience;

> In past days 15 years ago when I was young at age 28 years old I used to collect 100-120 pieces per day and these days younger people in the village aged 25-28 years old hardly get 5-6 pieces per day. Moreover, there is Yartsagunbu collecting pasture called Topar, there was enough Yartsagunbu and I used to get 40-50 pieces within 2-3 hours but now if people go they hardly get 1-2 pieces. Some people do not get a single piece in a day. I used to collect 600-700 pieces of Yartsagunbu myself only in the whole season of one month in the past. But these days we hardly collect 200-300 pieces of Yartsagunbu by all family members. I think that is why there is declining in the production of Yartsagunbu.

This statement depicts that, there is changes in abundant of Yartsagunbu. With above statement it shows that Yartsaguubu production is declining. The similar question was has been asked to four young man aged between 25-28 years old. All of them has similar reply and said that they are getting 5-6 pieces per day. He further adds that, the places like Topar, Chyukarbo, Lungju where he used to get more Yartsagunbus but these days they were comparatively produced less. A similar statement was given by aYartsagunbu trader Mr.Purna Budha. He is the first Yartsagunbu trader in Nepal and he introduced Yartsagunbu in Dolpa (Budha, 2021). He said,

> 'In the, past there are about 19-20 Kg of Yartsagunbu in our village Gumbatara. But now it is about 9-10 Kg of Yartsagunbu. I think that it is declining because of weather conditions (Sameu). These days there is uncertainty in the weather. No rain and snow on timely. If you see the winter there are some winters with very less snowfall some winters

> and some winters there is heavy snowfall. Yartsagunbu needs moderate snowfall.'

Mr. Budha's statement declares that Yartsagunbu production in Gumbatara is declining due to uncertain weather pattern. Yartsagunbu need snow and rainfall. On timely rain and snow are good for Yartsagunbu. Mr. Pema Budha, the earlier Yartsagunbu collectors in Gumbatara shares his experience.

> 'In the past, while you go to pasture you can see four to five Yarsa at once, and sometimes it makes you nervous to pick out because of the seeing large number Yartsagunbu on the ground. But now if you get one Yartsagunbu at once and the next will be found after one to two hours. Hence, I think that it is decreasing now. In the past, the whole villagers will collect around 17-18 KG of Yartsagunbu and now I think we collect only about 9-10 KG. So, it is declining the production of Yartsagunbu because of the current uncertain weather pattern.'

All the informants have a similar perception that Yartsagunbu production is declining due to the uncertainty of weather and climate. Mr. Siddhiman Budha gives more details on declining of Yartsagunbu. He said;

> "Yartsagunbu needs limited amount of rain and snow. These days there is huge uncertainty in both snowfall and rainfall. Sometimes there are no rainfall and snowfall and sometimes there are heavy snowfall and rainfall. The heavy snowfall and rainfall, and no snowfall and rainfall both are harmful to the production of Yartsagunbu. In the past days, there was timely rain and snow; it was regular in the pattern. There are no timely rain and snow. The heavy snowfall in the winter affects the egg hatching capacity of the caterpillar. Nowadays there is no snowfall in winter but snow falls only at end of winter, so that is not appropriate for caterpillars. In the summer there is sometimes heavy rainfall and sometimes no rainfall. Both uncertainties affect the life of the moth. So, heavy rainfall affects the egg hatching capacity of the moth. The caterpillars come from eggs, once the moth hatches the eggs. If there are no eggs hatching as a result no growth of Yartsagunbu. So, I think that Yartsagunbu, snowfall, and rainfall are very much connected."

This statement demonstrates that, snowfall and rainfall are very much connected with the production of Yartsagunbu. The snowfall and rainfall play an important role in the hatching of eggs to moths, and metamorphosis of the caterpillar, and finally the growth of Yartsagunbu. Summer and winter temperatures and snowfalls are the basis

for Yartsagunbu production. This is also shown by the study, Yartsagunbu production Bare impacted by current climate change. Chinese caterpillars' fungus (Yartsagunbu) distribution is assumed to be affected by winter and summer temperature and the seasonality of precipitation (Shrestha, 2014).Unseasonal snowfall in Dolpa not only affected in Tichurong valley of Dolpa but it is also affected Phoksundo valley of Dolpa. A combination of unseasonal snowfall, long periods of drought and warmer weather is affecting the Yartsagunbu (Lama, 2021).

