International Journal of Innovative Scientific Research
2025, Vol. 3, Issue 1, pp. 91-98

International Journal of
Innovative Scientific Research

Journal homepage: https://ijisr.net

Research paper

Exploration and Documentation of Economic Benefits of Seasonal Wild Vegetables in Dhanora Tehsil from Gadchiroli District, Maharashtra, India:

A Key to Sustainable Food Systems and Biodiversity Conservation

Swapnil S. Nandgawe * [1], **Pramesh A. Dani** [2], **Vasanta I. Kahalkar** [3]

[1] *Research Scholar, IHLR & SS, Department of Botany, Anand Niketan College, Anandwan, Warora, Maharashtra, India*

[2] *Department of Botany, Shri Govindrao Munghate Arts & Science College, Kurkheda, Gadchiroli, Maharashtra, India*

[3] *Department of Botany, Mahatma Gandhi Arts, Science and Late N. P. Commerce College, Armori, Gadchiroli, Maharashtra, India*

KEYWORDS

Wild Vegetables

Economic Benefits

Biodiversity Conservation

Sustainable Food Systems

Indigenous Knowledge

ABSTRACT

This study explores the multifaceted economic benefits of seasonal wild vegetables in Dhanora Tehsil, Gadchiroli District, Maharashtra. Located in the eastern region of Maharashtra, Dhanora Tehsil presents a remarkable landscape of ecological significance and traditional food systems. The region's unique ecological configuration, comprising tropical deciduous forests, varied topographical features, and distinct seasonal variations, creates an extraordinary biodiversity hotspot that supports an extensive array of wild vegetable species. Indigenous communities in Dhanora Tehsil possess intricate knowledge about seasonal wild vegetable identification, collection, processing, and utilization, which has been transmitted through oral traditions and practical learning across generations. This research aims to comprehensively explore and quantify the multifaceted economic benefits of seasonal wild vegetables, employing a holistic methodology that integrates ethnobotanical surveys, economic valuation techniques, and participatory rural appraisal methods. By systematically documenting the diversity, collection practices, economic contributions, and ecological interactions of wild vegetables, the study seeks to generate crucial insights that can inform more nuanced approaches to sustainable food systems, biodiversity conservation, and community-centered development strategies.

Field surveys were carried out from 23 May 2024 to 26 August 2024, employing a multifaceted research methodology designed to comprehensively document the economic and ecological potential of seasonal wild vegetables. Throughout the field surveys, personal interviews, and group discussions with indigenous communities, 28 wild vegetable species of 24 Families were identified and documented. The study also sheds light on the traditional knowledge associated with harvesting, processing, and utilizing these wild vegetables, which has been passed down through generations.

***Corresponding author**: Swapnil S. Nandgawe

DOI 105281/ijisr-1782924

1. Introduction

India's complicated and convoluted relationship with natural food resources is reflected in the Dhanora Tehsil, which is tucked away in Maharashtra's environmentally rich Gadchiroli District. Located in Maharashtra's northeast, this region is known for its thick forests, rolling hills, and primarily tribal people who have long maintained a close, mutually beneficial relationship with the natural world. A wide variety of wild vegetable species are supported by the region's exceptional biodiversity hotspot (Vincent et al., 2022), which is created by its distinctive ecological configuration, which includes tropical deciduous woods, diverse topographical features, and noticeable seasonal fluctuations (Waheed et al., 2024). A vital part of regional food systems, these wild vegetables are frequently disregarded in the general agricultural and nutritional discourse (Varzakas & Smaoui, 2024). They are not only a source of food but also a complex ecological knowledge system that has developed over many generations of close human-nature interactions (Von Grüning, 2021).

