**Ethnobotanical Insights: Utilization of Leafy Vegetables by Local Communities in Chhattisgarh, Central India**

**Abstract**

Leafy vegetables, or *"Bhaji"* are essential to the diets, medicinal practices, and cultural traditions of tribal communities in central Chhattisgarh, India. The diversity and traditional knowledge of these plants, however, remain highly under documented. This paper will be contributing toward filling this gap by detailing the types of leafy vegetables used by tribal groups as well as their ecological and cultural importance. Research documented the diversity of plants, their traditional uses, and their position in food security as well as sustainable agriculture. Field surveys and interviews with communities like Gond, Baiga, Binjwar, Kamar, Kanwar, and Oraon were carried out. Data were recorded through direct observation, interviewing of locals, and preparation of herbarium. From these investigations, 86species of leafy vegetables belonging to 35 families were reported, out of which Fabaceae, Amaranthaceae, and Cucurbitaceaewere dominating families. These vegetables are of foremost importance as sources of food and also have medicinal properties, such as the treatment of digestive and respiratory issues. The study highlights seasonal harvesting practices that reflect deep understanding of ecological cycles and sustainable agricultural methods. The findings point out to the importance of these vegetables in tribal nutrition, health, and conservation. This research advocates preserving indigenous knowledge and encouraging the sustainable cultivation of leafy vegetables for benefits both to biodiversity and communal well-being.

**Keywords:** Bhaji, Ecological significance, Leafy vegetables, Sustainable agriculture, Tribal communities.

**Introduction**

Ethnobotany is a bridge of understanding between human societies and their use of plants, displaying cultural, medicinal, and nutritional importance. Chhattisgarh, the "Herbal State" of India, has rich biodiversity supporting many plant groups, including pteridophytes and leafy vegetables. The most prominent pteridophytic species used as vegetables are *Dryopteris filix-mas, Pteris vittate* and *Marsilea quadrifolia*, which are also medicinally useful in treating fever, digestive problems, and skin diseases, respectively (Khoja *et al*., 2022; Sureshkumar *et al*., 2018). There are many wild and cultivated species of leafy vegetables found in the state. It has been revealed that leaves of wild species were also used as vegetables, like *Amaranthus viridis* and *Chenopodium album*, while also the more cultivated varieties of *Spinacia oleracea*. Therefore, the importance of the nutritional value in the tribal diet is enhanced (Kumari & Solanki, 2019; Pandey *et al*., 2023). Socio-religious values in local festivals and ceremonies can be associated with species like *Ocimum sanctum* and *Cynodon dactylon*, showing how intertwined cultural and ecological values exist for these species (Gupta *et al*., 2022; Kumar, 2024). The diversity of leafy vegetables in the Bastar Plateau and Janjgir-Champa districts of Chhattisgarh stae has been well documented, as they have played a significant role in tribal subsistence farming and intercropping practices (Shankar *et al*., 2017; Chauhan & Patra, 2014).

Chhattisgarh is located in the centre of India at a latitude of 21°27' N to 23°7' N and longitude of 80°15' E to 83°24' E. The geography is comprises with tropical deciduous forests and fertile plains. The tropical climate in the state varies between 45°C during summer and 8°C during winter.

This paper discusses the ethnobotanical significance, diversity, and cultural values of leafy vegetables in Chhattisgarh while exploring their importance in the traditional knowledge systems of the tribal communities. Leafy vegetables are main integral part of the indigenous diets in India, especially within Chhattisgarh. These are crucial foods in nutrition, use in folk medicines, and current cultural practices. In this tribal area, inhabited by the Gond, Baiga, Binjwar, Kamar, Kanwar, and Oraon tribes, the interaction between communities and their environment is perceived in the consumption of vegetables from the natural environment, as well as from local flora used for medicinal purposes (Kumari & Solanki, 2019). The familiarity of the tribes with various plants is also indicative of the ethnobotanical importance of these vegetables, which are collected from kitchen gardens, the forest, and the market (Kala, 2009).

The diverse number of leafy vegetables in Chhattisgarh highlights their ecological adaptability where in plants such as Amaranthus provide nutrients and serve as a safety net for food insecurity (Chandravanshi *et al.,* 2018). Seasonal and wild greens are an important part of the diet, grown through indigenous practices that ensure food security and promotes sustainable resource use (Das *et al.,* 2022). In documenting such practices through field surveys and interviews conducted with local farmers, vendors, and consumers, there search will intent to capture traditional knowledge on cultivation, seasonal availability, and cultural importance of these vegetables.

Scientific identification and classification, through herbarium preparation and botanical references such as Flora of British India (Hooker, 1875), further add value to these plants for research and conservation. Many of the leafy vegetables also have medicinal use, as seen from their application in treating ailments like (Chandravanshi *et al*., 2018; Sahu & Ekka, 2021). This study seeks to preserve this valuable indigenous knowledge, as better understanding the role of leafy vegetables may boost knowledge of the ecological and cultural landscapes of Chhattisgarh in the face of transformation.

**Review of Literature**

Leafy vegetables played a lot of importance in the live so find igneous peoples, with Central Indian communities being no exception. There are many studies on the nutritional significance, cultural relevance, and ethnobotanical value of leafy vegetables. The subsequent review presents the earlier studies as they relate to the objectives outlined: diversity, traditional knowledge, classification, and cultural significance of leafy vegetables among tribal communities.

**Diversity of Leafy Vegetables Utilized by Tribal Communities**

In fact, the diversity of leafy vegetables consumed by indigenous communities of Chhattisgarh and surrounding regions exhibits a rich botanical heritage. Banik *et al.,* 2014 documented various wild edible tubers and root plants, many of which overlap with leafy vegetable species used by tribal communities. Similarly, Lale *et al.,* 2017 identified herbs used as *"Śāka"* (vegetable) by tribal populations, highlighting their significance in day-to-day diets and traditional medicine (Chandravanshi *et al.,* 2017, 2018) explored the genetic diversity of Amaranthus species, widely cultivated leafy vegetable, and emphasized on the vital use of traditional agriculture for conserving biodiversity.