Changes in time of Yartsagunbu collection season

The Taralis perceived that there are changes in temperature because there is warmer the Yartsagunbu pastureland than past. It is also indicated by the level of snow on the mountain. Snow melts faster than past. The Taralis also experience seasons. While making such observations, they compared the present situation with the past Yartsagunbu season. He observed that temperature and humidity play important role in the ecology and physiology of the caterpillar fungus. The changes in temperature are also felt during the Taralis in during Yartsagunbu harvesting time and period Manalal Rokaya (47 years old) explained:

> In recent days the snow melts faster than past. And all Yartsagunbu are mostly growing at once and the Yarsagumbu season is shorter than past. In the past, it lasts for about two months but these days it long lasts hardly one month. There is changes in the abundance of Yartsagunbu. In the past, the Yartsagunbu period starts from May 24th it become late this time. These days we start to collect from around May 13th because these days snow melts fast and Yartsagunbu grows earlier than past because of snows melt. I think it might be that these days it earth is getting warmer than past.

The changes that have been observed by Tarali show that due to global warming Yartsagunbu harvesting season is a week earlier than in the past 20 years before. The season of the Yartsagunbu collection starts a week earlier than 20 years ago. Even I do remember myself in the year 2001, once I went to collect Yartsagunbu on 24th May, the Yartsagunbu found were just coming out from the ground. We used to go to Yartsagunbu pasture in the 3rd week of May. But these days' locals said if they go on this date that Yartsagunbu becomes over matured. Tarali also experienced that the Yartsagunbu harvesting season has also shortened. In the year 2001, when I went to the Yartsagunbu collection I do remember that I stayed in the pasture for around 45 days. But now people stay in the Yartsagunbu pasture for about 20-25 days.

Table 1: Comparison of the starting time and ending time of Yartsagunbu harvesting

Activities	Year 2000	Year 2022
Starting date of Yartsagunbu harvesting	May 24-26	May 15-17
Ending date of Yartsagunbu harvesting	July 16-17	June 14-17
Number of days spent in Yartsagunbu harvesting	45 days	30 days

Source: Field study 2020

This table shows that, there are changes in starting date of Yartsagunbu harvesting season in year 2000 and 2022 which shows that there is shift one week earlier of harvesting season. Similarly, the number of days spent in yartsagunbu pasture is also decreased. In this regards Mr. Gaja Budha states;

> Now yartsagunbu are growing earlier than past. In the past 15-20 years ago the snow on pasture and mountain melts gradually and at the same time Yartsagunbu also grows gradually and it takes long time. It makes Yartsagunbu collection time longer. But these days snows melts faster and Yartsagunbu grow an earlier than before and then Yartsagunbu collection time are becoming shorter than past.

Tarali experienced that the Yartsagunbu season is shorter than past because of snow melts fast these days. The Yartsagunbu harvesting starts a week earlier and it ends about two weeks before than past yarsagumbu harvesting time. With these changes declares that experienced among the Yartsagunbu collectors. Tarali perceived that there was too much cold in the pasture in the past in the first week of their stay in the pastureland. There is not possible to stay without a jacket but now we can stay without a jacket the whole day around. Jackets are needed only in the morning, evening, and night. These days it is not cold like in the past. It's warmer than past.

Conclusion

In conclusion, this anthropological study on climate change and its effects on the Yartsagunbu collection in the Western Himalayan region of Nepal were carried out based on Tarali people's experiences. Tarali people are percepts that climate change is affecting in the Yartsagunbu production. The term 'climate change' is not familiar among the Tarali people but affect and impact of climate change is experienced by Tarali people. Tarali people are also aware that anthropogenic activities such as deforestation, poaching of animals, over harvesting of herbs, people's highly movement in the pasture, polluting the pasturelands are main cause of climate change. Tarali perceived

that the current weather pattern, drought, the uncertainty of the rainfall, and snowfall have affected in production of Yartsagunbu. Moreover, heavy rainfall in summer, heavy snowfall in winter, and drought in spring, and getting warming in the winter are consequences of effect on Yartsagunbu production. Hence, while making polices on climate change the local experiences and perceptions of climate change should be recognized on the plural climate studies framework. They perceive that changes in Yartsagunbu distribution, harvesting season, and duration, are changing because of time 'Sameu', in other word climate change. As 'Sameu' is changing that Yartsagunbu distribution pattern is changing. According to Hume (2000) states, environment–behavior congruence is dynamic. Beliefs, values, and behavioral practices are changing during one's life along various time scales, while at the same time many elements of the object, built, and natural worlds are also changing at a multitude of time scales. Taralis belief that, 'Sameu' is changing and as the same time things are also changing in their surroundings including environment and climate.

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