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प्रधान सम्पादक

प्रो. (डॉ.) फारुक अली



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सफाली समग्र अंगिका विकास संस्थान, भागलपुर

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‘साइंसिया’ में प्रकाशित किए गए आलेखों में विचार और तथ्य लेखकों के अपने हैं, जिनके विषय में सफाली समग्र अंगिका विकास संस्थान, सम्पादक मण्डल, प्रकाशक तथा मुद्रक उत्तरदायी नहीं है। रिसर्च जर्नल के सम्पादन एवं प्रकाशन में पूर्ण सावधानी बरती गई है। फिर भी किसी भी त्रुटि के लिए सफाली अंगिका विकास संस्थान, संपादक मंडल, प्रकाशक तथा मुद्रक जिम्मेवार नहीं है। सम्पादन का कार्य पूर्णतः अव्यावसायिक और सदस्यों हेतु सीमित है। नकल की गई सामग्री के लिए लेखक (Author) स्वयं जिम्मेवार होंगे।

शोध पत्रिका से सम्बन्धित विवादों का न्यायालय क्षेत्र, भागलपुर (बिहार) होगा।

Editorial

Good wishes from the team of “Sciencia” a multidisciplinary halfyearly peer reviewed research journal is devoted to every part of Scienced, Arts, Law, Management, and Commerce. It's endeavour of disseminating researches continues in the present issue as well.

Many papers included in this volume focus on relevant issues of today. I wish distinguished research, readers and intellectuals to come up with their fertile pen to sustain the striving attempts of institutional, societal, organizational and individual in publish in this journal like previous issues. Original research papers, review articles, are solicited for year 14, Vol- 20, Issue-27, January-June, 2026 for early publication.

Our team is pleased to inform that information related to 'Sciencia' and our other activities are available on our website (www.ssavs.in).

We invite such reviews for further issues.

Heartiest thanks for your kind co-operation

With regards!

Prof. (Dr.) Faruque Ali

Editor-in-Chief
SCIENCIA

सम्पादक की कलम से...



शोध पत्रिका ‘साइंसिया’ का जुलाई-दिसम्बर, 2025 अंक आपके समक्ष प्रस्तुत है। इस अंक में सामाजिक विज्ञान से जुड़े कई चयनित आलेखों को शामिल किया गया है। ‘साइंसिया’ में प्रकाशित सभी आलेखों में विचार लेखक के अपने हैं। जर्नल के प्रकाशन में पूरी सावधानी बरती गई है। फिर भी किसी भी तरह की त्रुटियों और कमियों के लिए हम क्षमाप्रार्थी हैं। ‘साइंसिया’ का आगामी अंक (जनवरी-जून, 2026) ससमय प्रकाशित होगी। जर्नल के आगामी अंक के लिए आपसे मौलिक और तथ्य परक शोध आलेख आमंत्रित किए जाते हैं।

शोध पत्रिका ‘साइंसिया’ को गुणवत्तापूर्ण और उच्च स्तरीय बनाने हेतु आपके विचार और सुझाव की सादर अपेक्षा है।

डॉ. दीपक कुमार दिनकर
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Executive Editorial Message

It is with great pleasure that I welcome you to this new volume of the “Sciencia”, A Multidisciplinary halfyearly peer reviewed research journal. As we navigate the complex challenges of the 21st century, the need for robust, interdisciplinary research has never been more urgent. This issue brings together pioneering studies that not only push the boundaries of theoretical knowledge but also offer actionable insights for industry and policy. highlights a critical juncture in scientific inquiry.

The papers selected for this edition explore how innovative technologies can be harmonized with environmental stewardship to create resilient systems. Our contributors provide diverse perspectives on achieving sustainability through rigorous research.

We are committed to fostering a, rigorous, transparent, and prompt peer-review process, ensuring that impactful research finds its place in the academic community. We encourage you to delve into these papers, engage with the ideas, and consider contributing your own original work to our future issues of year 14, Vol- 20, Issue-27, January-June, 2026 for early publication.

Many Thanks,

With Warm Regards,

Dr. Aloka Kumari
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2. तथ्यों की प्रमाणिकता एवं भाषा की शुद्धता का विशेष ख्याल रखें और यथासंभव हमारे पैटर्न का अनुसरण करें।
3. कॉपीराइट का ख्याल रखें। जहाँ कहीं भी किसी अन्य लेखकों की सामग्रियाँ लें, उसे क्रमशः 1, 2, 3, ... से सूचित करें और आलेख के अंत में उसका पूरा संदर्भ दें। यथा-
 - i. शेखर, सुधांशु; गाँधी-विमर्श, दर्शना पब्लिकेशन, भागलपुर (बिहार), प्रथम संस्करण : 2015, पृ. 15.
 - ii. शेखर, सुधांशु; 'गाँधी का अर्थ-दर्शन', साइंसिया, प्रधान संपादक : डॉ. फारूक अली, सफाली समग्र अंगिका विकास संस्थान, भागलपुर (बिहार), वर्ष : 5, अंक : 9, जनवरी-जून 2017, पृ. 45.
4. सामान्यतः लेखकों की वैचारिक स्वतंत्रता का सम्मान किया जाएगा। लेकिन, जरूरत पड़ने पर संपादकीय टीम की सलाह से प्रधान संपादक या संपादक प्राप्त आलेखों में संशोधन कर सकते हैं।
5. प्रकाशनार्थ प्राप्त आलेख की मौखिक या लिखित स्वीकृति का अर्थ उस आलेख का अनिवार्यतः प्रकाशन नहीं है। प्रधान संपादक इसकी समीक्षा कर सकते हैं।
6. आलेख की स्वीकृति/अस्वीकृति एवं प्रकाशन के संबंध में प्रधान संपादक का निर्णय अंतिम होगा। इसे किसी भी तरह की कोई कानूनी चुनौती अनुमान्य नहीं होगी।
7. अस्वीकृति की दशा में रचनाओं को वापस लौटाना संभव नहीं है। अतः आलेख की एक प्रति अपने पास सुरक्षित रखें।
8. प्रधान संपादक जर्नल के हित में संपादकीय टीम में संशोधन एवं परिवर्तन कर सकते हैं।
9. 'साइंसिया' की सदस्यता बढ़ाने और इसके प्रचार-प्रसार हेतु आपका सहयोग आवश्यक है।
10. 'साइंसिया' के अलावा हमारे अन्य प्रकाशन-उपक्रमों (पत्रिकाओं एवं पुस्तकों) के प्रचार-प्रसार एवं वितरण में भी आपके सहयोग की अपेक्षा है।
11. पत्रिका के नियमित प्रकाशन हेतु सहयोग अपेक्षित है। यह सहयोग नकद/एकाउंट ट्रांसफर/ड्राफ्ट/चेक आदि किसी भी विधि से किया जा सकता है। सहयोग 'साइंसिया' के नाम एकाउंट नं. 50072500610, आईएफएससी IDIB000B749, इंडियन बैंक, टी. एन.बी. कॉलेज शाखा, भागलपुर (बिहार) पर देय है।
12. अधिक जानकारी हेतु प्रधान संपादक से 9431250795, संपादक एवं कार्यकारी संपादक से 9430027031, 8709145498 पर संपर्क कर सकते हैं।
13. आपके सुझावों का सदैव स्वागत है।

प्रो. (डॉ.) फारूक अली
प्रधान संपादक

सफाली समग्र अंगिका विकास संस्थान

महाशय/महाशया !

‘सफाली समग्र अंगिका विकास संस्थान’ अव्यावसायिक उद्देश्यों से जनहित में संचालित एक प्रकाशन ईकाई है। यह आपसी सहयोग के आधार पर कार्य करता है और आम लोगों के उत्थान में भागीदारी निभाने हेतु प्रयासरत है। हम नियमित रूप से दो शोध पत्रिकाएं - साइंसिया (आईएसएसएन : 2320-8422) एवं सफाली जर्नल ऑफ सोशल रिसर्च (आईएसएसएन : 2321-2292) प्रकाशित कर रहे हैं।

हम अपने प्रकाशन के विकास में आपसे सादर सहयोग का अनुरोध करते हैं। आप हमें निम्न रूपों में सहयोग कर सकते हैं-

1. हमारी शोध पत्रिकाओं की सदस्यता लेकर

सदस्यता सहयोग राशि :

साइंसिया : स्थायी सदस्यता 07 वर्ष - 5000 रुपये (संस्थागत), 2000 रुपये (व्यक्तिगत)

सफाली जर्नल : स्थायी सदस्यता 07 वर्ष - 5000 रुपये (संस्थागत), 2000 रुपये (व्यक्तिगत)

2. हमारी शोध पत्रिका में विज्ञापन देकर

विज्ञापन सहयोगी राशि

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	हाफ पेज - 10,000/- (रंगीन), इनसाइड	5,000/- (ब्लैक एंड ह्वाइट) बैक इनर
सफाली जर्नल :	फुल पेज - 10,000/- (रंगीन),	5,000/- (ब्लैक एंड ह्वाइट)
	हाफ पेज - 5,000/- (रंगीन),	2,500/- (ब्लैक एंड ह्वाइट)

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प्रो. (डॉ.) फारूक अली
अध्यक्ष

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I, Dr. Faruque Ali, hereby declare that the particulars given above are true to the best of my knowledge and belief.

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Journal- Baskaran, P., Kumari, A. and Van Staden, J. (2015) Embryogenesis and synthetic seed production in *Mondia whitei*. *Plant Cell Tissue Organ Cult* 121:205–214.

Book- Digumarti Bhaskara Rao, (2004): “Educational Employment and Human Resource Development”, Neelkamal Publications, New Delhi, India.

Chapter- Wilson, J. H., and Hunt, T., (2002). Chapter 24, The Adaptive Immune System. In *Molecular Biology of the Cell*, 4th Edition A Problems Approach. Essay, Garland Science.Pp. 151-162.

In Press- Islam, M.S. and Bari, M.A., (2026) *In vitro* regeneration protocol for artificial seed production in an important medicinal plant *Mentha arvensis* L. (*In Press*)

Ph.D. Thesis- S.Bhan; Growth of Grass Shrimp in a Contaminated and Uncontaminated site, Ph.D.Thesis, New Jersey, Institute of Technology, New York (1997).

NewsPaper- N.Kowlofsky; Oil spill has massive effects on vegetation, New York Times, 29

March, p 12 (1998).

Paper Presented in Seminar/ Conference- Kumari, A. and Pandey A.K. Pollination Ecology of Safflower, Proceedings of 7th International Safflower Conference, Nov. 3rd -6th Nov., 2008, Wagga Wagga, Australia.

Report- [USEPA] US Environmental Protection Agency; Characterization of Municipal Waste in the United States, Washington (DC); Office of Solid Waste and Emergency Response, report No. EPA/530-R-92-019 (1992).

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- **Figures & Tables:** Often inserted within the text at appropriate points, or grouped at the end.
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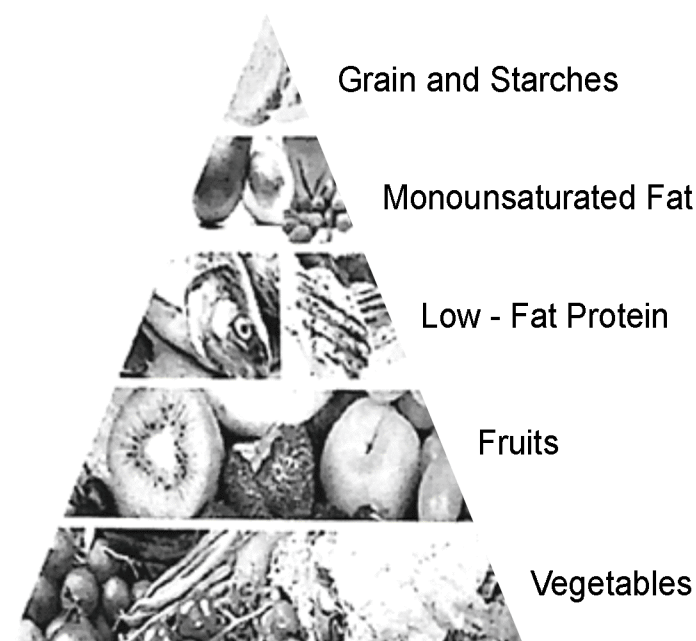
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**With Regards,
Team Scientia.**

About the NSI



Food Pyramid

The Nutrition Society of India (NSI) established in 1967 is an association of nutrition professionals, programmers and policy makers from India and abroad. The society is dedicated to disseminate the results of the latest research in nutrition - basic and applied aspects; analyse the current status of nutrition programmes in the country and recommend appropriate strategies to promote nutrition of the community at large. The NSI, through its annual meetings provides a forum for young scientists to present their research findings. NSI is the recognized Indian representative of

- International Union Nutritional Sciences (IUNS), through the adhering body, Indian National Science Academy (INSA), and
- Federation of Asian Societies of Nutrition

HEADQUARTERS:

The headquarters of the Society is located at the National Institute of Nutrition, (NIN) Hyderabad. The NSI has 36 zonal chapters in different parts of the country. It has about 6000 Life Members and 200 ordinary and 500 student members.