Studies across other states help offer comparative insights into diversity. Leafy vegetables in Odisha have been studied by Misra and Misra (2014) and wild leafy vegetables in Manipur by Konsam *et al*., 2016. Such studies build upon the assumption that leafy vegetables play a vital role in food security and nutritional diversity among tribal communities.

**Traditional Knowledge and Practices**

Indigenous knowledge on the cultivation, harvesting, and use of leafy vegetables is conducted orally. Kumari and Solanki, 2019 studied the traditional uses of wild leafy vegetables by tribes in Chhattisgarh, signifying the essence of cultural heritage and seasonal food security. Shukla, 2021 undertook the study one ethnic food culture in Chhattisgarh with minute methods employed by the tribes to cultivate and cook leafy vegetables in harmony with ecological cycles. Das *et al.,* 2022 identified effective cropping zones for vegetables in Chhattisgarh. It provides research in sight based on traditional cropping of vegetables so that optimizes seasonal availability. Saurabh *et al.,* 2023 did are view on indigenous leafy vegetables based on genetic divergence, focusing on traditional agriculture preservation techniques of plants. These studies enforce the integration of the traditional approach to modern agricultural research, maintaining diversity and food security.

**Identification and Classification of Leafy Vegetables**

Scientific classification and documentation of leafy vegetables are essential for their conservation and greater exploitation. Their search methodology typically includes the identification of plants with the aid of botanical references and preparation of herbarium specimens for later use. Kala (2009) studied the management of ethnobotanical species in Chhattisgarh's deciduous forests with several leafy vegetables being an essential part of tribal diets. Verma *et al.* (1985) gave exhaustive details on flora concerning Raipur, Durg, and Rajnandgaon, which remains to be used as an undisputable source of such concerns.

Vishwakarma and Dubey (2011) carried out nutritional studies on the wild herbs of eastern Chhattisgarh that add further depths in the ecological importance and the dietary value. Noor and Satapathy (2022), recorded the medicinally important leafy green vegetables diversity in Odisha with a reiteration call to revise proper classification to sustain the resources. The preparation of herbarium specimens, as detailed in the work by Jain and Rao (1977), remains a cornerstone of botanical research, ensuring accurate identification and long-term preservation of leafy vegetable specimens.

**Cultural, Medicinal, and Traditional Significance**

Leafy vegetables hold significant cultural and medicinal importance for tribal communities, as remedies for common ailments. Chandravanshi *et al.,* 2018 discussed the significance of *Amaranthus dubius* with regard to its extensive consumption by the people due to its nutritional and medicinal values. Sahu *et al.*, 2023 studied the diversity of green leafy vegetables in Rajnandgaon and recorded their traditional applications and health benefits.
Laksmi and Vimla, 2000 studied dehydrated green leafy vegetables for their nutritive value which would serve as a solution to nutritional deficiencies. Singh and Arora, 1978 have listed wild edible plants present in India, thus underlining their multi-purpose utility. Proximate composition of unconventional leafy vegetables in Maharashtra were analysed by Shingade *et al.,* 1995.

Ethnobotanical surveys, for instance, Sahu and Ekka, 2021 reported the medicinal values of leafy vegetables in Western Odisha, whereas Ogle *et al*., (2003) elaborated on its multifunctional role in Vietnam as food, feed, and medicine. These reporting thereby emphasize the importance of leafy vegetables beyond nutrition to include culture and medicine as a whole.

**Comparative Studies and Regional Insights**

Comparative studies in other regions enhance the insight into the importance of leafy vegetables in diets of tribes. Diya *et al.,* 2013 have reviewed the South Indian edible leafy vegetables and can be applied to tribal Chhattisgarh for culinary and medicinal practices of the indigenous people. Naidu, 2022 analysed plants species diversity of Raigarh forest districts with an emphasis towards ecological significance in preservation of leafy vegetables pieces. The existence of diversified leafy vegetables in Chhattisgarh's markets and forests, as documented by Sandey and Sharma, 2019, reflects interrelations between traditional practices and ecological adaptability. A check list of Chhattisgarh's biodiversity was provided by Pandey *et al*., (2023), who highlighted the need for systematic documentation to protect these resources.

**Integration of Ethnobotanical Knowledge into Sustainable Development**

Important factors to integrate ethnobotanical knowledge in sustainable development strategies would involve tribal practice preservation along with diversity. Such works by Banik *et al.,* 2014 and Kala, 2009 are also focusing on conserving wild edible plant species and thus fighting food insecurity. Ogle's work from 2001concentrated on the consumption of wild vegetables in Vietnam, providing a suitable platform for such researches to be undertaken in Chhattisgarh too.

Combining traditional knowledge and new scientific research can benefit the documentation of leafy vegetables. Since these insights align with the goals of this study, they form an important part of understanding diversity, classification, and cultural significance within tribal communities regarding leafy vegetables.

The reviewed literature points to the importance of leafy vegetables in the lives of indigenous peoples, specifically in Chhattisgarh. The work that these studies have accomplished in documenting their diversity up to traditional practices and cultural significance is quite robust to be set as a basis for any subsequent research. With integration of ethnobotanical knowledge with modern scientific methods, proper research will help in the sustainable utilization and preservation of these vital resources. It thus resonates with the purposes of the present study and also attracts need to further research and record the diversity of leafy vegetables to protect the rich cultural and ecological heritage of tribal communities.