In Dhanora Tehsil, Indigenous groups have cultivated a sophisticated knowledge of wild plants that goes beyond simple dietary needs, including profound ecological, cultural, and economic value in their customs (Balick & Cox, 2020). These communities, who are mainly made up of tribal tribes from Gond and Madia, have extensive information about how to identify, gather, process, and use seasonal wild vegetables (Chouhan & Sharma, 2022). This knowledge has been passed down through the years through oral traditions and hands-on learning (Fuller, 2005). Beyond their immediate market worth, these wild vegetables have significant economic benefits that cover intricate aspects of food security, nutritional diversity, healthcare cost reduction, and livelihood resilience (Leakey et al., 2021). Wild vegetables are a vital adaptive strategy in an area that is often plagued by agricultural uncertainties, restricted market access, and climate vulnerabilities (Inman et al., 2020). They give people a flexible and dynamic way to meet their nutritional and economic demands. Additionally, gathering and eating these veggies is a sustainable resource management strategy that maximizes community welfare while reducing ecological disturbance (Mallick et al., 2024).

The scientific and developmental significance of documenting these wild vegetable systems cannot be overstated, particularly in the context of emerging global challenges related to biodiversity conservation, climate change adaptation, and sustainable development (Flandroy et al., 2018). Despite their immense potential, wild vegetables remain marginalized in academic research, policy frameworks, and economic assessments, resulting in a significant knowledge gap that undermines their strategic importance (Mudau et al., 2022). This research aims to comprehensively explore and quantify the multifaceted economic benefits of seasonal wild vegetables in Dhanora Tehsil, employing a holistic methodology that integrates ethnobotanical surveys, economic valuation techniques, and participatory rural appraisal methods (Calizaya et al., 2023). The research aims to produce important insights that can guide more sophisticated approaches to sustainable food systems (Gliessman, 2021), biodiversity conservation, and community development strategies by methodically recording the diversity (Gofman, 2010), collection methods, economic contributions, and ecological interactions of wild vegetables (Turner et al., 2011). Additionally, by elevating indigenous communities' voices and knowledge, this research hopes to establish their traditional ecological wisdom as a useful tool for tackling today's environmental and socioeconomic issues (Silvestru, 2023).

2. Study area

Dhanora Tehsil, which is part of Gadchiroli District in eastern Maharashtra, offers an impressive environment with traditional food systems and ecological value. This region of the Deccan Plateau, which is between latitudes 18° 43' and 21° 50' North and longitudes 79° 45' and 80° 53' East, is home to an exceptional ecology with 78% forest cover of dry and moist deciduous landscapes. Due to its remote location, which has been mostly unaffected by industrialization and urbanization, the district has maintained a high biodiversity that is an essential source of indigenous biological knowledge. The region's complex topography, marked by hilly terrain and intricate river systems (Ghimire et al., 2023), creates diverse microclimates that support an extensive array of wild vegetable species (Ndayambaje et al., 2024). These native plants represent not just botanical diversity but also embody centuries of indigenous communities' sustainable food practices (Turner et al., 2022). By maintaining minimal external ecological disruption, Gadchiroli provides an exceptional natural laboratory for exploring how traditional food systems can simultaneously support human nutrition and biodiversity conservation (Chougale et al., 2023), offering crucial insights into sustainable ecological management (Liu et al., 2024).