Bhagalpur Chapter of NSI was initiated on 15th February, 2011. Since then, it is actively creating awareness about nutrition, food security among the people. It is striving to have nutrition security along with food security act. Presently there are 110 Life Members of this chapter spread over in Bihar, Jharkhand, New Delhi, West Bengal, Karnataka, Maharashtra and Andhra Pradesh etc.

For life membership please contact either NIN, Hyderabad or Safali Sasnsthana, Bhagalpur Camp Office of Bhagalpur Chapter



NUTRITION SOCIETY OF INDIA

National Institute of Nutrition (ICMR)
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E-mail : nsi@hyderabad@yahoo.com

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To
Dr. Faruque Ali
Chapter Convenor, Bhagalpur
Department of Zoology
T.N.B. College, Bhagalpur-812007
BIHAR

Sub. : Initiation of new chapter at Bhagalpur - Reg.

Dear Dr. Faruque Ali,

It gives me great pleasure to inform you that the Executive Committee of Nutrition Society of India has approved your proposal to initiate Bhagalpur Chapter at Department of Home Science, Bhagalpur University, Bhagalpur under your Convenership. I am herewith requesting you to inform us the address for correspondence along with email-id and tel./mobile numbers to nsi@hyderabad@yahoo.com.

I do hope that under your leadership the Bhagalpur Chapter will do several activities for the cause of nutrition science in the country.

With best wishes,

Yours faithfully

(Dr. K. Madhavan Nair)
Joint Secretary

Copy to:
Dr. V. Prakash
President, NSI &
Director, CFTRI
Mysore - 570 020

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Faculty / Academician	: ₹ 1000
Research Scholar	: ₹ 500
Student	: ₹ 300

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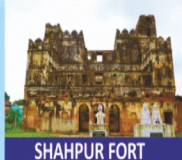
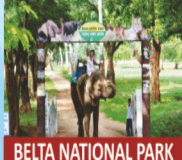
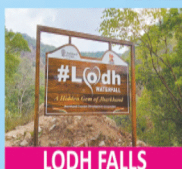
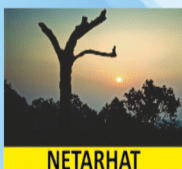
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Accommodation facilities will not be provided to any participant.

IMPORTANT CONTACTS

8210708722, 7763820280, 8210174610, 093349 96738

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TWO-DAY MULTIDISCIPLINARY NATIONAL SEMINAR

*"Where Culture Meets Nutrition:
Jharkhand's Local Foods for a Sustainable Tomorrow"*

On 8-9 May, 2026



Organized By:

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A Constituent Unit of NPU, Palamu

in Collaboration with

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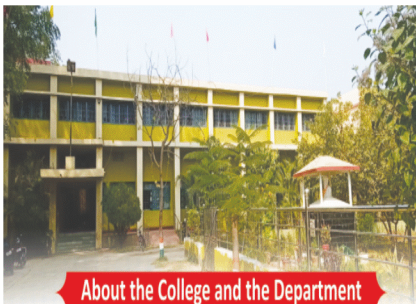
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Convener

Dr. Mini Tudu, HOD

Department of Home Science

Y.S.N.M. College, Medininagar



About the College and the Department

Yodh Singh Namdhari Mahila Mahavidyalaya (YSNM College), Medininagar, is a constituent unit of Nilamber-Pitamber University. It was established in 1968. The college offers quality education in Arts and Science, with a focus on academic excellence and holistic development. The Department of Home Science provides skill-based education in nutrition, health, and human development, and actively organizes seminars, workshops, and awareness programmes.

About the Seminar

Aligned with national priorities such as Nutrition Security, Sustainable Development, and NEP-2020, this seminar highlights the role of local and indigenous foods in addressing malnutrition and lifestyle-related diseases. Jharkhand's rich biodiversity offers significant potential for promoting sustainable health. It brings together experts and stakeholders to share insights, promote indigenous knowledge, and explore sustainable strategies for improving public health, with special emphasis on nutrition security, women's reproductive health, and sustainable livelihoods. The seminar also emphasizes how local foods can be utilized for income generation and entrepreneurship, encouraging communities—especially women—to develop small-scale food-based enterprises and value-added products for economic empowerment."

Sub Theme

- Indigenous Knowledge Systems and Tribal Food Culture
- Historical and Cultural Evolution of Food Practices
- Nutrition, Health and Community Food Systems
- Millets, Forest Foods and Sustainable Diets
- Food, Environment and Climate Sustainability
- Gender Perspectives in Food, Nutrition and Health
- Food Culture in Literature, Language and Art
- Philosophy, Ethics and Indigenous Food Wisdom
- Food Economy, Livelihood and Rural Development
- Public Policy, Food Security and Government Initiatives
- Education, Awareness and Community Nutrition Programs
- Science, Technology and Innovation in Traditional Foods
- Statistical and Research Approaches in Food and Nutrition Studies
- Urbanization, Globalization and Changing Food Habits
- Open Theme Related to the Main Seminar Theme

Call for Papers

Guidelines for Abstract Submission:

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Childhood Obesity : A Growing Problem in Bihar

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Abstract

Childhood obesity is an emerging public health challenge in India, with states like Bihar seeing a rapid epidemiological shift from undernutrition to rising trends of overweight and obesity among children and adolescents. Recent surveys show a doubling in obesity prevalence among school-aged populations of Bihar, with higher rates observed in urban versus rural settings. Major contributory factors include lifestyle changes, increased screen time, dietary transitions toward processed and calorie-dense foods, and reduced physical activity. Socio-emotional complications-ranging from low self-esteem to academic underperformance and metabolic disturbances-have been documented, with urban children showing higher vulnerability. While pharmacological therapy is rarely indicated in children, management centers on multidisciplinary, family-engaged lifestyle interventions, including region-specific dietary guidelines and increased physical activity. Preventive strategies targeting school and community settings, nutritious traditional diets, and awareness programs are crucial, given the region's unique demographic and cultural context. Timely diagnosis and regular monitoring remain essential, considering the risk of persistence into adulthood. This review, focusing on Bihar, synthesizes current prevalence, causes, complications, and context-adapted approaches to managing and preventing childhood obesity.

Keywords: childhood obesity, Bihar, prevalence, non-pharmacological management

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Childhood Obesity

Childhood obesity, marked by excess body fat accumulation, is a global epidemic that has rapidly emerged in India-even in regions historically associated with undernutrition. It is defined using age- and sex-adjusted body mass index (BMI) cut-offs, usually based on WHO growth standards. Overweight and obesity in childhood have well-documented links to adult metabolic disorders and numerous health complications (Singh et al., 2024; Das et.al., 2017; Gupta et.al.,2024; Giri et.al.,2023).

Prevalence of Childhood Obesity

Recent NFHS-5 (2019-2021) reported that approximately 5.1% of children aged 5-19 years are overweight, with urban areas showing higher prevalence rates compared to rural areas. In Bihar, between 2016 and 2021, the prevalence of overweight doubled in the 5-9-year age group (from 1.2% to 2.4%), and obesity rates among adolescents (10-19 years) also doubled (from 1.1% to 2.3%). Urban centers record significantly higher obesity rates (up to 6.2%), but rural rates, though

lower, are steadily rising. Comparable trends are noted in other Indian cities such as Sambalpur, where combined overweight and obesity prevalence approaches 12.3% in adolescents. This upward trend mirrors national meta-analysis estimates of overall childhood obesity prevalence in India at around 8.4% (Singh et al., 2024; Gupta et.al.,2024).

Symptoms and Causes: What Causes Childhood Obesity?

The etiology of childhood obesity is multifactorial. Major drivers include increased physical inactivity, especially screen time (children engaged in <30 minutes of activity/ day had an OR=3.2 for obesity), and high intake of calorie-dense foods, processed snacks, and sugary beverages. Urbanization and economic growth have led to dietary transitions and reduced outdoor activities. Additional contributing factors include (Singh et al., 2024; Das et.al., 2017; Bhatia et.al., 2021; Misra and Bhatia 2025; Sharma et al., 2025).

- Genetic susceptibility
- Socioeconomic status (greater urban prevalence)
- Family food environment and parental obesity
- Limited access to safe play areas in cities

Complications of Childhood Obesity; Socio-Emotional Consequences

Childhood obesity is associated with a host of physical and psychological complications, with specific nuances in the regional setting. Complications include:

Metabolic syndrome, type 2 diabetes, hypertension, dyslipidemia, and non-alcoholic fatty liver disease (Das et.al., 2017; Giri et.al.,2023; Ramesh et al., 2024).

- Orthopedic problems and early puberty
- Socio-emotional effects: Lower self-esteem, higher risk of anxiety and depression, academic challenges, and increased peer bullying-particularly pronounced in urbanized pockets with changing societal attitudes (Das et.al., 2017; Patel et.al., 2024; Singh et al., 2023).

In India, the dual burden of undernutrition and increasing obesity further complicates management and social narratives (Singh et al., 2024;. Singh and Verma, 2022).

Diagnosis of Childhood Obesity

Diagnosis is based on anthropometric measures (BMI-for-age using WHO or CDC charts); a BMI greater than the 85th percentile for age and sex constitutes overweight, and above the 95th percentile constitutes obesity. Physical examination is supplemented with history-taking for screen time, physical activity, and dietary intake. Screening for complications (BP, lipid profile, liver function) is suggested in obese children (Singh et al., 2024; Das et.al., 2017; Gupta et.al.,2024;, Ramesh et al., 2024).

Management of Childhood Obesity (Non-Pharmacological Emphasis)

Optimal management is largely non-pharmacological, especially in the pediatric population. Evidence-based guidelines, including recommendations from Indian pediatric societies, prioritize:

- Family-based behavioral intervention (goal-setting, self-monitoring)

- Structured increase in daily physical activity (minimum 60 minutes of moderate-vigorous activity)

Dietary counseling, reduction in processed food intake, and promotion of traditional, nutrient-dense foods such as sattu, makhana, lentils, seasonal fruits, and local millets common in Bihar (Das et.al., 2017; Ramesh et al., 2024; Rajesh and Iyer, 2022)

School-based interventions: Incorporating nutrition education, school meals reform, and increased physical education (Singh et al., 2024,, Ramesh et al., 2024).

Pharmacologic therapy is reserved for extreme cases under strict specialist supervision. Multidisciplinary involvement-dietitians, psychologists, educators, and community workers-is critical for sustainable impact (Das et.al., 2017; Ramesh et al., 2024).

Prevention of Childhood Obesity

Successful prevention strategies begin early and are best implemented at the family, school, and community levels (Singh et al., 2024; Ramesh et al., 2024).

- Limiting screen/ device time, encouraging outdoor play
- Adoption of locally-available, less-processed foods
- Regular monitoring of growth parameters in pediatric check-ups
- Community engagement to promote safe spaces for play and exercise, and awareness programs adapted for rural/urban differences in Bihar

Supporting a Child with Obesity: Family Approach

Support should be empathetic and non-stigmatizing, focusing on positive reinforcement of healthy behaviors (Das et.al., 2017; Ramesh et al., 2024).

- Family meals, with involvement of children in meal planning using local produce
- Encouraging participatory activities (e.g., walking, cycling, community sports)
- Collaborating with schools to monitor and support healthy weight gain
- Involving caregivers and grandparents, who are often primary influencers, to drive home-based changes

When to See a Healthcare Provider

Children with persistent weight gain, rapid BMI increases, or comorbidities (e.g., hypertension, acanthosis nigricans) should be referred to a healthcare provider for further assessment and management. Early intervention can halt progression and manage complications, underscoring the need for regular screening and monitoring in endemic regions like Bihar (Singh et al., 2024; Das et.al., 2017).

Conclusion

Childhood obesity in Bihar is a growing public health concern, mirroring broader national and international trends. Early determination, monitoring, and family- and community-based non-pharmacological interventions are key to controlling this epidemic. Culturally tailored, multisectoral strategies are essential for sustainable impact, demanding urgent action

from policymakers, educators, healthcare professionals, and families across the region.