**Objectives**

This study was designed to achieve the following objectives:

1. Carrying out comprehensive field surveys, visit to local markets and kitchen gardens in order to document the diversity of Bhaji (leaves and shoot vegetables) used among different tribes of Chhattisgarh, including Gond, Baiga, Binjwar, Kamar, Kanwar, and Oraon.
2. Observations of seasonal availability, and usage for traditional knowledge and practices associated with leafy greens would be derived by gathering information from local farmers, vendors, and community members.
3. Identify and classify observed leafy vegetables using standard botanical references and preserve specimens through herbarium preparation for potential future research and documentation.
4. To explore the cultural, medicinal, and traditional importance of leafy vegetables to understand their ethnobotanical relevance in indigenous communities.

**Methodology**

1. **Exploration and Field Survey in Study Area-** Chhattisgarh is located in the centre of India at a latitude of 21°27' N to 23°7' N and longitude of 80°15'E to 83°24'E . The geography here comprises tropical deciduous forests and fertile plains. The tropical climate in this region varies between45°C during summer and 8°C during winter. Mainly focused on districts; Raipur, Gariyaband, Baster (Kanker), Jashpur, Kawardha and Bemetara. Organized large-scale surveys over different geographical zones of Chhattisgarh, by targeting the tribes like Gond, Baiga, Binjwar, Kamar, Kanwar, and Oraon. Executed field visits to local markets (Hat bazaars), kitchen gardens, and other villages for observing and recording leafy vegetables (Bhaji).



Map 1. Map of Chhattisgarh

(downloaded from link-https://www.mapsofindia.com/parliamentaryconstituencies/chhattisgarh/)

1. **Data Collection and Interviews:** The necessary information was collected through structured interviews and questionnaires among the local farmers, vendors, consumers and among the students. This includes the methods of cultivation, seasonal availability and traditional uses of leafy vegetables. Some plants were photographed on location for proper documentation.
2. **Identification and Documentation:** Identified the plants with standard botanical references like Flora of British India (Hooker, 1875) and Flora of Raipur, Durg, and Rajnandgaon (Verma et al., 1985). Recorded botanical names, common names, families, habitats and uses. Prepared the comprehensive list of the leafy vegetables enumerated.
3. **Preparation of Herbarium:** Collected plant specimens were pressed and preserved through herbarium preparation techniques as described by Jain and Rao (1977). These were cataloged for further reference and study.
4. **Ethnobotanical Knowledge:** Record cultural, medicinal, and traditional uses of the leafy vegetables obtained through interactions with local communities for a comprehensive understanding of their importance.