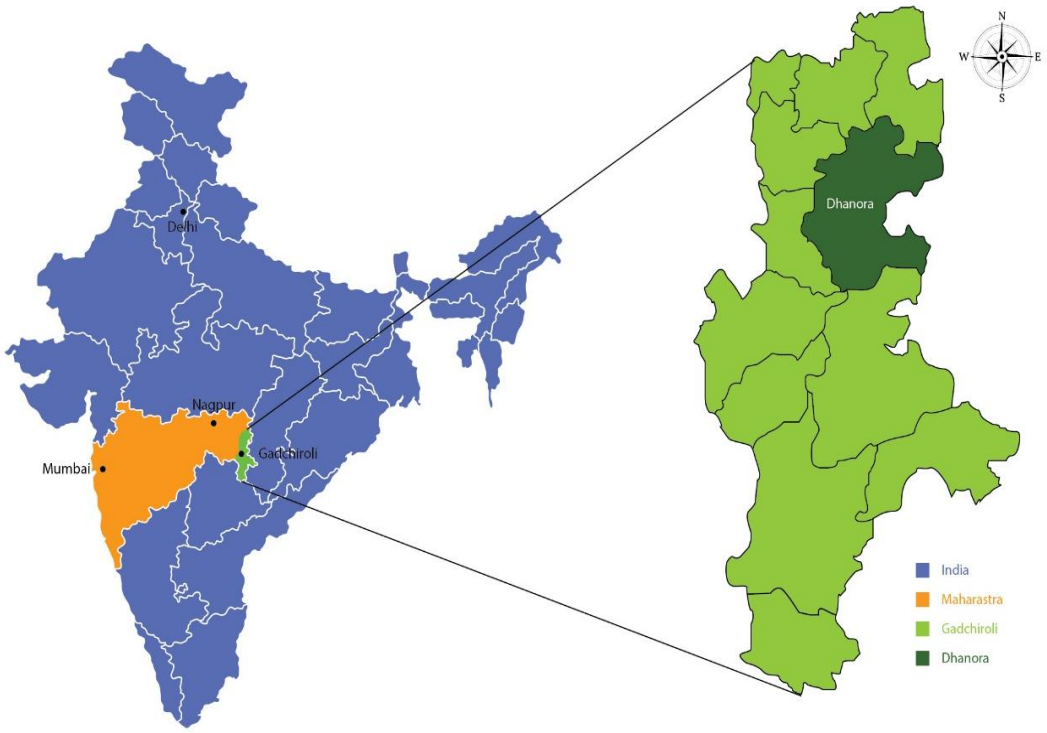

Fig. 1 Map of Dhanora Tehsil, Gadchiroli District, eastern Maharashtra, India

3. Methodology

The study was strategically conducted across 11 carefully selected villages in Dhanora Tehsil of Gadchiroli District: Dhanora, Yerkad, Murumgaon, Sawargaon, Karvafa, Pendhari, Chatgaon, Godalwahi, Kondawahi, Rangi, and Mohali. Field surveys were carried out from 25 May to 20 August 2024, employing a multifaceted research methodology designed to comprehensively document the economic and ecological potential of seasonal wild vegetables.

A holistic approach to data collection was implemented, integrating structured interviews, in-depth personal interactions, and collaborative group discussions with key community stakeholders. These included traditional healers (Vaidus), Indigenous Forest dwellers, and elderly community members possessing deep-rooted ecological knowledge. The research methodology was carefully crafted to systematically identify, document, and evaluate the economic significance of wild vegetable species in the local ecosystem.

The data collection process emphasized detailed documentation of local plant nomenclature, traditional uses, and ecological contexts. Voucher specimens were meticulously collected, enabling precise botanical identification and providing a robust scientific foundation for understanding the region's biodiversity. Participatory observation techniques were employed to capture traditional harvesting practices, there by illuminating the intricate relationship between local communities, wild vegetables, and sustainable food systems.

4. Observations

The recorded plants are arranged in a tabulated manner (Table 1). They are arranged in alphabetical order genera wise with information as botanical name, vernacular name, and family, habit, edible plant part, market selling price.

5. Results and Discussion

The series of images presented provides a comprehensive visual documentation of the research on wild vegetables in Dhanora Tehsil, Gadchiroli District, Maharashtra, India. The images capture various aspects of the study, including the identification of wild vegetable species, traditional harvesting practices, and the trade and utilization of these resources within the local communities.

Table 1 List of Wild Vegetables with their Family and Vernacular name with Economic Value

