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Fodder Diversity, Availability and Utilization Patterns in the Western Himalayas

ABSTRACT

Trees have been used for centuries for fodder globally. Tree foliage is a substantial source of feed for livestock. As in many other regions of the world, farmers in the Himalayan region depend largely on this tree for sustaining their livestock during the winter and summer seasons for almost half of the year. Himalayas are remote and inaccessible; people's dependency relies mainly on forests resource to fulfill livelihood services. Fodder The availability of fodder in the hill villages of the Uttarakhand Himalayan region is insufficient, and a part of this food is supplemented through the lopping of tree foliage. The dependency is very high (>70%) during the period, beginning from October to February. Owing to changing climatic conditions, a farmer's preference for a particular tree species is also variable, depending on where he lives, according to the low, middle and high hill regions depending on where he lives. For the present study, a Questionnaire survey was conducted in selected districts of the Kumaon and Garhwal regions of Uttarakhand.

HIGHLIGHTS

- To quantify various fodder species in the Uttarakhand Himalayas.
- To conduct a survey to understand the utilization pattern of the Uttarakhand Himalayas.
- To assess the preferences of people according to elevation and season.

Keywords: Trees, Fodder, Questionnaire survey, inaccessibility, Season, Elevation

INTRODUCTION

The Himalayas are the youngest fold mountain range globally and represents 18% of India's total geographical area. Himalayas are home to diversified tribes and people, living in remote and inaccessible valleys and mountain ins. Due to inaccessibility, they are relying have relied on forest resources since the inception of civilization (Rawat *et al.* 2020; Parveen *et al.* 2018). Fodder and fuel woods are two essential livelihood resources for people of the Himalayas (Ramakrishnan *et al.* 2000). Further, it is observed that livestock's mainly relies Further hermore, livestock rely mainly on forest wealth, especially in the Himalayas (Tulachan *et al.* 2002). Fodder collection plays a critical role in the turning the wheel of hill agriculture in the mountains

of the Himalaya (Makino 2009). Forests fulfill 118% of the fodder demand in the Himalayan region for feeding the cattle for approximately five to six months in a year (Pandey and Singh 1984). Several species of fodder yielding trees are distributed in different elevation zones in the mountains of the Uttarakhand Himalaya. Due to variation in climate and elevation, a farmer's preference changes according to elevation

and season (Verma *et al.* 1989; Rawat *et al.* 2018). The An in-depth understanding and detailed data one community's community choice in the selection of k eys species is of a re vital importance for formulation of for formulating environmental conservation practices (Kala 2007). Case studies are limited in of the Uttarakhand Himalaya, which is conducted on fodder resources according to season, elevation and lacks are limited by season and elevation, are limited by the use of fodder resources and lack comprehensiveness (Anonymous 1982; Jackson 1985; Bhatt and Rawat 1993; Singh 1985; 1989, 2002, 2005; Jodha and Shrestha 1990; Singh and Bohra 2005; Singh and Gaur 2005; Bohra 2006 and Singh and Sundriyal, 2009; Nautiyal *et al.* 2018). In order to To address the availability and utilization pattern of fodder tree species in the Uttarakhand Himalayas Following, the following objectives were framed defined in our case study.

1. To list various available fodder tree species available in the Uttarakhand Himalayas.
2. To conduct a survey to understand fodder utilization and preference pattern patterns according to elevation and season in the Uttarakhand Himalayas.

MATERIALS AND METHODS

(a) Study area

The state of Uttarakhand was chosen as the study area, which is known for because of its highly varied physiographic physiography and biodiversity. Uttarakhand is located between coordinates E 77° 34' – 81° 03' and N 28° 43' – 31° 28' and is among the 12 Himalayan states of India.

(b) Methodology

To assess the fodder preference, elevation and seasons season were chosen as criteria criteria. To understand the effect of elevation, the study area was classified into five elevation zone zones (Table 2). Comm unities The communities were interviewed through questionnaire questionnaires for the

collection and recording of Data the data. Surveys were conducted limited to two political regions, Kumaon and Garhwal, in duration of 2018– 2022 from 2018– 2022, during different seasons of the years year. Information regarding the details of the fodder species part used, the season of the logging locality, and the local names were documented was obtained by interviewing the communities and shepherds residing in the study villages. To identify the fodder species, Fodder collection sites were visited in company by companies with shepherds and women women during the gathering of fodder. To understand utilization

pattern, seasonal

for pattern, season, and species preference, surveys were carried out for each species separately in different seasons. The specimens were collected and identified from the Botanical Survey of India and Systematic Discipline of FRI, Dehradun.