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Importance of Plant-Based Protein in Comparison to Animal Protein : A Nutritional Perspective

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Abstract

Protein is an essential macronutrient required for growth, tissue repair, immune function, enzymatic activity, and metabolic regulation. Traditionally, animal-based proteins have been considered nutritionally superior because of their complete amino acid profile and higher digestibility (90-99%). However, evidence synthesized in the present paper from studies published between 2020 and 2025 demonstrates that plant-based proteins are nutritionally superior to animal proteins when consumed in adequate quantity, diversity, and appropriate combinations. Plant-based proteins show digestibility values of 75-90%, improving to nearly 90% with processing methods such as soaking, sprouting, fermentation, and cooking. Their protein quality, measured by PDCAAS, ranges from 0.70 to 1.00, with soy protein achieving a score of 1.00, equivalent to animal protein. The findings further indicate that higher intake of plant-based protein is associated with improved cardiometabolic health outcomes, including lower LDL cholesterol, better blood pressure regulation, improved glycaemic control, and reduced inflammatory markers. Plant protein sources provide significant dietary fiber (5-15 g per 100 g food) and contain no cholesterol, whereas animal protein sources contain approximately 60-120 mg cholesterol per 100 g and higher saturated fat levels. Although animal proteins have higher leucine content (8-11 g/100 g protein) compared to plant proteins (6-8 g/100 g protein), functional outcomes related to muscle maintenance and metabolic health are comparable when total protein intake is sufficient. The health benefits, plant-based proteins play a crucial role in sustainability and nutritional security, requiring fewer natural resources, producing lower greenhouse gas emissions, and being more affordable and accessible. Overall, the evidence supports prioritizing plant-based protein while moderating animal protein intake as a nutritionally adequate, health-promoting, and environmentally sustainable dietary strategy.

Keywords: Plant-based protein; Animal protein; Protein quality; Cardiometabolic health; Sustainable nutrition

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Introduction

Protein, a fundamental macronutrient, is indispensable for human growth, cellular repair, immune competence, enzymatic processes, and metabolic regulation (Krams et.

al., 2019). Traditionally, animal-based proteins derived from meat, poultry, dairy, eggs, and fish have been positioned as the gold standard in nutrition due to their complete amino acid profiles and high biological value. These proteins have naturally high levels of essential

amino acids, particularly leucine, which is integral to muscle protein synthesis (Ahmed et.al., 2023). However, mounting evidence from recent nutritional science, epidemiological studies, and public health research suggests that plant-based proteins can offer comparable health benefits when consumed appropriately and may present additional physiological and environmental advantages (Kumar et. al., 2022; Langyan et. al., 2022a).

Global dietary patterns are shifting in response to rising concerns over chronic disease prevalence, climate change, and food system sustainability. In high-income countries and increasingly in middle-income nations, cardiovascular disease, obesity, type 2 diabetes, and certain cancers rank among the leading causes of morbidity and mortality (Berger et. al., 2015) epidemiological transition has spurred researchers and policymakers to re-evaluate protein sources within healthy diets. A growing body of longitudinal studies now demonstrates that diets emphasizing plant-derived proteins such as legumes, pulses, nuts, seeds, whole grains, and soy products are associated with reduced incidence of cardiovascular events, improved lipid profiles, better glycaemic control, and favourable body composition outcomes compared with diets heavily reliant on animal proteins (Langyan et. al., 2022b).

The relationship between dietary protein source and health outcomes is multifaceted. Plant proteins are naturally free from cholesterol and generally lower in saturated fats nutrients that, when consumed in excess from animal sources, have been linked to increased cardiovascular risk. Furthermore, plant foods contribute non-protein benefits, including dietary fiber, antioxidants, phytochemicals, and micronutrients, which

influence gut microbiota composition, inflammatory pathways, and metabolic health (Sharma et al., 2025a). Recent randomized controlled trials indicate that when total protein intake and essential amino acid targets are met, plant protein supports muscle maintenance and metabolic function comparably to animal protein across various age groups and physical activity levels.

Beyond individual health, the environmental footprint of protein production has become a central consideration. Life-cycle assessments reveal that plant protein systems require markedly fewer resources land, water, and energy while producing substantially lower greenhouse gas emissions than conventional livestock production. These sustainability advantages are leading international bodies and national dietary guidelines to recommend increased consumption of plant-based proteins as part of integrated strategies for nutrition security, climate mitigation, and public health.

Given this convergence of evidence, a nuanced understanding of both plant- and animal-based proteins is essential. This paper examines the latest research on protein quality, bioavailability, health outcomes, disease risk modulation, dietary patterns, and sustainability. Recognizing the complex interplay between nutritional adequacy and long-term health, we explore how optimizing plant-based protein intake can contribute to effective dietary recommendations that support individual well-being and planetary health.

Objectives

1. To examine the nutritional composition and quality of plant-based protein in comparison to animal-based protein.

2. To analyse the impact of plant-based and animal-based protein consumption on major health outcomes, particularly cardiovascular and metabolic health.
3. To evaluate recent scientific evidence on protein bioavailability, digestibility, and functional benefits from both plant and animal sources.
4. To highlight the role of plant-based protein in promoting sustainable, affordable, and long-term nutritional security.

Methodology

The present study adopts a systematic narrative review methodology to examine the importance of plant-based protein in comparison to animal protein from a nutritional perspective. Recent and relevant literature published between 2020 and 2025 was reviewed to ensure the inclusion of the latest scientific evidence. Secondary data were collected from peer-reviewed journals, international health organization reports, and reputable databases such as PubMed, ScienceDirect, WHO, FAO, and Nutrition Reviews. Studies focusing on protein quality, amino acid composition, bioavailability, health outcomes, and sustainability were selected. Comparative analysis was conducted to evaluate nutritional benefits, health impacts, and dietary implications of plant- and animal-based protein sources (Langyan et. al., 2022a). The findings were synthesized thematically to draw meaningful conclusions and support evidence-based recommendations.

Protein Quality and Amino Acid Profile

Protein quality is commonly assessed based on the presence and proportion of essential amino acids required for human health. Animal-based proteins such as meat, eggs,

milk, and fish are traditionally classified as "complete proteins" because they contain all essential amino acids in adequate proportions. In contrast, many individual plant protein sources are considered "incomplete" as they may be limited in one or more essential amino acids, such as lysine or methionine (Sharma et. al., 2023). However, recent nutritional research emphasizes that consuming a variety of plant-based protein sources such as cereals combined with legumes can easily provide a complete amino acid profile. Moreover, soy protein and quinoa are recognized as high-quality plant proteins comparable to animal sources in terms of amino acid adequacy.

Digestibility and Bioavailability of Protein

Digestibility and bioavailability are key indicators of protein utilization in the human body (Bandyopadhyay et al., 2022). Animal proteins generally show higher digestibility scores due to lower fiber content and a favourable amino acid structure. However, modern dietary practices such as soaking, sprouting, fermentation, and cooking significantly improve the digestibility of plant-based proteins. Recent studies also indicate that plant proteins, when consumed in adequate amounts, effectively support muscle maintenance, enzyme activity, and metabolic functions. Additionally, plant-based proteins offer the advantage of being free from cholesterol and typically lower in saturated fat, contributing positively to long-term health outcomes.

Associated Nutritional Components and Health Value

Beyond protein content alone, the overall nutritional matrix of protein sources is crucial. Plant-based protein foods provide additional health-promoting nutrients such as dietary

fiber, antioxidants, phytochemicals, magnesium, potassium, and folate (Bryant, 2022). These components play a significant role in reducing inflammation, improving gut health, and preventing non-communicable diseases. In contrast, animal-based protein sources, while rich in vitamin B12, iron, and zinc, may also contain higher levels of

saturated fat and, in some cases, additives when processed (Sharma et al., 2025b). Therefore, from a holistic nutritional perspective, plant-based protein sources support not only adequate protein intake but also improved overall dietary quality, as demonstrated in below table: 1.

Table 1: Comparative Nutritional Composition of Plant-Based and Animal-Based Protein Sources

Nutritional Aspect	Plant-Based Protein	Animal-Based Protein
Amino Acid Profile	Complete when combined; some sources naturally complete (e.g., soy)	Naturally complete
Digestibility	Moderate to high; improved with processing methods	High
Fiber Content	High	Absent
Saturated Fat	Low	Moderate to high
Cholesterol	Absent	Present
Micronutrients	Rich in antioxidants, magnesium, folate	Rich in vitamin B12, iron, zinc
Long-term Health Impact	Supports heart and metabolic health	Excess intake linked with chronic diseases

Source: Compiled from WHO, FAO, and USDA nutritional guidelines

The nutritional composition and quality of plant-based protein are comparable to animal-based protein when dietary diversity and appropriate preparation methods are applied. The inclusion of plant-based protein not only fulfills essential protein requirements but also enhances overall dietary quality, thereby effectively fulfilling the first objective of the study (Sharma et al., 2025).

Impact on Cardiovascular Health

Cardiovascular diseases (CVDs) remain one of the leading causes of global mortality. Recent epidemiological studies indicate that higher consumption of plant-based protein is associated with improved cardiovascular

health markers, including lower levels of low-density lipoprotein (LDL) cholesterol, reduced blood pressure, and improved endothelial function (Berger et. al., 2015). Plant proteins are naturally free from cholesterol and low in saturated fats, both of which are strongly linked to atherosclerosis and heart disease. Additionally, the presence of dietary fiber, antioxidants, and phytochemicals in plant protein sources helps reduce systemic inflammation and oxidative stress, key contributors to cardiovascular risk (Manzoor et. al., 2023).

In contrast, diets high in animal-based protein especially red and processed meats have been associated with increased intake of saturated

fats and sodium, which may elevate blood pressure and cholesterol levels (Singar et al., 2024). While lean animal proteins such as fish and low-fat dairy can support heart health when consumed in moderation, excessive reliance on animal protein sources has been linked with higher incidence of coronary artery disease in several long-term cohort studies.

Influence on Metabolic Health and Diabetes

Protein source also significantly affects metabolic health, including obesity and type 2 diabetes mellitus. Plant-based protein consumption has been consistently associated with improved insulin sensitivity, better glycaemic control, and lower body mass index (BMI). The high fiber content of plant protein foods slows glucose absorption, reduces post-prandial blood sugar spikes, and enhances satiety, thereby aiding weight management (Bryant, 2022).

Animal-based proteins, particularly those derived from processed meats, have been linked to increased insulin resistance and higher risk of type 2 diabetes. High intake of animal fat and heme iron may promote oxidative stress and pancreatic β -cell dysfunction. However, high-quality animal proteins consumed as part of a balanced diet

can contribute positively to muscle mass and metabolic function, especially in older adults, highlighting the importance of moderation and dietary balance.

Role in Chronic Disease Prevention and Longevity

Long-term dietary patterns rich in plant-based proteins have been associated with reduced risk of several chronic diseases, including certain cancers, hypertension, and kidney disorders. Plant proteins support gut microbiota diversity, which plays a critical role in immune regulation and inflammation control. Moreover, replacing animal protein with plant protein has been shown to reduce all-cause mortality in several population-based studies.

Animal protein intake, while nutritionally valuable, may increase disease risk when consumed excessively or in processed forms. High protein load from animal sources can place stress on renal function in susceptible individuals and may contribute to inflammatory pathways. Therefore, shifting dietary patterns toward greater inclusion of plant-based proteins supports both disease prevention and healthy aging.

Table 2: Comparative Health Impact of Plant-Based and Animal-Based Protein

Health Outcome	Plant-Based Protein	Animal-Based Protein
Cardiovascular Health	Lowers LDL cholesterol and blood pressure	Excess intake linked with heart disease
Diabetes Risk	Improves insulin sensitivity	Higher risk with processed meat intake
Body Weight	Enhances satiety and weight control	May contribute to obesity if high in fat
Chronic Disease Risk	Reduces cancer and inflammation risk	Increased risk with overconsumption
Gut Health	Promotes beneficial microbiota	Limited impact on gut diversity

Source: <https://hsph.harvard.edu/?utm>

The above table 2 clearly demonstrates that plant-based protein exerts protective effects against major health conditions, particularly cardiovascular and metabolic disorders. While animal-based protein remains an important nutrient source, prioritizing plant-based protein intake and moderating animal protein consumption significantly improves overall health outcomes, thereby effectively fulfilling the second objective of the study.