Botanical Name	Vernacular Name	Family	Habit	Edible Part Use	Market Selling Price
Actinoscirpus grossus (L.f.) Goetgh. & D.A.Simpson	Kacharkande	Cyperaceae	Herb	Root tubers	Rs.20/-per bunch
Allmania nodiflora (L.) R.Br. ex Wight	Dhan Bhaji	Amaranthaceae	Herb	Leaf & young shoot	Rs.20/-per bunch
Alternanthera sessilis (L.) DC.	Patur Bhaji	Amaranthaceae	Herb	Leaf and young shoot	Rs.10/-per bunch
Amorphophallus paeoniifolius (Dennst.) Nicolson	Surankand	Araceae	Herb	Corm	Rs.50/- to 100/- per kg
Amorphophallus sp. (Kunth) Blume	Var/Varadu	Araceae	Herb	Young Stem	Rs.20/-per bundle
Bauhinia malabarica Roxb.	Koyar bhaji	Fabaceae	Tree	Young Leaves	Rs.10/-per bunch
Boerhavia diffusa L.	Khaparkhuti bhaji	Nyctaginaceae	Herb	Leaf & young shoot	Rs.10/-per bunch
Borassus flabellifer L.	Tali kand & Tal fal	Arecaceae	Tree	Root	Rs. 5/-per parts
Buchanania lanzan Spreng.	Charoli	Anacardiaceae	Tree	Ripened fruits & seeds	Rs.30/- to 50/- per bunch
Capparis zeylanica L.	Varakli	Capparaceae	Climbing shrub	Unripe Fruits	Rs.10/- to 20/- per bunch
Celastrus paniculatus Willd.	Pimplacha bar	Celastraceae	Climber	Unripe fruit	Rs.30/-per bunch
Costus speciosus (J.Koenig) Sm.	Haldulikand/Kev kanda	Costaceae	Herb	Rhizome	Rs.20/-per bunch
Chlorophytum tuberosum (Roxb.) Baker	Lengda bhaji	Liliaceae	Herb	Young Leaf tips	Rs.10/-per bunch
Dioscorea bulbifera L.	Mataru	Dioscoreaceae	Climber	Fruits	Rs.20/- to 40/- per bunch
Diospyros melanoxylon Roxb.	Tembharun	Ebenaceae	Tree	Leaf & Fruit	Rs.10/- to 20/- per bunch
Glinus oppositifolius (L.) Aug.DC.	Kadu Bhaji	Molluginaceae	Herb	Leaf & young shoot	Rs.20/-per bunch
Holarrhena antidysenterica (G.Don) Wall. ex A.DC.	Kulyachaful/Shenga	Apocynaceae	Shrub & Tree	Frowers & Pods	Rs.10/- to 20/- per bunch
Ipomoea aquatica Forssk.	Bhonga bhaji/Nalichi bhaji	Convolvulaceae	Herb	Leaf	Rs.10/-per bunch
Momordica dioica Roxb. ex Willd.	Katval	Cucurbitaceace	Climber	Fruit	Rs.20/- to 50/- per bunch
Madhuca longifolia (L.) J.F.Macbr.	Moha	Sapotaceae	Tree	Seed & Flower	Rs.40/- to 50/- per kg
Nelumbo nucifera Gaertn.	Bhisi kand	Nelumbonaceace	Herb	Rhizomes	Rs.80/- to 120/- per kg
Olax scandens Roxb.	Haratfari Bhaji	Olacaceae	Shrub	Young leaf and Shoot	Rs.10/-per bunch
Oroxylum indicum (L.) Kurz	Tattu Falli	Bignoniaceae	Tree	Fruit	Rs.50/-per bundle
Phoenix sylvestris (L.) Roxb.	Shindole	Arecaceae	Tree	Riped Fruits	Rs.10/-per bunch
Pleurotus sp. (Fr.) P. Kumm.	Bamboo Sati	Pleurotaceae	Mushroom	Whole body	Rs.20/-per bundle
Portulaca oleracea L.	Ghorbhaji	Portulacaceae	Herb	Leaf & young shoot	Rs.10/-per bunch
Smilax zeylanica L.	Sherdire	Smilacaceae	Climber	Young shoots	Rs.30/-per bundle
Termitomyces heimii (Pat.) R. Heim	Dumbar satya	Agaricaceae	Mushroom	Whole Body	Rs.50/- to 100/- per bundle

Fig. 2 [Photo Plate I]: **A.** *Capparis zeylanica* L. **B.** *Amorphophallus* sp. (Kunth) Blume **C.** *Holarrhena antidysenterica* (G.Don) Wall. ex A.DC. **D.** *Termitomyces heimii* (Pat.) R. Heim.