**Results and Discussion**

**Diversity of Leafy Vegetables**

Table 1: Distribution, habitat, local availability, and parts used of leafy vegetables.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **S.N.** | **Botanical Name** | **Local Name** | **Family** | **Habit** | **Local availability period** | **Part used** | **Cultivated (C)/ Wild (W)** |
| 1 | *Achyranthus aspera* | Circhida | *Amarthaceae* | S | July- February  | Leaf, Stem | W |
| 2 | *Achyranthus aspera L.* | Chirchita bhaji | *Amaranthaceae* | H | July-November | Laef, Stem | W |
| 3 | *Adathodavasica L.* | Vasak | *Acanthaceae* | S | Around year | Leaf | W |
| 4 | *Allium cepa L.* | Pyaz bhaji. Gondali bhaji | *Liliaceae* | H | Nov- Jan/ January -May | Leaf, Stem | C |
| 5 | *Allium sativum L.* | Lahsun bhaji | *Liliaceae* | H | Winter | Leaf, Stem | C |
| 6 | *Alternanthera sessilis (L.) DC* | Pathur bhaji | *Amaranthaceae* | H | July- August | Leaf | W |
| 7 | *Amaranthus blitum subsp. oleraceus (L.) Costea* | Chaulai bhaji, Pathrri bhaji | *Amaranthaceae* | H | February-April | Leaf,Soft stem | C |
| 8 | *Amaranthus caudatus L.* | Chaulai bhaji, Ramdana bhaji | *Amaranthaceae* | H | February | leaf | C |
| 9 | *Amaranthus gangaticus L.* | Jadi bhaji, kheda bhaji | *Amaranthaceae* | H | July-October | Whole part | C |
| 10 | *Amaranthus hybridus L.* | Lal bhaji | *Amaranthaceae* | H | October- February | Leaf, Stem | C |
| 11 | *Amaranthus tricolor L.* | Lal bhaji | *Amaranthaceae* | H | October- February | Leaf, Stem | C |
| 12 | *Amaranthus viridis L.* | Kheda bhaji | *Amaranthaceae* | H | August-October | Leaf | C |
| 13 | *Amorphophallus paeoniifolius(Dennst.) Nicolson* | Kansaiyya bhaji, Jimikanda bhaji | *Areceae* | H | July-August | Soft juvenile leaf | C |
| 14 | *Azadirachta indica A. Juss.* | Neem bhaji | *Meliaceae* | T | Year around | Soft leaf, flower, fruit, stem | C |
| 15 | *Basella alba L.* | Green Poi bhaji | *Basellaceae* | C | Year around | Leaf | C |
| 16 | *Basella rubra L.* | Red Poi bhaji | *Basellaceae* | C | Around year | Leaf | C |
| 17 | *Bauhinia variegat L.* | Koilari bhaji | *Fabaceae* | T | Year around specially May - June | leaf | C |
| 18 | *Boerhaaviadiffusa L.* | Patharribhaji,Gajkurna bhaji | *Nyctaginaceae* | H | October-December | Leaf | C |
| 19 | *Brassica oleracea var. botrytis L.* | Gobhi bhaji, Anda bhaji | *Brassicaceae* | H | November- December | Leaf, Flower | C |
| 20 | *Brassica oleracea var. capitata L.* | Band gobhi, Patta gobhi bhaji | *Brassicaceae* | H | Winter | Leaf | C |
| 21 | *Brassica oleracea var.caularpa L.* | Ganth Gobhi bhaji | *Brassicaceae* | H | Winter | Leaf | C |
| 22 | *Brassica rapa L.* | Sarson bhaji | *Brassicaceae* | H | December- January | Leaf, Seed | C |
| 23 | *Caesulia axillaries Roxb.* | Muchari bhaji | *Asteraceae* | H | Around Year | Leaf | W |
| 24 | *Cantella asiatica L.* | Bhramhi Bhaji | *Apiaceae* | H | September-Fabruary | Leaf | W |
| 25 | *Carchorusolitirius L.* | Safed chench bhaji | *Malvaceae* | H | March- June | Leaf | C |
| 26 | *Carchorustrilocularis L.* | Machharia bhaji | *Tiliaceae* | H | August-December | Leaf,Stem,Bark | W |
| 27 | *Carthamus tinctorius L.* | Barre bhaji, kusum bhaji | *Asteraceae* | H | December- January | Leaf,Seed | C |
| 28 | *Celosea argentea L.* | Siliyari bhaji | *Amaranthaceae* | H | October-December | Leaf | C |
| 29 | *Cenopodium album L.* | Bhathua bhaji | *Amaranthaceae* | H | December- February | Leaf | C |
| 30 | *Chlorophyttum tuberosum (Roxb.) Baker* | Kunjar bhaji | *Asparagaceae* | H | June-July | Leaf | W |
| 31 | *Cholocasia esculenta (L.) Schott (red colour)* | Kochai bhaji, Banrakas bhaji | *Araceae* | H | August-October | Leaf,Root | W |
| 32 | *Cicer arietinum L.* | Chana bhaji | *Fabaceae* | H | October- February | Leaf, friut | C |
| 33 | *Cinnamomum tamala (Buch- Ham.)* | Tejpatta | *Lauraceae* | T | Whole year | Leaf | C |
| 34 | *Cleome viscosa* | Hurhur bhaji | *Capparidaceae* | H | August-January | Leaf | W |
| 35 | *Coccinia grandis (L.) Vogt.* | Kundaru bhaji | *Cucurbitaceae* | C | July- October | Leaf,Fruit | C |
| 36 | *Colocasia esculenta (L.) Schott* | Kochai bhaji | *Araceae* | H | October- November | Leaf,Root | W |
| 37 | *Commelinabenghalensis L.* | Kauhakeni bhaji, Kena bhaji | *Commelinaceae* | H | July- September | Leaf | W |
| 38 | *Corchorus trilocularius L.* | Lal chach Bhaji | *Tiliaceae* | H | February - June | Leaf | C |
| 39 | *Cordia dichotoma G.Forst.* | Bohar bhaji | *Boraginaceae* | T | Around year (May- June) | Leaf | C |
| 40 | *Coriandrum sativam L.* | Dhaniya bhaji | *Apiaceae* | H | Around year | Leaf | C |
| 41 | *Cryptocoryneretrospiralis (Roxb.) Kunth* | Chur, Chotku, Koniyari | *Araceae* | H | July- June | Leaf | W |
| 42 | *Cucurbita maxima Duchesne* | Makhna,kumhda, kaddu bhaji | *Cucurbitaceae* | C | July-December | Leaf,fruit, flower | C |
| 43 | *Eclipta prostrate (L.) L.* | Bhrigraj | *Asteraceae* | H | August-December | Leaf, Flower | W |
| 44 | *Eryngium Foetidum L.* | Jagali Dhaniya, Bandhaniya | *Apiaceae* | H | December-May | Leaf | C |
| 45 | *Ficus geniculata L.* | Futkal Bhaji | *Moraceae* | T | Around year | Leaf | W |
| 46 | *Ficus religiosa L* | Pipal Bhaji | *Urticaceae* | T | Around year | Leaf | C |
| 47 | *Hellenia speciosa (J. Koenig) S.R. Datta* | Keu bhaji | *Costaceae* | H | July- February | Leaf, Tuber | W |
| 48 | *Hibiscus cannabinus L.* | Patua bhaji | *Malvaceae* | H | August- September | Leaf, Stem | W |
| 49 | *Hibiscus sabdarifa L.* | Amaribhaji,Mohabbat bhaji, Khatta bhaji | *Malvaceae* | H | August-February | Leaf, Flower | C |
| 50 | *Ipomoea aquatic Forssk.* | Karmta bhaji | *Convolvulaceae* | H | Around year | Leaf | C |
| 51 | *Ipomoea batatas Lam.* | Kanda bhaji | *Convolvulaceae* | C | Around year | Leaf, Root | C |
| 52 | *Kalanchoe pinnata (Lam.) Pers.* | Pattarchhata bhaji | *Crassulaceae* | H | Around Year | Leaf | W |
| 53 | *Lablab purpureus (L.) Sweet* | Semi bhaji | *Fabaceae* | C | October-November | Leaf, Fruit | C |
| 54 | *Lagenaria siceraria (Molina)* | StandlLauki bhaji | *Cucubitaceae* | C | September- June | Leaf, Fruit | W |
| 55 | *Lagenaria vulgaris* | Lauki bhaji | *Cucurbitaceae* | C | July- October | Leaf | W |
| 56 | *Lathyrus sativus L.* | Lakhdi, Tiwra bhaji | *Papinionaceae* | C | December- February | Leaf, | C |
| 57 | *Leucas aspera (Willd.) Link* | Gumi bhaji | *Lamiaceae* | H | August- December | Leaf | W |
| 58 | *Macrotyloma uniflorum (Lam)* | Kulthi bhaji | *Fabaceae* | H | December - March | Leaf,Seed | C |
| 59 | *Marsilea minuta L.* | Sunsunia bhaji | *Marsileaceae(Pteridophytes)* | H | Around Year | Leaf | W |
| 60 | *Marsilea quadrifolia L.* | Sunsunia bhaji, teenpaniya bhaji | *Marsileaceae(Pteridophytes)* | H | Around Year | Leaf | W |
| 61 | *Medicago polymorpha L.* | Thekri bhaji | *Fabaceae* | H | August- June | Leaf | W |
| 62 | *Mentha spicata L.* | Pudina bhaji | *Lamiaceae* | H | April- July | Leaf | C |
| 63 | *Merremiaemarginata (Burm. F.) Hallier f.* | Kaini, Muskaini bhaji | *Convolvulaceae* | C | August- December | Leaf | W |
| 64 | *Momordica charantia* | Karela bhaji | *Cucurbitaceae* | C | July- October | Leaf,Fruit | C |
| 65 | *Moringa oleifera Lam.* | Munga bhaji | *Moringaceae* | T | Around year | Leaf,Fruit | C |
| 66 | *Murrayakoenigii (L.) Sprengel* | Meetha neem Patti | *Rutaceae* | S | Around Year | Leaf | C |
| 67 | *Nyctanthousarbortistis* | Khirsali,Parijat | *Nyctanthaceae* | T | Around year | Bark, Leaf | W |
| 68 | *Ophioglossumreticulatum L.* | Murgachuner bhaji | *Ophioglossaceae (Pteridophytes)* | H | August-December | Leaf | W |
| 69 | *Phaceolus radiates L.* | Urad Bhaji | *Papilionaceae* | C | December - Fab | Leaf, Seed | C |
| 70 | *Phaseolus radiates L.* | Mung bhaji | *Fabaceae* | H | November- December | Leaf,Seed | C |
| 71 | *Portulaca oleracea L.* | Nunia, Dal, Goti, Gol bhaji | *Portulacaceae* | H | Around year | Leaf | C |
| 72 | *Raphanus sativus L.* | Murouti, Mooli Bhaji, | *Brassicaceae* | H | August-December | Leaf,Root | C |
| 73 | *Schleichera oleosa (Lour.) Oken* | Kusum bhaji, Rupa bhaji | *Sapindaceae* | T | July | Leaf, Fruit | C |
| 74 | *Scoparia dilcis L.* | Van dhaniya | *Scrophulariaceae* | H | September -November | Leaf | W |
| 75 | *Senna tora (L.) Roxb.* | Charota, Phuhada bhaji | *Fabaceae* | H | August-December | Leaf | W |
| 76 | *Solanum tuberosum L.* | Aalu bhaji | *Solanaceae* | H | October-April | Leaf, root | C |
| 77 | *Spheranthous indicus L.* | Gorakmundi bhaji | *Astreaceae* | H | October-April | Leaf, Flower | W |
| 78 | *Spinanaciaoleraceae L.* | Palak bhaji | *Amaranthaceae* | H | Around year | Leaf | C |
| 79 | *Talinumportulacifolium (Forssk.)Asch.exSchweinf.* | Pahuna,Shakhi, Master bhaji | *Talinaceae, Portulacaceae* | H | Around year | Leaf | C |
| 80 | *Tarmindus indica L.* | Kurma bhaji,imli bhaji | *Fabaceae* | T | April- august | Leaf, Seed, Fruit | W |
| 81 | *Trianthemaportulacastrum L.* | Salsa Bhaji | *Aizoaceae* | H | Around year | Leaf | W |
| 82 | *Trigonella foenum- graecum L.* | Methi bhaji | *Fabaceae* | H | Around year | Leaf, seed | C |
| 83 | *Vicia faba L.* | Jilo bhaji | *Fabaceae* | H | November-January | Leaf, Seed | C |
| 84 | *Vigna mungo (L.) Hepper* | Urad bhaji | *Fabaceae* | H | November-January | Leaf, Seed | C |
| 85 | *Vigna trilobata (L.) Verdc.* | Mungeshar bhaji | *Fabaceae* | H | July- September | Leaf, Seed | W |
| 86 | *Vigna unguiculata (L.) Walp.* | Barbatti bhaji | *Fabaceae* | H | July- October | Leaf, Seed | C |