Protein Bioavailability and Amino Acid Utilization

Protein bioavailability refers to the extent to which absorbed amino acids are utilized for metabolic and structural functions in the body. Animal-based proteins generally demonstrate higher bioavailability due to their complete amino acid profile and higher concentrations of essential amino acids, particularly leucine, which plays a key role in muscle protein synthesis. Indicators such as PDCAAS and DIAAS scores consistently place animal proteins such as eggs, dairy, and meat at the upper end of protein quality scales.

However, recent nutritional studies indicate that plant-based proteins especially soy, legumes, pulses, and mixed plant diets can achieve comparable bioavailability when consumed in sufficient quantity and variety (Manzoor et. al., 2023). The numeric data presented in the table below shows that plant-based proteins achieve PDCAAS values ranging from 0.70 to 1.00, with soy protein matching animal protein at a score of 1.00. This evidence highlights that protein quality is not solely dependent on origin but on dietary composition and intake adequacy.

Digestibility and Absorption Efficiency

Digestibility determines how effectively dietary protein is broken down into absorbable

amino acids. Traditionally, animal proteins have shown higher digestibility rates (90-99%) compared to plant proteins due to lower fiber content and absence of anti-nutritional compounds (Bandyopadhyay et al., 2022). However, the digestibility gap between plant and animal proteins has narrowed significantly with the application of traditional and modern processing methods such as soaking, sprouting, fermentation, and thermal cooking (Mohammadi et. al., 2022).

As reflected in the numeric comparison, plant-based proteins demonstrate digestibility levels ranging from 75-90%, improving to nearly 90% with proper processing. While animal proteins retain a slight advantage in nitrogen retention and DIAAS scores, research suggests that higher intake levels of plant protein effectively compensate for lower digestibility without adverse health effects (Poonia et al., 2022). Improved digestibility enhances nutrient absorption, supports positive nitrogen balance, and makes plant proteins suitable for diverse age groups, including children and older adults.

Functional and Physiological Benefits of Protein Sources

Beyond digestibility and bioavailability, functional benefits are critical in assessing protein quality. Animal-based proteins show high efficiency in muscle maintenance and repair, particularly in populations with increased protein needs (Day et. al., 2022). However, evidence increasingly supports the functional adequacy of plant-based proteins in maintaining muscle mass, metabolic health, and immune function when total protein intake meets recommended levels.

The table 3 further shows that plant proteins provide additional functional advantages, including significant fiber content (5-15 g per

100 g food) and zero cholesterol, which contribute to improved gut health, reduced inflammation, and better cardiovascular outcomes. Plant proteins have also been

associated with lower inflammatory markers such as C-reactive protein, whereas excessive intake of animal protein especially processed varieties may elevate inflammatory responses.

Table 3: Comparison of Bioavailability, Digestibility, and Functional Indicators of Protein

Parameter	Plant-Based Protein (Average)	Animal-Based Protein (Average)
Protein Digestibility (%)	75–90% (up to 90% with processing)	90–99%
PDCAAS Score	0.70 – 1.00	0.90 – 1.00
DIAAS Score	65 – 90	90 – 120
Leucine Content (g/100 g protein)	6.0 – 8.0	8.0 – 11.0
Nitrogen Retention (%)	65 – 85	80 – 95
Fiber Content (g/100 g food)	5 – 15	0
Cholesterol (mg/100 g)	0	60 – 120
Inflammatory Impact	Anti-inflammatory	Pro-inflammatory if excessive

Source: Compiled from FAO and WHO protein quality evaluation reports

The animal-based proteins demonstrate slightly superior bioavailability and digestibility, plant-based proteins provide functionally equivalent outcomes when dietary diversity, adequate intake, and appropriate processing methods are applied. The added benefits of fiber, anti-inflammatory properties, and metabolic support underscore the growing nutritional relevance of plant-based proteins, thereby effectively fulfilling the third objective of the study.

Environmental Sustainability of Protein Sources

- **Lower Greenhouse Gas Emissions:** Plant-based protein production generates significantly fewer greenhouse gas

emissions compared to livestock farming. Animal agriculture contributes substantially to methane and nitrous oxide emissions, while plant protein sources such as pulses and legumes have a much lower carbon footprint (Ferrari et. al., 2022).

- **Efficient Resource Utilization:** Plant proteins require less land, water, and energy per unit of protein produced. This efficiency makes them more suitable for feeding a growing global population without exhausting natural resources.
- **Reduced Environmental Degradation:** Shifting towards plant-based protein reduces deforestation, soil degradation, and water pollution caused by intensive animal farming.

Overall, environmental sustainability strongly supports the inclusion of plant-based protein as a primary dietary protein source for future food systems.

Economic Affordability and Accessibility of Plant-Based Protein

Affordability is a key determinant of dietary adequacy, particularly in low- and middle-income populations. Plant-based protein sources such as lentils, chickpeas, beans, peas, groundnuts, and cereals are generally less expensive than animal protein sources like meat, fish, and dairy. They also have longer

shelf lives and require fewer storage resources, making them economically viable for households and public nutrition programs.

Plant proteins play a vital role in addressing protein-energy malnutrition due to their wide availability and cultural acceptability across regions. Government-supported food security schemes and school-based nutrition programs often rely on plant protein because of its cost-effectiveness and scalability. The table 4 below highlights a comparative overview of sustainability and affordability indicators between plant-based and animal-based protein sources.

Table 4: Comparative Indicators of Sustainability and Affordability

Indicator	Plant-Based Protein	Animal-Based Protein
Cost per kg protein	Low to moderate	High
Water requirement	Low	Very high
Land requirement	Minimal	Extensive
Greenhouse gas emission	Low	High
Shelf life	Long	Short to moderate
Accessibility	Widely accessible	Limited by cost
Suitability for public programs	High	Limited

Source: <https://gfi.org/initiatives/climate/environmental-benefits-of-alt-proteins>

Contribution to Nutritional Security and Public Health

Nutritional security goes beyond calorie sufficiency and includes access to adequate protein and micronutrients over time. Plant-based proteins contribute to long-term nutritional security by providing consistent, reliable sources of protein along with fiber, vitamins, minerals, and bioactive compounds. These nutrients collectively help prevent both undernutrition and diet-related non-communicable diseases.

Regular inclusion of plant-based protein supports healthy digestion, improved gut microbiota, and better metabolic outcomes, reducing healthcare burdens. At a population level, dietary patterns rich in plant protein have been associated with lower rates of cardiovascular disease, obesity, and diabetes, strengthening public health resilience (. Their integration into daily diets helps ensure sustainable nutrient availability without compromising environmental or economic stability.

Role in Future Dietary Models and Global Food Systems

Plant-based protein is increasingly recognized as a cornerstone of future dietary models aimed at balancing health, sustainability, and food security (Anyiam et.al., 2025). Global nutrition frameworks now advocate for protein diversification, encouraging a shift from animal-heavy diets toward plant-forward eating patterns. Such models emphasize dietary diversity, resilience to climate shocks, and reduced dependence on resource-intensive food systems.

From a long-term perspective, plant-based protein supports intergenerational food security by conserving natural resources while meeting present nutritional needs. Its adaptability across cultures, cuisines, and agricultural systems makes it a practical solution for global nutrition challenges. By integrating plant-based protein into policy planning, agriculture, and dietary guidelines, societies can move toward equitable, sustainable, and nutritionally secure food systems.

Results and Discussion

The findings of the present review clearly demonstrate that plant-based protein holds substantial nutritional value (Anyiam et.al., 2025) and offers multiple health, economic, and environmental advantages when compared with animal-based protein. The results derived from recent epidemiological studies, clinical trials, and nutritional assessments (2020-2025) indicate that diets with a higher proportion of plant-derived protein are consistently associated with improved cardiometabolic health outcomes (Bandyopadhyay et al., 2022). Evidence synthesized in this study shows lower levels of LDL cholesterol, improved

blood pressure control, better glycaemic regulation, and reduced inflammatory markers among populations consuming higher amounts of plant-based protein. These findings strongly align with the first and second objectives, confirming that plant proteins, when consumed in adequate quantity and variety, are nutritionally comparable to animal proteins (Singar et al., 2024)..

From the perspective of protein quality, the results indicate that although animal-based proteins demonstrate slightly higher digestibility and bioavailability scores, high-quality plant proteins such as soy, legumes, pulses, and combined cereal-legume diets effectively meet essential amino acid requirements. The discussion of PDCAAS and DIAAS values highlights that protein adequacy is achievable through plant-based diets with appropriate dietary planning. Functional outcomes related to muscle maintenance, metabolic activity, and immune function were found to be comparable between plant- and animal-based proteins when total protein intake is sufficient (Krams et.al., 2019), thereby fulfilling the third objective of the study.

Furthermore, the discussion underscores the broader role of plant-based protein in promoting sustainable and long-term nutritional security. The results reveal that plant protein production requires significantly fewer natural resources and generates lower greenhouse gas emissions, while remaining more affordable and accessible for large populations. This positions plant-based protein as a practical solution to address protein-energy malnutrition, climate change concerns, and rising healthcare burdens simultaneously. Overall, the discussion reinforces that prioritizing plant-based protein (Singar et al., 2024), while moderating animal protein intake, represents a nutritionally

sound, economically viable, and environmentally sustainable dietary strategy, supporting the fourth objective and the central premise of the study.

Conclusion

The study concludes that plant-based protein holds significant nutritional, health, economic, and environmental advantages when compared with animal-based protein, making it a vital component of modern dietary patterns. Evidence from recent studies (2020-2025) demonstrates that plant-based proteins, when consumed in sufficient quantity and appropriate combinations, provide adequate essential amino acids, satisfactory digestibility, and functional benefits comparable to animal proteins. Although animal-based proteins exhibit slightly higher bioavailability and leucine content, these differences have minimal impact on overall health outcomes when total protein intake and dietary balance are ensured. Moreover, plant-based proteins offer additional protective benefits, including high dietary fiber, antioxidant and phytochemical content, and the absence of cholesterol, which collectively contribute to improved cardiovascular, metabolic, and gut health. The review further highlights that greater reliance on plant-based protein supports sustainability by reducing environmental burden, conserving natural resources, and improving affordability and accessibility, particularly in resource-limited populations. Overall, prioritizing plant-based protein while moderating animal protein intake emerges as a nutritionally sound, health-promoting, and environmentally sustainable strategy, reinforcing its importance in future dietary guidelines and public health policies.

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Women of Bihar Pursuing Nutrition Science and their Future Career in Mushroom cultivation

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Abstract

Bihar is one of the most populous and agriculturally significant states of India and has historically faced issues such as poverty, malnutrition and gender inequality. However, in recent years there has been a gradual rise in women's participation in higher education, particularly in science-related disciplines such as nutrition science. Nutrition science integrates food systems, health and sustainability and has become increasingly relevant for addressing food security challenges in rural regions. The integration of nutrition science with mushroom cultivation offers a promising livelihood opportunity for women in Bihar. Mushrooms are nutrient-rich foods containing high quality protein, vitamins and bioactive compounds that contribute to improved dietary quality. At the same time, mushroom cultivation requires relatively low land and investment, making it suitable for small-scale rural enterprises. Bihar has emerged as one of India's leading mushroom-producing states, producing around 45,000 metric tonnes in 2024-25 and creating employment opportunities for thousands of farmers, including women self-help group members. Successful initiatives by women farmers such as Bina Devi, who has trained more than 70,000 women in mushroom farming, highlight the potential for women's empowerment through this sector. Thus, the convergence of nutrition science education and mushroom-based agribusiness can support food security, women's empowerment and sustainable development goals (SDGs) such as Zero Hunger and Gender Equality.

Keywords: Populous, surging, sustainable, zero hunger, SDGs, nutraceutical.

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Introduction

Bihar is one of the most densely populated states of India and its economy largely depends on agriculture. Despite its agricultural potential, the state has long struggled with poverty, malnutrition and gender inequality. In recent years, however, the participation of women in higher education has increased significantly, particularly in fields related to health, nutrition and

agricultural sciences (Singh, 2018). Nutrition science is an interdisciplinary field that examines the relationship between food, human health and environmental sustainability. It plays an important role in addressing issues such as malnutrition, micronutrient deficiency and public health improvement (Kumar, 2023). Women pursuing nutrition science acquire knowledge about dietetics, food processing, public health nutrition and community nutrition programs,

which can contribute to rural development and food security initiatives. One emerging area where nutrition science intersects with rural entrepreneurship is mushroom cultivation. Mushroom farming is considered a sustainable agricultural activity because it requires minimal land, utilizes agricultural waste and generates high economic returns (Aditya & Bhatia, 2020). For women in rural areas, particularly those associated with Self-Help Groups (SHGs) under programs such as JEEVIKA, mushroom cultivation offers an accessible and profitable livelihood option.