Figure 2 showcases the diversity of wild vegetables found in the region, with the photo plate highlighting key species such as *Capparis zeylanica*, *Amorphophallus* sp., *Holarrhena antidysenterica*, and *Termitomyces heimii* (Mushroom). This visual representation complements the comprehensive list of 28 wild vegetable species identified during the research, belonging to 24 botanical families. The images serve as a valuable reference for the documented wild vegetable resources in the study area.

Fig. 3 [Photo Plate II]: **A.** *Cheilocostus speciosus* (J.Koenig) C.D.Specht**, B.** *Smilax zeylanica* L. **C.** *Olax scandens* Roxb. **D.** *Boerhavia diffusa* L. **E.** *Allmania nodiflora* (L.) R.Br. ex Wight **F.** *Borassus flabellifer* L. **G.** *Alternanthera sessilis (L.) DC*. **H.** *Nelumbo nucifera* Gaertn

Figure 3 further expands the visual inventory by presenting additional wild vegetable species, including *Cheilocostus speciosus*, *Smilax zeylanica*, *Olax scandens*, *Boerhavia diffusa*, *Allmania nodiflora*, *Borrassus flabellifer*, *Alternanthera sessilis*, and *Nelumbo nucifera*. This photographic documentation not only aids in the identification of these plants but also showcases the diversity of the regional flora and its potential for sustainable utilization.