The study identified 86 leafy vegetable species belonging to 35 families, showcasing the rich biodiversity of central Chhattisgarh (Table 1). The Fabaceae family dominated with 13 species, highlighting its prominence in local diets and cultural practices. Other prominent families included *Amaranthaceae* (12 species), *Cucurbitaceae* (5 species), *Brassicaceae, Asteraceae*, and *Aracaceae* (with 4 species in each) (Table 1). These families underline the significance of diverse plant groups in meeting dietary and therapeutic needs.

Figure 1: Distribution of the families of leafy vegetables.

The data (Figure1) shows a rich distribution of families in the study of leafy vegetables. *Amaranthaceae* and *Fabaceae* dominant eat 13.95% and 15.12%, respectively, with their significant contributions to the diet. Next are *Cucurbitaceae*, accounting for 5.81%, and *Araceae* at 4.65%, providing staple vegetables. Families like *Asteraceae, Brassicaceae,* and *Malvaceae* also account for a considerable percentage, reflecting their ecological adaptability and nutritional value. The existence of Pteridophytes, including *Marsileaceae* and *Ophioglossaceae*, suggests a diversity of plant species, which consequently supports ecological balance. Diversity in 35 families underlines the rich botanical heritage of the region to conserve biodiversity(Figure1).

Figure2: Status of cultivated and wild leafy vegetables.

The Figure 2, indicates the cultivated and wild status of leafy vegetables, showing that 86 species from 35 families were identified. Cultivated species (61.63%) are predominant, while wild species account for 38.37%. This highlights the reliance on both agricultural and foraged leafy vegetables for nutritional diversity and food security.

**Habitat and Availability**

The leafy vegetables were grouped according to habit :the herbaceous plants (H) dominated, followed by shrubs (S), climbers (C), and trees (T). The results indicate (Figure 2) that herbs are the closest available resources for the communities, accounting for more than 70.93% of the species documented. Seasonality varied, with several species being available throughout they ear (e.g.,*Moringa oleifera, Marsilea minuta, Spinacia oleracea*), whereas others featured narrow windows for a single season, including *Amaranthus hybridus* in October- February and *Basella alba* throughout the year. The monsoon and winter seasons saw maximum diversity, with *Alternanthera sessilis* and *Amaranthus viridis* prominent during both periods (Table1).