This study therefore explores the relationship between women studying nutrition science in Bihar and their potential career opportunities in mushroom cultivation, examining the nutritional benefits of mushrooms, existing success stories, and the future prospects of this growing sector.

Mushroom Cultivation Overview

Bihar is the biggest producer of mushrooms, with 45,000 MT in 2024-25. The states of Patna, Nalanda, and Muzaffarpur export mushrooms to nearby states. Oyster and milky mushrooms are the most common types since they don't need much technology and use agricultural waste. Button mushrooms, on the other hand, demand more money to grow. (Indian Masterminds, 2026) State subsidies (50-90%) go to women first and help 60,000-70,000 farmers.

Mushroom cultivation has emerged as an important agro-based enterprise in Bihar. The state currently produces approximately 45,000 metric tonnes of mushrooms annually, making it one of the leading producers in India (Indian Masterminds, 2026).

Government initiatives and training programs have played a major role in promoting

mushroom cultivation among rural women. Various schemes provide 50-90% subsidies for infrastructure and training, particularly for women farmers and self-help groups (Indian Masterminds, 2026). Institutions such as Krishi Vigyan Kendras (KVKs) and the JEEVIKA program offer technical guidance, training and marketing support to rural entrepreneurs.

Production makes a lot of money: a small shed can make Rs 4.2 lakh from 2,100 kg a year. JEEVIKA connects SHGs to training, which can double or triple their income. Mrs. Patel and other leaders went from 60 bags to 100 bags thanks to KVK Nalanda training. (Fresh Plaza, 2025)

Nutritional Value of Mushrooms

Mushrooms are widely recognized as nutritionally rich foods that provide a wide range of macro- and micronutrients. They contain high-quality proteins, dietary fiber, vitamins and essential minerals that contribute to improved human health (Kumar, 2023). In addition to their nutritional benefits, mushrooms contain several bioactive compounds, including polysaccharides and polyphenols. (World Health Organization & World Bank, 2025). Species such as *Agaricus bisporus* (button mushroom) and *Pleurotus sajor-caju* (oyster mushroom) are well suited to the climatic conditions of northern India, including Bihar. Their low-fat content and high fiber content also make them beneficial for digestive health and weight management (Kumar, 2023).

Nutrient (per 100g)	Content	Health Benefit
Protein	6-30g	Muscle growth, satiety
Fiber	High	Digestion, cholesterol control
Vitamin D2	Variable	Bone health
Polyunsaturated fats	>75%	Heart health
Selenium	High	Antioxidant Défense

Because of these properties, nutritionists often recommend mushrooms as part of balanced diets, particularly in regions where malnutrition and protein deficiency remain major public health concerns.

Integration of Nutrition Science and Mushroom Cultivation

Nutrition science education provides students with knowledge related to food processing, dietetics, food microbiology and public health nutrition. These skills can be directly applied to the production, processing and promotion

of mushroom-based food products (Aditya & Bhatia, 2020).

Nutrition Science and Mushroom Cultivation Come Together

Nutrition classes cover a lot of ground, including food processing, business, and public nutrition. Mushroom farming is a good fit for home-based businesses, so dietitians can combine cultivating mushrooms with diet advice. Learning how to make spawn and control pests is related to food microbiology abilities.

Case Study	Background	Achievement
Bina Devi	Self-taught farmer	Trained 70,000 women; 100+ villages
Pushpa Jha	Homemaker	Rs 500 start to commercial sales
Anita Devi	Home Science grad	200+ SHG women; multi -village impact
Mrs. Patel	Rural entrepreneur	Value-added products from 60 bags

Challenges Faced by Women

Key barriers: Inadequate knowledge, fluctuating prices, lack of storage/cooling, high initial setup for button mushrooms. Rural women face economic constraints, market access issues. Nutrition graduates encounter gender biases, limited funding, despite subsidies. Climate control and hygiene demand training.

Despite the promising opportunities, women involved in mushroom cultivation face several challenges. One major barrier is the lack of technical knowledge and training, particularly in rural areas where access to agricultural extension services may be limited (Singh, 2018). Market instability is another significant

challenge. Women entrepreneurs also face financial constraints and gender-related barriers (World Bank, 2023).

Future Career Prospects

The Indian mushroom market is projected to reach USD 1,610.89 million by 2025, with a compound annual growth rate (CAGR) of approximately 12.7% (Yahoo Finance, 2026). This growth creates multiple career opportunities for women pursuing nutrition science. Potential career paths include mushroom farm management, nutraceutical product development, community nutrition training and export-oriented processing enterprises.

Career Path	Skills Needed	Projected Growth
Farm Manager	Cultivation, pest control	High; 60k+ farmers
Nutraceutical Developer	Bioactive analysis	12.7% CAGR
SHG Trainer	Community nutrition	JEEVIKA expansion
Exporter/Processor	Quality compliance	25% export rise

Recommendations

Nutrition science curricula should include modules on mushroom cultivation and food entrepreneurship. Training programs through Krishi Vigyan Kendras and JEEVIKA (NDTV, 2025) should be expanded for women graduates. Government policies should support cold storage, marketing networks and processing facilities.

Conclusion

Women pursuing nutrition science in Bihar have significant potential to contribute to the mushroom cultivation sector. By combining scientific knowledge of nutrition with sustainable agricultural practices, they can improve food security, generate income and promote rural development. With appropriate training, policy support and market linkages, mushroom cultivation can become an important pathway for women's economic empowerment and sustainable agricultural growth in Bihar.

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Impact of nutritional adequacy on Socio-economic status of school children

(With reference to Amarpur, Banka district)

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Abstract

School-aged children require nutritionally adequate diets to support healthy growth, immunity, and disease prevention. Adequate intake of macro- and micronutrients is essential for maintaining physiological functions and promoting proper development of bones, muscles, and organs. Nutrition during childhood is also crucial for brain development, particularly for cognitive functions such as memory, learning, and problem-solving. Nutrients such as iron, omega-3 fatty acids, iodine, and vitamins play significant roles in neurological development and academic performance. An assessment of nutritional adequacy among school-going children in the Amarpur block of Banka district reveals a substantial need for improved nutritional interventions from a socio-economic perspective. Previous research and national datasets indicate that undernutrition among children in India remains a critical issue, particularly in economically disadvantaged populations. Data collected from government reports and academic literature using anthropometric indicators and dietary surveys show that the prevalence of underweight children varies widely between 6.6% and 83%, while stunting ranges between 13.8% and 75% across different regions. These findings highlight that child hunger and malnutrition remain significant public health challenges requiring urgent attention.

Keywords : School students, nutrition, sufficient, socio-economic, Banka District, physical development.

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Introduction

Nutrition plays a fundamental role in the physical, cognitive, and psychological development of school children. Adequate nutrition during childhood ensures proper growth, strengthens the immune system, and supports learning abilities and academic performance (ICMR-NIN, 2020). Poor nutrition during the early years can lead to long-term health consequences, including impaired

cognitive development and reduced productivity later in life (WHO, 2018).

Malnutrition continues to be a major public health concern in developing countries, particularly in India where socio-economic disparities significantly affect dietary intake and access to health services. Children belonging to low-income households are more vulnerable to undernutrition due to food insecurity, limited dietary diversity, and

inadequate health care facilities (UNICEF, 2019).

Amarpur block in Banka district of Bihar represents one such region where poverty, limited infrastructure, and low awareness about balanced diets contribute to nutritional deficiencies among children. Bihar consistently reports higher levels of stunting, wasting, and underweight children compared to national averages, highlighting the need for localized studies to understand the determinants of child nutrition (NFHS-5, 2019-21). Therefore, the present study investigates the relationship between nutritional adequacy and socio-economic status among school children in Amarpur by analysing dietary practices, anthropometric indicators, and socio-economic determinants.

Objectives

- To evaluate the nutritional condition of school children in Amarpur.
- To analyze the link between socio-economic position and getting enough nutrients.
- To examine the effectiveness of government nutrition programmes for children.
- To suggest policy interventions for improving child nutrition outcomes.

The significance of the study:

Understanding the nutritional challenges faced by school children in rural regions such as Amarpur can help policymakers design targeted interventions for improving child health and educational outcomes. Adequate nutrition is strongly associated with improved cognitive development, better school attendance, and

higher academic performance (FAO, 2020). Furthermore, addressing malnutrition can contribute to long-term socio-economic development by enhancing human capital and reducing intergenerational cycles of poverty (Ramachandran, 2013).

Review of the Literature

Several studies have highlighted the strong relationship between socio-economic status and child nutritional outcomes. The National Family Health Survey-5 (2019-21) reported that Bihar has one of the highest levels of child malnutrition in India, with 42.9% of children under five being stunted and 22.9% wasted (NFHS-5, 2019-21). These figures indicate persistent nutritional deprivation among children from economically weaker households.

Gopalan (1993) emphasized that inadequate nutrition during childhood can negatively affect educational attainment and future economic productivity. Poor dietary intake during early life stages may lead to cognitive impairment, reduced school performance, and long-term health complications.

Similarly, Dasgupta et al. (2016) found that children from low-income rural households in Bihar often consume diets with limited diversity, leading to deficiencies in essential micronutrients such as iron, zinc, and vitamin A. Although the Mid-Day Meal Scheme (MDMS) has improved school attendance and partially addressed hunger among school children, several studies suggest that the programme still faces challenges in providing nutritionally balanced meals (MoWCD, GOI, 2020).

Methodology

The study adopted a mixed-method research design involving both quantitative and qualitative approaches. Anthropometric measurements including height, weight, and body mass index (BMI) were collected from 100 school children aged between 6 and 14 years.

Structured interviews were conducted with children and their parents to collect information regarding household income, dietary habits, and parental education. Primary data were collected from schools and government offices in Amarpur block. Secondary data sources included reports from NFHS-5, Integrated Child Development Services (ICDS), and relevant academic literature on child nutrition.

Tools utilised

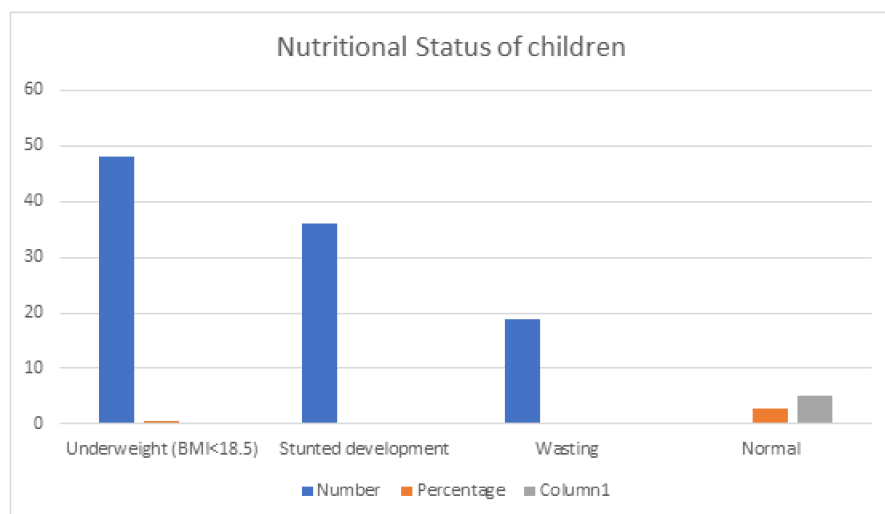
- WHO Growth Standards for BMI-for-age and height-for-age.
- The Modified Kuppuswamy Scale is employed to categorise socio-economic status (Saleem,2019).

Results and discussion:

The findings indicate a high prevalence of malnutrition among school children in the study area. Approximately 48% of children were underweight, 36% showed signs of stunting, and 19% were affected by wasting. These indicators reflect chronic and acute nutritional deficiencies commonly observed in economically disadvantaged communities (WHO, 2018).

Nutritional Status of Children

Condition	Number	Percentage
Underweight (BMI <18.5)	48	48%
Stunted Development	36	36%
Wasting	19	19%
Normal	~0	~0%



Counts reflect direct scaling from percentages; prevalence overlap.
normal category is minimal due to high

Socio-economic Factors Affecting Nutrition

1. Low-Income Impact Table

Group	Undernourished Children	% of Undernourished
Low-Income (< ₹5,000/month)	50	62%
Others	30	38%

Socio-economic factors were found to have a strong influence on nutritional status. Children belonging to households earning less than ₹5,000 per month showed a significantly higher

prevalence of undernutrition. Low household income often limits access to diverse and nutritious food, resulting in inadequate nutrient intake (FAO, 2020).