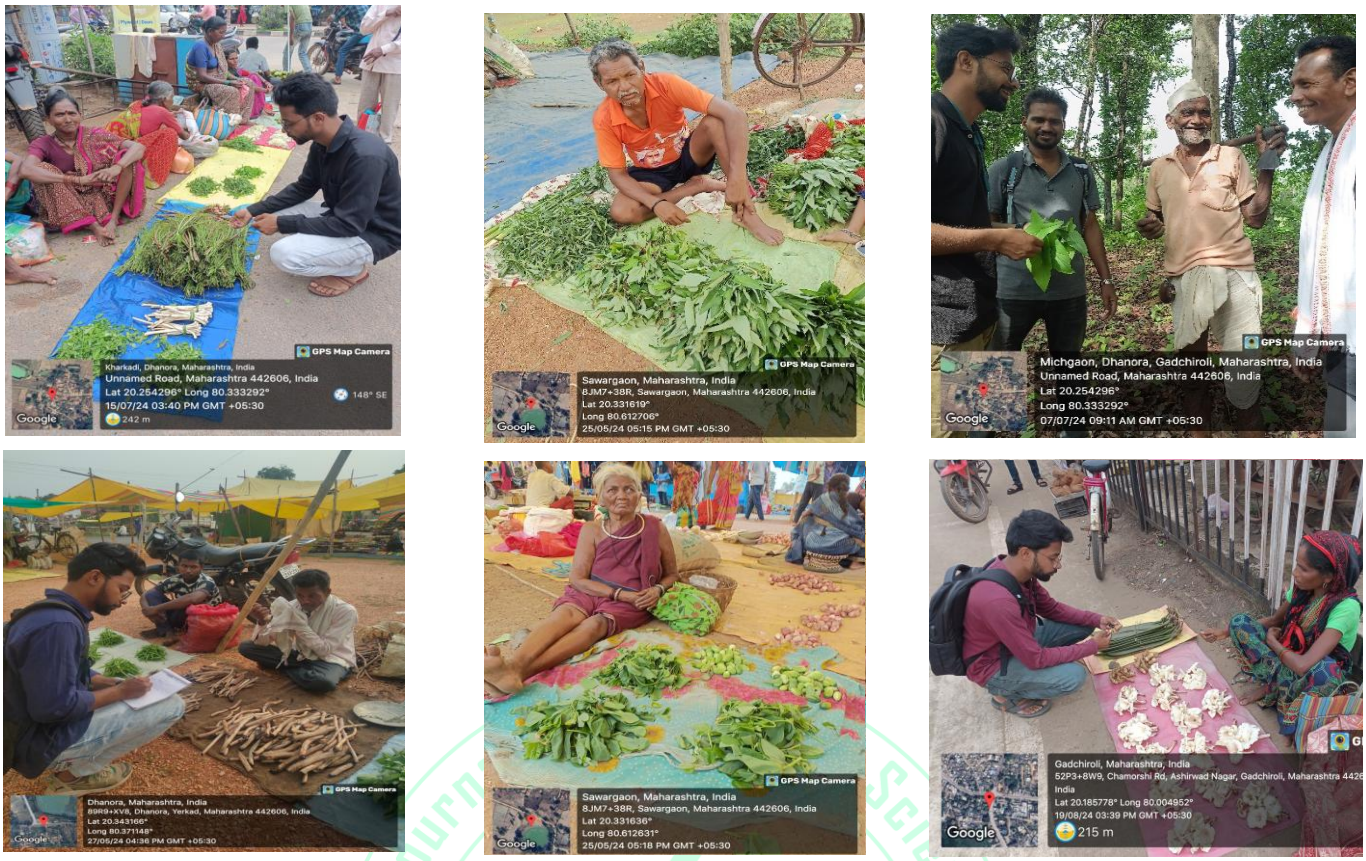

Fig. 4 [Photo Plate III]: Field documentation of wild vegetables trade in local market vendor shops from Dhanora Tehsil, Gadchiroli, showcasing the diverse array of wild vegetables being sold, including various leafy greens, wild mushrooms, fruits and flowers, and other edible plant parts

Figure 4 provides a compelling visual narrative of the local trade and utilization of wild vegetables within the Dhanora Tehsil. The images depict the vibrant local markets, where vendors offer a wide array of seasonal wild vegetable species, highlighting their integration into the traditional food systems and economies of the indigenous communities. The images capture the active participation of community members in the harvesting, processing, and sale of these valuable natural resources, underscoring the economic and cultural significance of wild vegetables in the region.

The comprehensive visual documentation presented in these images serves as a powerful complement to the research findings, providing a rich and tangible representation of the exploration and documentation of economic benefits of seasonal wild vegetables in Dhanora Tehsil. These images not only contribute to the scientific understanding of the local biodiversity but also offer a glimpse into the intricate relationship between the indigenous communities and their natural environment, fostering a holistic appreciation for the sustainable use of wild vegetable resources.

6. Conclusion

The comprehensive study of wild vegetables in Dhanora Tehsil, Gadchiroli District, revealed a rich botanical diversity that holds significant implications for sustainable food systems and local economic development. A total of 28 wild vegetable species were identified across 24 botanical families, highlighting the remarkable ecological wealth of the region. Notably, key species such as *Alternanthera sessilis* (Patur Bhaji), *Holarrhena antidysenterica (*Kudyache ful), and *Boerhavia diffusa* (Khaparkhuti Bhaji) emerged as prominent wild vegetable resources primarily available during the late summer to monsoon seasons. The research underscores the critical role of these wild vegetables in enhancing food security, supporting local livelihoods, and maintaining biodiversity. These indigenous food sources not only provide nutritional alternatives but also represent a sustainable approach to food production that is deeply integrated with local ecological systems.

7. Future Prospects

The future trajectory of this research demands a multifaceted approach that integrates sustainable harvesting protocols, market development, and community empowerment. Strategic initiatives should focus on developing comprehensive conservation guidelines, creating market linkages that connect local wild vegetable resources to regional and national markets, and implementing robust research programs to document

nutritional, medicinal, and economic potential. Simultaneously, policy frameworks must be developed to recognize and protect indigenous knowledge, support community-based conservation efforts, and promote sustainable livelihood options for tribal communities. By fostering skill development, establishing cooperative models, and conducting detailed phytochemical analyses, we can transform these wild vegetables from local resources to potential economic drivers that simultaneously preserve ecological diversity and support traditional food systems.

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