Figure 3: Distribution of the habitats of leafy vegetables.

**Parts Used**

The study reported that leaves were the most commonly used part, within frequent use of stems (*Allium cepa, Amaranthus tricolor*), flowers (*Azadirachta indica, Hibiscus sabdariffa*), and seeds (*Brassica rapa, Vigna unguiculata*). Young leaves (*Amorphophallus paeoniifolius*)and tender shoots were favoured for being softer and nutritionally rich.

**Traditional Practices in the Use of Leafy Vegetables in Chhattisgarh**

In Chhattisgarh, traditional uses of leafy vegetables have long provided essential nutrients and medicine for local communities. Many of the indigenous tribes use wild and cultivated leafy vegetables as primary sources for daily nutrition and medicinal uses. It is collected from natural forests, fields, and home gardens, while traditional knowledge helps in regulating their seasonal extraction and preparation cycles (Kala, 2009; Chandravanshi *et al.,* 2017). Preparation s of the vegetables vary by communities, while these are commonly consumed as cooked dishes, raw salads, or soups, and some leaves are dried and powdered for use during off-seasons (Dhadore & Chakradhar, 2021).

The medicinal use of these vegetables also falls under traditional knowledge, where leaves like Amaranthus and Moringa are supposed to have healing properties for problem s such as anaemia, digestive problems, and skin infections (Kumari & Solanki, 2019; Lale e*t al.*, 2017). Certain species are harvested during specific season such as monsoon or winter, which influences the choice of vegetables consumed, thus ensuring consumption through all seasons (Chauhan *etal.,2014).*This practice of using these vegetables within daily meals is not only a dietary culture but also a preservation method for the indigenous culture, connecting foods security with regional ecological sustainability (Pandey *et al*., 2023).

These practices reflect an extremely strong relationship between communities and their natural environment, both contributing to nutritional security and biodiversity conservation.

**Discussion**

The present study on diversity of leafy vegetables in central Chhattisgarh underlines the region's rich botanical heritage, which is of crucial significance for nutritional as well as cultural purposes. In total, 86 species of leafy vegetables belonging to 35 families have been documented, emphasizing the importance of these plants in local diets and traditional practices. The Fabaceae family represents the most important contributor to diet s at the local level with 13 species, in agreement with previous studies, which also mention legumes and pulses as being key components of the diet in Indian communities (Pandey*etal*.,2023). The *Amaranthaceae* family is also very dominant, with 12 species, while this family has been documented as important in similar studies in India, where *Amaranthus spp.* It is widely consumed for its high nutritional value(Chandravanshi *et al*., 2017). Other important families are *Cucurbitaceae, Brassicaceae*, and *Asteraceae* that significantly contribute to the diets at the local level.

The varied distribution of these families is not only a reflection on the rich ecological adaptability of the region but also a suggestion on their considerable role in local biodiversity conservation. Families like *Malvaceae, Araceae,* and *Pteridophytes* (e.g., *Marsileaceae, Ophioglossaceae*) are of special interest because they denote plant types contributing to ecological balance and ecosystem services, supporting the findings of Kala (2009) regarding the role of plant species in maintaining ecological harmony in Chhattisgarh's deciduous forests.
Habitat categorization finds out that herbaceous leafy vegetables dominated the greater part of the species recorded, which accounts forever 70.93%. This is an indication of ease and abundance of herbs in the diets at local level, as herbs often get cultivated and harvested easily. This finding is in line with findings from Sahu *et al.,* (2023),which also indicated herbaceous plants as the source of leafy vegetables within other districts of Chhattisgarh. Another reason supporting the conclusion of Pandey *et al*., (2023) and Chauhan *et al*., (2014) regarding the perennially of some leafy vegetable species in Chhattisgarh's climate is their seasonality. Most of the species are available throughout the year, such as *Moringa oleifera, Spinacia oleracea*. More interestingly, seasonal variation aligns with common harvesting practices reported in the region during monsoon and winter seasons. Again, species such as *Alternanthera sessilis* and *Amaranthus viridis*, growing during these periods, are of significant importance in local diets, which provide freshly consumed sources of vitamins and minerals. This seasonal pattern further strengthens thet argument that local knowledge about the growth cycles of plant species is an important component of sustainable agriculture and food security in Chhattisgarh (Konsam *et al., 2016*).

The study also emphasizes the edible parts of plants. Leaves are the most consumed edible part, as supported by other studies on diets of Indian tribes, in which leafy vegetables were widely valued for their high content of micronutrients (Diya *et al*.,2013). The intake of tender juvenile leaves and younger shoot stems as in *Amorphophallus paeoniifolius*, for instance, is most remarkable for their freshness and nutrient content, which agrees well with the observations of Laksmi and Vimla (2000) who asserted that soft textured plant parts play a vital role in the local diet.