RESULTS

Diversity and availability according to elevation

A total of 41 species of fodder plants representing 24 genera taxonomically belonging to 18 families were enlisted and documented (Table 1). The most common fodder species belong to the family Leguminaceae (27 spp.) and are trailed by Moraceae (12 spp.) (Table 1). The maximum richness of species was shown by the genus *Ficus* (8 spp.), then followed by *Quercus* (5 spp. each).

Table 1: Some major fodder plants listed during the survey of the study area

Sl. No.	Botanical Name	Family	Local name
1	<i>Acacia catechu</i>	Mimosaceae	Khair
2	<i>Acer cesium caesium</i>	Sapindaceae	Kainjal
3	<i>Acer acuminatum</i>	Sapindaceae	Kainjli
4	<i>Albizia chinensis</i>	Mimosaceae	Siris
5	<i>Albizia lebeck</i>	Mimosaceae	Siris
6	<i>Albizia procera</i>	Mimosaceae	Siris
7	<i>Anogeis latifolia</i>	Combretaceae	Daur
8	<i>Bauhinia purpurea</i>	Caesalpiniaceae	Guiral
9	<i>Bauhinia variegata</i> L.	Caesalpiniaceae	Kachnar
10	<i>Bauhinia semla</i>	Caesalpiniaceae	Semla
11	<i>Butea monosperma</i>	Caesalpiniaceae	Dhak
12	<i>Celtis australis</i>	Ulmaceae	Kharik
13	<i>Cinnamomum tamala</i>	Lauraceae	Dalchini
14	<i>Ficus auriculata</i>	Moraceae	Timla
15	<i>Ficus hederacea</i>	Moraceae	—
16	<i>Ficus hispida</i>	Moraceae	Ghogsu
17	<i>Ficus neriifolia</i>	Moraceae	Khilku
18	<i>Ficus palmata</i>	Moraceae	Bedu
19	<i>Ficus racemosa</i>	Moraceae	Gullar
20	<i>Ficus semicordata</i>	Moraceae	Khainu
21	<i>Ficus subincisa</i>	Moraceae	Chanchari

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|----|-------------------------------|-----------|---------|
| 22 | <i>Fraxinusxanthoxyloides</i> | oleaceae | Ashtree |
| 23 | <i>Grewiaoptiwa</i> | Tiliaceae | Bhimal |

UNDER PEER REVIEW

CONCLUSION AND DISCUSSION

According to the respondents, there are seasonal variations in fodder availability. It was observed that ~~tree~~ foliage is preferred for feeding ~~only in the~~ summer and winter ~~season's only. Further seasons. Furthermore,~~ during the rainy season, abundant herbs, shrubs, ~~trees and~~ tree fodder species are available to feed livestock's. ~~Result for feeding livestock. The results~~ of our case studies ~~reveals reveal~~ that some of the species in the Indian Himalayan region are similar with that of those in other regions (Samant *et al.* 2007; Singh *et al.* 2008; Singh and Sundriyal 2009; Nautiyal *et al.* 2018) ~~in the Indian Himalayan Region. Results. The results~~ of recent case studies indicate that species are becoming scarce because the forests and pasture lands are being converted to ~~crop agriculture agricultural crops~~ and to ~~settlement. Results settlements. The results~~ of the study suggest that there is a diversity of fodder plants in Uttarakhand Himalaya but due to reductions in grazing areas, it was ~~hard difficult~~ to find ~~fodder in enough quantity fodder~~ to fulfill the daily nutritional ~~requirement requirements~~ of livestock. The present case study revealed that altitude ~~as well as and~~ seasons significantly ~~influences influence~~ the preference ~~of for~~ fodder ~~by among~~ inhabitants. Moreover, sites ~~which were in higher elevation at higher elevations in the Himalayas and inaccessible were more sites~~ relied ~~more~~ on conventional forests than communities near ~~to~~ cities. Singh *et al.* (2012) concluded in their case study on *Q. semecarpifolia* that season and altitude ~~influences influence~~ nutrient composition. ~~In nutshell summary,~~ our case study ~~tried aimed~~ to fill some of the research gaps, but ~~some more additional~~ comprehensive case studies are ~~needed required by.~~

the researchers and scientists revealing scientists revealed the nutrient composition and preference of fodder due to altitude and season in the western Himalayas Himalayas.

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