Parents Education

Parent Education	Total Children	Malnourished	% Malnourished
Illiterate	50	28	55%
Educated	50	11	22%

Parental education also played an important role in determining children's nutritional outcomes. Children of illiterate parents were more likely to suffer from malnutrition compared to those whose parents had basic education. Children of illiterate parents were much more likely to be malnourished (55%) than children of educated parents (22%).

Government Actions and Shortcomings

Government programmes such as the Mid-Day Meal Scheme, Integrated Child Development Services (ICDS), and Poshan Abhiyaan have contributed to improving child nutrition and increasing school enrolment. However, limitations such as irregular food supply, lack of protein-rich foods, and inadequate awareness programmes reduce the

effectiveness of these interventions in rural areas (MoWCD, 2020).

Conclusion

The study confirms a strong link between the socioeconomic position of the family and the nutritional status of school kids in Amarpur. Poverty, lack of healthcare, and lack of knowledge continue to make malnutrition a problem.

Suggestions:

- i. To make MDMS stronger, meals should include eggs, legumes, and fortified foods.
- ii. Conducting community nutrition awareness programs to educate parents about balanced diets and child health.
- iii. Providing regular health check-ups and micronutrient supplementation, particularly iron and folic acid, for school children.

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Role of Rural Women Entrepreneurs in Empowering a New Bihar

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Abstract

Rural women entrepreneurs in Bihar operate across agri processing, handicrafts, retail, and service micro enterprises, often organized through Self Help Groups (SHGs) and JEEViKA networks. Their entrepreneurship contributes to poverty reduction, improved nutrition and education outcomes, and greater household decision making power for women. Evidence from Bihar shows that SHG based models increase savings, credit access, and enterprise activity, with stronger outcomes where technical support and market aggregation exist.

Keywords : Rural women entrepreneurs, Self Help Groups, JEEViKA networks, Bihar

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Introduction

Agriculture plays a vital role on India's economy. India has the largest arable land resource in the world and with 20 agri-climatic regions all 15 major climates in the world exist in India over 58 percent of the rural household depends on agriculture as their principal means of livelihood. According to the periodic labour force survey of 59.7 percent of women in rural areas are self-employed, 11 percent are regular wage or salary earners in comparison, 57.4 percent men in rural society are self-employed 14.2 percent are regular wage and 28.3 percent are casual workers. While the share of nature of work among men and women on normal areas are not different. There is a huge difference in the type of self-employment between men and women. Most self-employed women in rural areas work as helpers in household enterprises (Borhardt et. al., 2017). According to PLFS survey Bihar had the highest share of self-employed female workers

in rural areas. In comparison Assam were some states with the lowest share of rural women who were self-employed. The correlation between a state's per capita income with its share of self-employed women in rural areas was found to be 0.25 percent (Gandhi, 2018). This means that states that had a higher share of self-employed women are likely to have a lower per capita income relatively while the direction of the association is expected given the informality and vulnerability are capital with such jobs in the rural areas.

The small magnitude of the correlation coefficient implies that this association is not strong. The negative association between the income per capita and self-employed women can also be noticed in the 30 days average wage of self-employed men and women in rural areas.

Rural Challenges

Unemployment is the major challenged forced by rural youth and more so by female rural youth. A large number of rural female youth lack the skills regaled for job opportunities in the ener-evolving manufacturing and service sectors in order to fulfill to aspirations fooled by rising rural income and increased exposure to media (Gandhi, 2018). Today's rural female youth needs better education, jobs, better lifestyle and economic independence in addition, for agriculture to continue to remain the mainstay. It need to midonism itself in order to attract more or at vast redain rural female youth. Development efforts have been low on usage of innovative tech

i.e. the deep tech encompassing artiliat intelligence machine learning, blockctain etc. There technologies are the key to transform agriculture and other rural businesses technology led intervention had the promise of not only increasing agriculture productivity and growth but also reducing poverty.

Self-employed Women in Rural Areas

According to the numbers reported in the PLFS 2021-22 survey. Self employed women in rural areas earned the lowest wage among men and women from rural and urban areas on an average, wages earned by self employed urban men were 4 times that of self-employed rural women (Economic Survey, 2021-2022)

those of self-employed men in rural areas was 2.5 times that of self employed women in rural areas, while self employed women in urban area earned 1.7 the wages carmel by self-employed women is rural area (Borrhardt et. al., 2017). While men reported gross earnings of approximately Rs. 16,300 in a month in urban areas, women in rural area reported gross earning of approximately Rs. 3,900. The in equating income could be because women.

Especially in rural areas, are expected to be primary caregiver for children and older house hold member. Household chores like cooking, cleaning and fetching water are also usually the primary responsibility of the women in rural areas. This is reflected in the number of house worked in a week by self employment in rural areas, which in almost 19-21 house less than urban employed males and 10-12 house less than self employed rural males self employed women in urban areas worked on a couple of house more than those in rural areas, indication that their rural counterparts they are also expected to do the larger share of domestics chores. In addition of the social conditioning where women are expected to be the primary care given and do majority of the household chores, what are some imfectiments that limit a women's participation and efficiency as an entrepreneur (Borrhardt et. al., 2017). There is pediments range from poor education levels to lack of financial support to information arrymmetry over the year's the government has taken active store towards improving the literacy rates among women in rural areas yet there is a gender gets in the literacy rates of men and women in both urban and rural areas. Moreover improvement in literacy rates of women in rural areas has not translated into a higher share of participation is labour force.

Financial support for Female Entrepreneur in Rural Area's

Financial inclusion can help improve the economics prospects for female entrepreneurs in rural areas (Economic Survey, 2021-22). Research suggest that improving access to banks has a positive impact on the poor and disadvantaged groups can increase economic activity and also saving while conventional banking charels improved access to financial services in rural areas, lack of a universal,

government issued identity card and limited financial literacy limited financial inclusion of women (Borrhardt et. al., 2017). The government of India addressed there issue through a three pronged approach popularly known as the JAM Trinity - Jan Dhan Yojna, aadhar card and mobile phone as on date there are around so none women who opened banks account under the Jan Dhan Yojna, who also benefited from the Direct Benefit transfer scheme of the government during the national lockdown (Sharma and Vohra, 2020). There not only helped women, who wanted the privacy to opiate their finance and saving. There was especially necessary for women with their our business as evidence suggerts that after microloan intonded for women are after used up for their husband's business. There two were supplemented by the mobile network connectivity where in India become a market known for some of the ehepeat date rate in the world along with low-cost mobile phone and customized financial application that could be used on both feature and smart phone women could now access bank account and conduct financial transaction from the safety of their women and as per their convenience.

Government Support to Women in Rural Areas

While the Jan Trinity was instrumental in the proliferation of formal financial services, the government also supported women in rural areas with the scheme that encouraged them to start independent ventures. The

PMEGP scheme in implemented by the kindly and village industries commission (KVIC) on the nodal agency at the national level and district industries centre (DICs) and Banks. The beneficiary gets the subsidy under the scheme through her bank in the subsidy from the KVIC. Women in rural full under the special

category of beneficiaries where they are expected to contribute only 5 percent of the project cost and get a subsidy at the rate of 35 percent. The balance amount of the total cost is given to the beneficiary as a lean from her bank.

To address the social issues, regarding the financial dependence of the women, especially those in rural areas, the government launched the Sukanya Samridhi Account in 2015 which is a saving scheme to encourage parents to build a found for the education and marriage expenses of the clooghtors (MSDE, GOI). The scheme has the highest tax exemption, comen with soverlogn guarantee and can be opened at the nearest post office. This was done keeping in mind the rich of the postal services in rural areas another government scheme to support female entrepreneurs is stand-up-india, launched in 2016. The scheme offers loans between of Rs. 10 lakh to Rs. 1 crore to women for setting in business outside the non-frame sector (Startup Ecosystem in India). To strong then financial literacy, the Reserve Bank of India has also released the National Stratige for financial education (NSFF- 2020-25) that acknowledge the need to improve financial literacy among women information asymmetry in another weak link in value chains of women entrepreneurs from rural areas, Niti Aeyog's women entrepreneurship platform (WEP) is one such digital initiative that aims- To reduce the information asymmetry for women entrepreneurs (Kantar IMRD, 2019). This online platform was launched on march 8, 2018 it collaborate with public and private sector organization and being information on all women focused schemes, initiative and programmes in one portal. This scheme (MSDE, GOI)

were three pillar - iccha sharkit to motivate inspring women entrepreneurs to start new

business. Gyan Shakti to provide knowledge and ecosystem support to faster budding entrepreneurs and Kurma Shakti to provide hands on support in setting up and scaling businesses in a nutshell the platform provides information on lunching and financial assistance incubation and acceleration support entrepreneurship mentorship community networking and compliance and tax assistance among other currently the platform is more popular with urban female entrepreneur than rural once and is adapting to the needs of rural entrepreneurs (Sharma and Vohra, 2020), A smaller sample of their data indicates that female entrepreneurs from their 3 cities are mostly engaged in agriculture related businesses in contract most women entrepreneurs from Tior I and Tior a cities were running education sector enterprises mahila-e-hoat in another government initiative form women entrepreneurs and soft, help groups for show casing their products that are made or manufactured by them as an online platform (FICCI and Ernsi & Young, 2012). This is a unique way to improve the access of rural entrepreneur to market, increase digital financial inclusion and empower women.

Conclusion

In addition to the several government initiation is current above there are many cooperatives, not for profit and for-profit organization. That are trying to connect with rural women entrepreneurs to reduce information, asymmetry increase their market reach and improve their productivity while government initiation, like Mahila-e-hoat are essential and important. Its reach is not as expansive as those of digital online e-commerce companies. The next should be to start selling their products directly on channels like Flipkart and Amazon that have a lot of Traffic.

This not only will support rural women entrepreneurs by giving them access to a much large market

but will also strengthen them the call for Aatma Nirbhar India scheme that incentivize business like tax credits or exemption that source their inputs or products from rural women entrepreneurs help increase private sector participation that will in true benefit women entrepreneurs research also suggest that women entrepreneurs feel more confident conducting business with female business currently women made up only 22 percent of bank employees and 12 percent of microfinance institution employees number from the PIFS survey indicate clearly that female rural-self employed workers are among the most vulnerable among all entrepreneurs in terms of wages and nature of work.

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Co-dependency and Depressive Symptoms among the Spouses of Alcohol Dependence Syndrome

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Abstract

Co-dependency is a pathological pattern of relating with others that comprises one's self-esteem, relationships, blurred boundaries, and psychological distress. The present study was conducted to assess the co-dependency and depressive symptoms among the spouses of Alcohol Dependence Syndrome (ADS), and to assess the quality of life, perceived stress, self-compassion, and resilience among the co-dependent spouses of ADS. The findings of the study indicated that both groups were matched at the baseline. There was a significant difference between the experimental and control group on co-dependency, depression, quality of life (physical, psychological and environment domains), perceived stress, self-compassion, and resilience post-intervention in terms of improvement among the spouses of ADS. From the findings it could be concluded that Integrative Psychotherapy developed for the present study was effective in managing codependency, depressive symptom, quality of life, perceived stress, self-compassion, and resilience among spouses of Alcohol Dependence Syndrome.

Keywords : Co-dependency, Depressive Symptoms, Spouses of Alcohol Dependence Syndrome

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Alcohol dependence syndrome (ADS):

Alcohol dependence syndrome (ADS) is "a cluster of behavioural, cognitive and physiological phenomena that develop after repeated alcohol use. It typically includes a strong desire to consume alcohol, difficulties in controlling its use, persisting in its use despite harmful consequences, a higher priority given to alcohol use than to other activities and obligations, increased tolerance and, sometimes, a physiological withdrawal state" (World Health Organization, 2018).

According to a WHO survey, nearly 5.1% of the global burden of diseases is attributable to alcohol consumption, and it causes nearly

3.3 million deaths every year (Eashwar et.al.,2020). In the 2022 National Family Survey, India (NFHS-5) survey, Telangana has 43.4% alcohol consumption. The relapse rates ranged from 9.6% to 90% in five studies conducted in locations of Haryana, Delhi, Punjab, and Telangana where the community prevalence of alcohol use disorder is more than 15% (Sarkar, 2022).