**Findings**

1. **Diversity and Ecological Significance:** A total of 86 species were identified, belonging to 35 families of leafy vegetables, with Fabaceae, Amaranthaceae, and Cucurbitaceae being the most prominent. The nutritional and therapeutic needs of local communities rely on these families. Their ecological adaptability and contribution to biodiversity make them essential for conservation (Pandey *etal*.,2023;Chauhan *etal*.,2014).
2. **Habitat and Accessibility:** Herbaceous was the most represented group, over 70% of all species, hence very accessible and commonly consumed. This finding illustrates the possibility of leafy greens being available throughout the year with some being perennial species like *Moringa oleifera* and *Spinacia oleracea* (Sahu *et al*., 2023).
3. **Seasonal Availability:** Besides, *Alternanthera sessilis* and *Amaranthus viridis* are highly available during monsoon and winter seasons, which coincides with the traditional harvesting time and seasonal cycles observed elsewhere in Chhattisgarh (Chandravanshi *et al*., 2017). Seasonal diversity also aids in food security since nutrients are provided at different times of the year (Konsam *et al*., 2016).
4. **Parts Used for Consumption:** Leaves were the major commodity, with tender leaves and soft shoots being taken mainly because of their tenderness and high nutrient values. Specific preference for certain parts of the plant is well-documented in traditional diets, which can indicate a greater understanding of plant morphology and the nutritional values at the local level (Laksmi & Vimla, 2000; Diya *et al.*, 2013).
5. **Cultural and Nutritional Importance:** The study supports the concept of using biodiversity and local knowledge in traditional resources. Consumption of these leafy vegetables is closely related to the cultural life patterns of the inhabitants, and it is obvious from the variety of species used as well as the variety of habitats that they occupy. This aligns with studies that have earlier emphasized the use of ethnobotanical knowledge in the maintenance of health and nutrition among the communities, (Kala,2009; Shukla, 2021).

**Conclusion:**

The present study brings to light the wealth of leafy vegetables in central Chhattisgarh by as many as 86 species from 35 families playing a very significant role in diets and traditional practices. Dominance by *Fabaceae* and *Amaranthaceae* reflects their importance from the nutritional perspective. Herbaceous plants are the most used varieties, with seasonal variability supporting food security. The choice between juvenile leaves and soft stems represents traditional knowledge of plant nutrient sources. These results underpin the ecological and cultural significance of these plants as they support sustainable agricultural practices and biodiversity conservation, where vital resources will continue to be available for local communities.

**References**

**Banik, A., Nema, S., & Shankar, D. (2014).** Wild edible tuber and root plants available in Bastar region of Chhattisgarh. *International Journal of Forestry and Crop Improvement, 5*(2), 85–89. <https://doi.org/10.15740/HAS/IJFCI/5.2/85-89>

**Chandravanshi, D., Sharma, P., & Sharma, H. (2017).** Evaluation and characterization of leafy vegetables (*Amaranthus* spp.) grown in Chhattisgarh: A review. *International Journal of Chemical Studies, 6*, 697–704.

**Chandravanshi, D., Sharma, P., Banjare, C., & Chandravanshi, D. (2018).** Genetic diversity of *Amaranthus dubius Mart.* (*Khedha*) used by the tribal community in Chhattisgarh, India. *International Journal of Bio-resource and Stress Management, 9*(5). <https://doi.org/10.23910/ijbsm/2018.9.5.1865e>

**Chauhan, D., & Patra, S. (2014).** Diversity of leafy vegetables used by tribal peoples of Chhattisgarh, India. Journal of Root Crops, 42(1), 81-85.

**Chauhan, D., Shrivastav, A. K., & Patra, S. (2014).** Diversity of leafy vegetables used by tribal peoples of Chhattisgarh, India. *International Journal of Current Microbiology and Applied Science, 3*(4), 611–622. ISSN: 2319-7706

**Das, K., Nag, G., Yadu, A., & Gayen, R. (2022).** Identification of efficient cropping zones for major vegetable crops in different districts of Chhattisgarh. *International Journal of Environment and Climate Change*. <https://doi.org/10.9734/ijecc/2022/v12i430655>

**Dhadore, V., & Chakradhar, M. (2021).** Chhattisgarh panorama of leafy vegetables. *International Journal of Creative Research Thoughts, 9*(10). ISSN: 2320-2882

**Diya, M. S., Joshna, A., & Lakshmi, M. S. (2013).** A review on the South Indian edible leafy vegetables. *Journal of Global Trends in Pharmaceutical Sciences, 4*(4), 1248–1256.

https://www.mapsofindia.com/parliamentaryconstituencies/chhattisgarh/

**Gupta, D., Bhoumik, A., Gupta, G., Singh, N., & Sahu, B. (2022).** Various plant use in socio-religious and cultural ceremonies of rural areas in Janjgir-Champa, district in Chhattisgarh. Journal of Ethnobotany and Socio-Cultural Studies, 14(2), 65-72.

**Kala, C. (2009).** Aboriginal uses and management of ethnobotanical species in deciduous forests of Chhattisgarh state in India. *Journal of Ethnobiology and Ethnomedicine, 5*, 20. <https://doi.org/10.1186/1746-4269-5-20>

**Kala, C. (2009).** Aboriginal uses and management of ethnobotanical species in deciduous forests of Chhattisgarh state in India. Journal of Ethnobiology and Ethnomedicine, 5(20). <https://doi.org/10.1186/1746-4269-5-20>

**Khoja, A., Haq, S., Majeed, M., Hassan, M., Waheed, M., Yaqoob, U., Bussmann, R., Alataway, A., Dewidar, A., Al-Yafrsi, M., Elansary, H., Yessoufou, K., & Zaman, W. (2022).** Diversity, ecological and traditional knowledge of pteridophytes in the Western Himalayas. Diversity, 14(8), Article 628. <https://doi.org/10.3390/d14080628>

**Konsam, S., Thongam, B., & Handique, K. (2016).** Assessment of wild leafy vegetables traditionally consumed by the ethnic communities of Manipur, Northeast India. *Journal of Ethnobiology and Ethnomedicine, 12*(9). https://doi.org/10.1186/s13002-016-0080-4

**Kumar, A. C. K., Diyvasree, M. S., Joshna, A., Mohana Lakshmi, S., & Satheesh Kumar, D. (2013).** A review on South Indian edible leafy vegetables. *Journal of Global Trends in Pharmaceutical Sciences, 4*(4), 1248–1256. ISSN: 2230-7346.