There has been a paradigm shift from an intervention model to a recovery-oriented system of care for addiction treatment (Substance Abuse and Mental Health Services Administration (SAMSHA, 2010). A study enumerated the importance of social and family support, and it helps addicts avoid

returning to substance use (Cavaiola et.al., 2015). Similarly, another study explored that one's quality and nature of social support predicted abstinence among addicts (Korcha et al., 2016; Menon & Kandasamy, 2018). Hence, a lack of family support can damage recovery, particularly when family members avoid or withdraw from the person.

Family intervention has become integral to addiction treatment. Attributes of the family that enhance addiction recovery are being honest, supportive of the addiction treatment, providing emotional support and being there for them (Menon and Kandasamy, 2018).

On the contrary, studies have also supported that family disengagement, lack of knowledge about addiction, and severe family problems are associated with a greater risk of relapse and lower chances of abstinence (Brown et al., 2015). Hence, family-based substance-use disorder interventions are supported by empirical evidence and effectively promote long-term behaviour change, including recovery (SAMSHA, 2010).

Family Intervention in Addiction Recovery

Family is an integral and functional unit of society that has gained much attention from researchers (Sooryamoorthy, 2012). A study explored the involvement of family significantly impacted the treatment program for patients coping with addiction. It also improved treatment entry, treatment completion and treatment outcomes. The study also quoted the advantages of family-focused practices and found that such practices are observed to be limited (Ashcroft, 2018).

There have been differences between the Indian and Western countries in terms of familial structure and outlook throughout the

ages. Indian society tends to give importance to familial bonds. Above mentioned prevalence of addiction in India, many families also tend to be impacted, as addiction affects not only the addicted person but the entire family. Sometimes the family members knowingly or unknowingly tend to nurture, protect, and support the substance abuser. It is an attribute of human nature to help others, but sometimes this behaviour might work as a double-edged sword. It may make it easier and simpler for the substance abuser to continue the downward spiral of continuing the substance abuse. It is also observed that no matter how much addicts are messed up, one of the family members always tends to be there to rescue and nurture their behaviour (Salonia et al., 2021). This behaviour of rescuing tends to enable the addicts to maintain their drinking behaviour and reduce their responsibility for taking active steps to help themselves through treatment.

The study (Javanmard and Garegozlo, 2013) demonstrates that the family is the most fundamental site for the human relationship that offers a primary structure for establishing supportive relationships. Hiremath and Jalapure (2015) support this proposition by associating a supportive family environment with a better prognosis and a successful reduction in alcohol consumption and abuse during treatment. Hence, family interventions help not only the addicts but also the family members, children and spouses.

Family Involvement in Addiction Treatment

Despite the negative impact on families, addiction treatment has historically focused only on individuals who are dependent on substances. Csiernik (2002) described family-focused services as the 'neglected aspect of addiction treatment'. Researchers have also

stated that health professionals view family members as 'adjuncts', and usually, they are not perceived as an integral part of addiction treatment. This creates a significant barrier to family involvement in addictions.

The involvement of family members in routine addiction treatment has been documented as necessary for two fundamental and interrelated reasons. Firstly, family-focused services can aid in reducing harm to the family members who tend to suffer at the same time, the entire family as a unit. Secondly, the family members' involvement in addiction treatment also improves the quality of treatment outcomes for the patients.

Studies reveal that only 20% (or fewer) of individuals with substance use disorders seek treatment (Hasin & Keyes, 2010). Among those who receive treatment, approximately 50% drop out of treatment and treatment completion is one of the factors most closely associated with positive treatment outcomes. Although studies have documented robust evidence when involving families in addiction treatment, most services target the individual with the addiction, and there is little evidence of family-focused approaches in addiction service provisions (Copello et al., 2006).

It is essential to identify any gaps in service provisions and barriers to implementing family-focused practices that have been identified in the literature. Such services tend to be an essential guide to help move towards best practices for families in addiction treatment. Miller (2003) conducted a study exploring that there are currently no clearly identified best practices and scoping reviews that policymakers and clinical settings can use for families of the addicts. It is the need of the hour to develop policies and implement best practices in addiction treatment with various

family-focused interventions. Several issues become salient when treating a couple or family where the alcoholic is currently abstinent.

According to McCrady (1990), it is not only abstinence which should be focused on treatment but also an increased awareness of interpersonal issues. It is working on these issues that can lead to promoting the well-being of the family and the addict. Such treatments tend to reduce and decrease family tensions and the projection of blame. Although the drinker may abstain, family members tend not to immediately trust the alcoholic to make decisions and rekindle new roles and responsibilities. The spousal relationship is also compromised, as there can be a lack of intimacy due to the drinking behaviour of the addicts. This reaction can be normalized, and family expectations for a quick return to adaptive levels of functioning should be tempered.

Studies suggest a therapist can play a significant role in repairing such relationships and instilling hope in the family members, leading to increased familial trust and a functional and family environment. This familial support can directly or indirectly improve the sobriety period for alcoholics. A study attempts to validate clinical impressions that spouses affected by alcoholism tend to develop distinct roles where they may act as enablers or rescuers (Orford et al., 1976).

Hence, it becomes vital to learn about these distinct roles and behaviours that the spouses of individuals with Alcohol Dependence tend to have or acquire in the course of the period due to their partner's drinking behaviour and or through intergenerational trauma. These behaviours are also known as co-dependency. Let us understand co-dependency in detail.

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The Landscape of Solar Power: Global Advances and India's Leadership in Solar Capacity and Mega Parks

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Abstract

This article presents an overview of the global solar power landscape, highlighting the top ten countries by installed solar capacity in 2025 and providing a special focus on India's strides in solar energy deployment. Analyzing India's leading solar power parks and the states spearheading the nation's energy transition, the article assesses the strategic measures, policies, and infrastructural developments that have supported India's rapid solar expansion. The manuscript addresses the socio-economic and environmental dimensions of solar power adoption, as well as future challenges and opportunities for sustainable growth.

Keywords : Solar Power, Global Solar Rankings, Solar Parks, Renewable Energy, Installed Capacity, Sustainable Development, Clean Energy

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Introduction

Global energy systems are undergoing a paradigm shift, with solar power emerging as a cornerstone for sustainable electricity generation. In 2025, nations across continents have prioritized large-scale solar projects to decarbonize their electricity grids, incentivize innovation, and diversify their energy portfolios. India, recognized as one of the world's leading solar adopters, has leveraged abundant sunlight, policy support, and technological advancements to position itself as a pivotal participant in the global solar market. The country's journey is marked by mega solar parks, ambitious state-level targets, and a strong commitment to clean energy (Mishra, 2025; The Indian Express, 2025)

Discussion

The landscape of solar power in 2025 is defined by unprecedented global growth and transformative leadership from key nations. Worldwide installed solar capacity has surged past 2.2 terawatts, with nearly 600 gigawatts added in a single year, driven by falling costs, policy incentives, and technological innovations. China remains the undisputed global leader, boasting almost 890 gigawatts, followed by the United States and India, with India recognized as both the fastest-growing solar market and the third-largest in total installed capacity (Ornate Solar, 2025; Gupta, 2025).

India's rapid ascent showcases a blend of utility-scale mega parks-such as Bhadla Solar Park-and expanding rooftop solar initiatives that reach households, institutions, and businesses from villages to major cities. This

expansion has been facilitated by supportive government policies, domestic manufacturing incentives, and a strong push for energy independence and climate resilience. India's achievement is not just about scale, but also about inclusivity and innovation, positioning the nation as a model for dynamic renewable energy adoption (Gupta, 2025) In short, the global solar revolution is a mosaic of large-scale investments, technological breakthroughs, and localized ingenuity, with

India serving as a beacon for sustainable growth and the transition to clean energy.

Global Leaders in Solar Power

The year 2025 witnessed significant advancements in solar installations worldwide. The top ten countries with the most installed solar power are presented in Table 1.

Table 1: Top 10 countries with the most solar power installed

Rank	Country	Installed Solar (MW 2024)	AGR (2023-2024)
1	China	887930	45.6%
2	US	177470	27.5%
3	India	97384	33.7%
4	Japan	91610	2.8%
5	Germany	89943	20.1%
6	Brazil	53113	40.0%
7	Spain	38587	20.9%
8	Australia	38472	15.6%
9	Italy	36013	22.7%
10	South Korea	26645	13.4%

Source: Mishra (2025)

China's phenomenal capacity cements its position as the global leader, contributing almost sixty percent of all new renewable capacity in the Asia-Pacific region. India, standing third globally, demonstrates remarkable progress, registering over 97 GW of installed solar capacity-reflecting an annual growth rate of 33.7 percent. This scale underscores the urgency and ambition behind India's renewable targets, driven by energy demand, policy mandates to cut emissions, and the promise of achieving net-zero by 2070 (The Indian Express, 2025).

Major Solar Power Parks in India

India's large-scale solar parks have become emblems of its clean energy revolution. The

scale and sophistication of these projects have optimized land use, reduced costs through economies of scale, and attracted both international and domestic investment. As of 2025, a list of operational solar parks in India is displayed in Table 2. These parks symbolize India's shift towards decentralized, grid-strengthening, and economically viable renewable energy.

Mega solar parks have played an essential role in India's remarkable solar capacity growth by providing large-scale, centralized hubs for efficient power generation. These parks-such as Bhadla, Pavagada, and Kurnool-have harnessed economies of scale to lower costs, secure substantial private and public

investment, and accelerate project commissioning, making India's energy transition more affordable and accessible. Furthermore, they showcase effective land

management and robust grid integration, driving India to its position as one of the world's top solar power producers

Table 2 : List of major solar parks in India

State	Name of Solar Park	District	Installed Capacity
Rajasthan	Bhadla solar park	Jodhpur	2245 MW (spread over 14000 acres)
Rajasthan	Nokh solar park	Jaisalmer	925 MW (planned)
Rajasthan	Phalodi-Pokhran solar park	Jodhpur and Jaisalmer	750 MW
Karnataka	Pavagada solar park	Tumkur	2050 MW (spread over 13000 acres)
Andhra Pradesh	Kurnool ultra mega solar park	Kurnool	1000 MW (spread across 5932 acres)
Andhra Pradesh	NP Kunta solar park	Ananthapuramu	978.5 MW (spread across over 7925 acres)
Andhra Pradesh	Kadapa ultra mega solar park	YSR Kadapa	1000 MW (spread across 5927 acres)
Andhra Pradesh	Galiveedu solar park	YSR Kadapa	500 MW
Gujarat	Ckaranka solar park	Patan	730 MW (spread across 5384 acres)
Gujarat	Dholera ultra mega solar park	Ahmedabad	1000 MW (planned; spread across close to 4942 acres)
Gujarat	Radhanesda solar park	Banskantha	700 MW (spread across 3477 acres)
Madhya Pradesh	Rewa ultra mega solar park	Rewa	750 MW (spread across 1590 acres)
Madhya Pradesh	Neemuch solar park	Neemuch	500 MW (proposed; spread across approximately 2633 acres)
Madhya Pradesh	Agar solar park	Agar Malwa	550 MW (spread across 3706 acres)
Madhya Pradesh	Shajapur solar park	Shajapur	450 MW (planned)
Madhya Pradesh	Floating solar power park (Omkareshwar)	Khandwa	600 MW
Madhya Pradesh	Mandsaur solar farm	Mandsaur	250 MW (spread across 1000 acres)
Tamil Nadu	Kamuthi solar power project	Ramanathapuram	648 MW (spread across 2500 acres)

Data compiled from the sources: FreyrEnergy (2024); Fenice Energy (2024a); Fenice Energy (2024b); TAYPRO (2025); GPCL (2019); Power Technology (2021); The Times of India (2024)

Installed Solar Capacity in Top 10 Indian States

State-wise leadership has been instrumental in driving India's solar success. Progressive state policies, land availability, and tailored incentive programs have helped specific states achieve outstanding results. Installed solar capacity of top 10 states in India is presented in Figure 1.

Rajasthan leads by a significant margin, owing to its vast desert terrain and favorable solar irradiance. Gujarat's industrial infrastructure and progressive solar policies, Maharashtra's large-scale feeder solarization, and Karnataka's project diversity showcase India's regional potential. These states collectively represent over half of the nation's solar capacity, furthering India's ambition to exceed 500 GW of clean energy by 2030 (India Data Map, 2025).

The rapid deployment of solar parks and networks has created substantial socioeconomic and environmental positive impacts. Key outcomes include: (1) Job Creation: New avenues for skilled and unskilled labor in project construction, operation, and maintenance. (2) Rural Upliftment: Solar parks embrace local partnerships, land-lease arrangements, and community benefit models. (3) Environmental Gains: Reduced dependence on fossil fuels, mitigation of greenhouse gas emissions, and improved air quality. (4) Grid Modernization: Enhanced integration of solar power has strengthened national and state grids, improved load balancing, and increased energy reliability (Shah, 2025).