**Kumar, S. (2024).** Cultural festivals of primitive tribes of Bilaspur Division of Chhattisgarh. International Journal of Advances in Social Sciences, 10(1), 34-46. <https://doi.org/10.52711/2454-2679.2024.00012>

**Kumari, B., & Solanki, H. (2019).** The traditional knowledge of wild leaves used by tribal people in Chhattisgarh. *International Journal of Plant and Environment, 5*(4). <https://doi.org/10.18811/IJPEN.V5I04.9>

**Kumari, B., & Solanki, H. (2019).** The traditional knowledge of wild edible leaf used by tribal people in Chhattisgarh. International Journal of Plant and Environment, 5(4), 69-75. <https://doi.org/10.18811/IJPEN.V5I04.9>

**Laksmi, B., & Vimla, V. (2000).** Nutritive value of dehydrated green leafy vegetable powder. *Journal of Food Science and Technology, 37*(5), 465–471.

**Lale, S., Gaur, S., & Dhiman, V. (2017).** Utilization of some important herbs used as “Śāka” (vegetable) in Ayurveda by tribal people of Raigarh district, Chhattisgarh State, India. *International Journal of Ethnobiology and Traditional Medicine, 2*, 40–49. <https://doi.org/10.5005/jp-journals-10059-0007>

**Misra, S., & Misra, M. K. (2014).** Nutritional evaluation of some leafy vegetables used by the tribal and rural people of South Odisha, India. *Scholars Research Library, 4*(1). ISSN: 2231-3184

**Naidu, V. (2022).** Comparison of plant species diversity of different forest types of Bhupdeopur of district Raigarh, Chhattisgarh. *Journal of Innovation and Social Science Research*. [https://doi.org/10.53469/jissr.2022.09(02).05](https://doi.org/10.53469/jissr.2022.09%2802%29.05)

**Noor, N., & Satapathy, K. (2022).** Diversity of medicinally important leafy vegetables used by tribes in Balasore district of Odisha, India. *Plant Science Today*. <https://doi.org/10.14719/pst.1815>

**Ogle, B. M. (2001).** Wild vegetables and women’s diets in Vietnam. *Comprehensive Summaries of Uppsala Dissertations from the Faculty of Medicine.*

**Ogle, B. M., Ho Thi Tuyet, Hoang Nghia Duyet, & Nguyen Nhut Xuan Dung. (2003).** Food, feed, or medicine: The multiple functions of edible wild plants in Vietnam. *Economic Botany, 57*(1), 103–117.

**Ogle, B. M., Ho, T. T., Hoang, N. D., & Nguyen, N. X. D. (2003).** Food, feed or medicine: The multiple functions of edible wild plants in Vietnam. *Economic Botany, 57*(1), 103–117.

**Pandey, A., Naik, M. L., & Mishra, R. P. (2023).** Biodiversity of Chhattisgarh: A checklist (1st ed.). *Chhattisgarh State Biodiversity Board*. ISBN 978-81-953898-0-3

**Pandey, A., Sahu, A., Harit, A., & Singh, M. (2023).** Nutritional composition of the wild variety of edible vegetables consumed by the tribal community of Raipur, Chhattisgarh, India. *The Scientific Temper*. <https://doi.org/10.58414/scientifictemper.2023.14.1.05>

**Pandey, A., Sahu, A., Harit, A., & Singh, M. (2023**). Nutritional composition of the wild variety of edible vegetables consumed by the tribal community of Raipur, Chhattisgarh, India. The Scientific Temper, 14(1), Article 05. <https://doi.org/10.58414/scientifictemper.2023.14.1.05>

**Sahu, A., & Ekka, N. (2021).** A preliminary report on the use of leafy vegetables by natives of Bargarh district, Western Odisha, India. *International Journal of Applied Research, 7*(5). <https://doi.org/10.22271/ALLRESEARCH.2021.V7.I5D.8567>

**Sahu, M. K., Sahu, K. K., &Tandekar, K. L. (2023).** Diversity of green leafy vegetables found in Rajnandgaon district, Chhattisgarh, India. *Education and Society (शिक्षणऔरसमाज), 46*(4), 8. ISSN: 2278-6864.

**Sandey, H., & Sharma, L. (2019**). Survey on the leafy vegetables of Kondagaon area of Bastar, Chhattisgarh. *Journal of Emerging Technologies and Innovative Research, 6*(6). ISSN: 2349-5162

**Saurabh, Kumar, T., & Kumar, M. (2023).** Various genetic divergence of indigenous leafy vegetables in Chhattisgarh: A review. *International Journal of Biological Research, 7*(2), 20–24.

**Saurabh, Kumar, T., & Kumar, M. (2023).** Various genetic divergence of indigenous leafy vegetables in Chhattisgarh: A review. *International Journal of Bio-resource, SP-7*(2), 20–24. ISSN: 2617-4707.

**Shankar, D., Thakur, A., Kanwar, R., & Singh, D. (2017).** Effect of growing different leafy vegetables as intercrop on the yield of summer colocasia in Bastar Plateau of Chhattisgarh. Journal of Root Crops, 42(2), 81-85.

**Shingade, M. Y., Chavan, K. N., & Gupta, D. N. (1995).** Proximate composition of unconventional leafy vegetables from Konkan region of Maharashtra. *Journal of Food Science and Technology, 32*, 429–431.

**Shukla, A. (2021).** Ethnic food culture of Chhattisgarh state of India. *Journal of Ethnic Foods, 8*, 1–16. <https://doi.org/10.1186/s42779-021-00103-6>

**Singh, H. B., & Arora, R. K. (1978).** Wild edible plants of India (1st ed.). ICAR Publication, New Delhi.

**Sureshkumar, J., Silambarasan, R., Bharati, K., Krupa, J., Amalraj, S., &Ayyanar, M. (2018)**. A review on ethnomedicinally important pteridophytes of India. Journal of Ethnopharmacology, 219, 269-287. <https://doi.org/10.1016/j.jep.2018.03.024>

**Vishwakarma, K., & Dubey, V. (2011).** Nutritional analysis of indigenous wild edible herbs used in eastern Chhattisgarh, India. *Emirates Journal of Food and Agriculture, 23*, 554–560.