The global transition toward renewable energy has placed solar power at the forefront of sustainable development, reshaping energy economies and redefining strategies for

decarbonization. Over the past decade, advances in photovoltaic (PV) technologies, innovative storage systems, and cost reductions have made solar power a mainstream energy source rather than a niche alternative. Globally, the diversification of solar technologies is notable. Developments in bifacial panels, perovskite solar cells, and floating solar farms have enhanced efficiency and land-use flexibility, addressing challenges of intermittency and spatial constraints. Nations such as China, the United States, and members of the European Union have led large-scale installations, leveraging both public and private investments. China, in particular, dominates the manufacturing of solar modules and has established integrated value chains that drive affordability. Within this global context, India has emerged as a pivotal leader in solar energy deployment, setting ambitious renewable targets and achieving remarkable milestones. Guided by the National Solar Mission and aligned with the Paris Agreement commitments, India aims to reach 500 GW of non-fossil fuel capacity by 2030, with solar energy constituting a significant share. India's solar revolution is characterized by both centralized and decentralized initiatives, ranging from utility-scale solar parks to rooftop installations. The establishment of mega solar parks-such as Bhadla Solar Park in Rajasthan, Pavagada Solar Park in Karnataka, and Rewa Ultra Mega Solar in Madhya Pradesh-symbolizes the country's commitment to scale and innovation. These parks not only optimize land and resource use but also attract international investment and catalyze local employment. India's leadership also stems from its strategic approach to policy, technology, and financing. The government's push for domestic manufacturing under the "Make in India" initiative, combined with the International Solar Alliance (ISA)-a coalition of over 120

countries headquartered in Gurugram-underscores India's vision of global solar cooperation. Moreover, integrating solar power with agrivoltaics, electric mobility, and green hydrogen production indicates India's broader systemic approach to sustainability.

Conclusion

India stands at the forefront of the global solar revolution, having established itself as a leading nation in both capacity addition and the operationalization of mega solar parks. The coordinated efforts of central and state actors, supportive policies, technological innovation, and robust funding frameworks have fostered an environment conducive to rapid expansion. As India strives towards ambitious renewable energy targets, its journey provides instructive lessons for other emerging economies pursuing decarbonization and sustainable development. However, challenges persist. Grid integration, intermittency management, and recycling of solar panels remain critical issues worldwide. For India, land acquisition, transmission infrastructure, and financing constraints require continued innovation and policy refinement. Addressing these challenges through advanced storage technologies, digitalized grid management, and circular economy principles will determine the long-term resilience of solar ecosystems. The evolving landscape of solar power demonstrates a collective global momentum toward a cleaner energy future, with India standing at the helm of large-scale implementation and international collaboration. As technological frontiers expand and economies align toward net-zero goals, solar power is poised to remain a cornerstone of global energy transformation.

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Threat analysis report of witness protection scheme 2018 of Bihar

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Abstract

This manuscript presents a threat analysis of the Bihar Witness Protection Scheme. It examines legal and institutional design, operational vulnerabilities, threat vectors affecting witnesses and prosecutions, and prioritized mitigations for state authorities and implementing agencies. The analysis synthesizes the national Witness Protection Scheme template and Bihar government adoption documents and guidance.

Keywords : Witness Protection Scheme, Bihar Government, Threat Analysis Report

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Introduction

To identify and evaluate threats that undermine the effectiveness of the Scheme in protecting witnesses in high risk criminal matters in Bihar, and to propose actionable mitigations and monitoring metrics. Manuscript covers legal framework and institutional arrangements; threat taxonomy; vulnerability analysis; operational gaps in Bihar's rollout; prioritized recommendations; and monitoring indicators. The analysis assumes the Bihar Scheme follows the national template's categories and procedural architecture (WPS, 2018)..

Methodology

- Document review: Primary review of the Witness Protection Scheme, 2018 (Ministry of Home Affairs) and Bihar government notifications and Directorate of Prosecution circulars referencing the Bihar Scheme (BDPHD, 2025).

- Comparative synthesis: Cross referencing national template provisions with published state-level implementation notes and secondary summaries to identify common operational failure modes.
- Threat modelling: Structured identification of threat vectors (physical, social, administrative, institutional, technical) and mapping to likely impacts on prosecution outcomes and witness safety.

Legal and Institutional Context

Key elements of the Scheme. The national Scheme defines categories of threat, a Competent Authority for protection decisions, a State Witness Protection Fund, and enumerates protection measures including police protection, relocation, identity protection, and change of identity. The Scheme also prescribes confidentiality safeguards and monitoring mechanisms.

Bihar adoption and governance. Bihar has issued notifications and administrative orders to operationalize the Scheme, established a State Witness Protection Fund, and set up committees and prosecution directorate guidance to implement the Scheme at district and state levels. These instruments form the basis for operational procedures in Bihar (BWPS, 2020).

Threat taxonomy and impact

- Direct physical attack on witness or escort - Likelihood: high in organised crime, caste political, and land dispute cases; Impact: critical (case collapse, witness death). Causes include delayed activation of protection and inadequate armed escort protocols.
- Intimidation and threats to family or community - Likelihood: high; Impact: high (recantation, non cooperation). Causes include narrow protection scope focused on the individual and lack of family support measures.
- Administrative leaks and identity compromise - Likelihood: medium-high; Impact: high. Causes include paper based records, weak access controls, and multiple handoffs between agencies.
- Compromise during relocation or identity change - Likelihood: medium; Impact: high. Causes include inadequate relocation planning, insufficient inter state coordination, and local informant networks.
- Corruption and collusion within implementing agencies - Likelihood: medium; Impact: critical. Causes include political pressure, lack of independent oversight, and absence of rotation/anti collusion safeguards.
- Resource shortfalls and logistical constraints - Likelihood: high; Impact: medium-high. Causes include underfunded State Witness Protection Fund and lack of vetted safe houses (WPS,2018).

Systemic vulnerabilities in Bihar's implementation

1. Reactive approval process. The requirement for formal application and Competent Authority approval can create life threatening delays unless emergency activation is explicitly empowered (Bihar Notification).
2. Confidentiality and records management gaps. Paper records and broad access increase leak risk; identity change procedures are complex and vulnerable to procedural errors.
3. Insufficient family and socio economic support. The Scheme's operational focus on immediate physical protection often omits livelihood, housing, and psychosocial support for witnesses and dependents.
4. Institutional capture risk. Local political dynamics and weak independent oversight create opportunities for collusion and deliberate undermining of protection measures.
5. Capacity and resource constraints. Shortage of trained protection officers, safe houses, and contingency funds undermines timely and sustained protection (BDPHD, 2025).

Prioritized Mitigations and Operational Recommendations

Immediate actions (0-3 months): Emergency activation SOP: Authorize police to provide immediate protection for a defined short period (e.g., 72 hours) without Competent

Authority approval; require retrospective review. Contingency disbursement rules: Enable rapid release from the State Witness Protection Fund for emergency relocation, medical care, and subsistence. Confidentiality lockdown: Issue standing orders restricting access to witness files to named officials; prohibit printing and require secure transport of any physical records (BWPS, 2020).

Short term measures (3-12 months):- Family protection package: Institutionalize protection for immediate family members, short term livelihood support, and trauma counselling. Dedicated trained units: Create small, trained witness protection units within police and prosecution with mandatory rotation and vetting to reduce collusion risk. Safe house network and relocation protocols: Map and vet a roster of safe houses (state and inter state), standardize transport and cover story protocols, and maintain secure communication channels.

Medium term reforms (12-24 months):- Secure digital case management: Deploy a role based, auditable witness registry with encryption and tamper evident logs; limit data replication. Independent oversight board: Constitute a multi stakeholder oversight body (judicial, prosecution, civil society) to review denials, leaks, and systemic failures and to publish redacted performance metrics. Community engagement and stigma reduction: Partner with NGOs and local leaders to build protective coalitions and reduce social ostracism of witnesses.

Monitoring, KPIs, and Risk Management

Suggested KPIs. Time from threat report to first protection action; number of witnesses granted protection who subsequently testify; recantation rate among protected witnesses; incidents of post protection attacks; number of

confidentiality breaches; fund disbursement turnaround time. Risk controls. Regular audits of access logs; mandatory rotation and background checks for protection officers; whistleblower channels with legal safeguards; judicial review for contested denials (BWPS, 2020).

Conclusion

The Bihar Witness Protection Scheme, 2018 provides a necessary legal framework aligned with the national template, but operational risks-notably delays in activation, confidentiality lapses, resource shortfalls, and institutional capture-threaten its effectiveness. Prioritizing emergency activation protocols, confidentiality controls, family protection, dedicated trained units, secure digital records, and independent oversight will materially reduce the most severe threats and improve prosecution outcomes. Immediate implementation of the recommended emergency SOPs and contingency funding will yield the highest short term risk reduction.

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Diabetes Mellitus Type 2 Risk Factors and Vascular Complications

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Abstract

Type 2 Diabetes mellitus (T2DM) is a growing global health problem that substantially increases the risk of both macrovascular and microvascular disease. To synthesize current evidence on major risk factors for T2DM and the mechanisms and clinical spectrum of its vascular complications, and to summarize prevention and management strategies. Multifactorial risk reduction - targeting glycemia, blood pressure, lipids, lifestyle, and use of cardioprotective glucose-lowering agents - reduces vascular events and progression of microvascular disease.

Keywords : Type 2 diabetes mellitus, Vascular complications, diseases

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Introduction

Diabetes mellitus (Type 2) is characterized by insulin resistance and relative insulin deficiency and is associated with chronic hyperglycemia and metabolic dysregulation. The global prevalence of diabetes is increasing in parallel with aging populations and rising rates of overweight and obesity, driving a growing burden of vascular complications. Effective prevention and management require understanding both the risk factors that predispose to T2DM and the pathophysiologic links between diabetes and vascular injury (Sah et.al., 2025).

Methods

Narrative synthesis of recent reviews and primary care analyses on T2DM risk factors and vascular damage progression; sources

include peer reviewed reviews and clinical analyses (Fabris et.al., 2025).

Risk Factors for Type 2 Diabetes Mellitus (Fabris et.al., 2025).

- Nonmodifiable Risk Factors
 - Age. Incidence rises with advancing age.
 - Genetic predisposition and family history. Multiple genetic loci and familial clustering increase susceptibility.
 - Ethnicity. Certain ethnic groups have higher baseline risk.
- Modifiable Risk Factors
 - Overweight and obesity. Central adiposity is a primary driver of insulin resistance.

- Physical inactivity. Low activity worsens insulin sensitivity and weight gain.

- Unhealthy diet. High-calorie, high-sugar, and processed-food diets increase risk.

- Smoking and alcohol use. Both contribute to metabolic and vascular risk.

- Hypertension and dyslipidemia. Frequently coexist with insulin resistance and amplify vascular risk.

Pathophysiology Linking Diabetes to Vascular Complications

Core mechanisms include chronic hyperglycemia, insulin resistance, dyslipidemia, low-grade inflammation, oxidative stress, and endothelial dysfunction. These processes accelerate atherosclerosis and impair microvascular structure and function. Advanced glycation end products, activation of protein kinase C pathways, and increased reactive oxygen species contribute to basement membrane thickening, capillary occlusion, and impaired tissue perfusion. These mechanisms explain the increased incidence of coronary artery disease, stroke, peripheral arterial disease, retinopathy, nephropathy, and neuropathy in people with T2DM.

Vascular Complications (Fabris et.al., 2025).

Macrovascular Complications

Atherosclerotic cardiovascular disease is the leading cause of morbidity and mortality in T2DM and includes:

- Coronary artery disease presenting as stable angina, acute coronary syndromes, or silent ischemia.

- Ischemic stroke with higher recurrence and worse outcomes.

- Peripheral arterial disease leading to claudication, critical limb ischemia, and increased amputation risk.

Microvascular Complications

- Diabetic retinopathy: progressive retinal microangiopathy causing vision loss.

- Diabetic nephropathy: albuminuria and progressive decline in glomerular filtration leading to chronic kidney disease.

- Diabetic neuropathy: distal symmetric polyneuropathy and autonomic neuropathy increasing foot ulcer and cardiovascular risk.

Risk factor	Primary mechanism	Associated vascular complication
Obesity/central adiposity	Insulin resistance; inflammation	CAD; stroke; microvascular disease. (Sah <i>et.al</i> , 2025)
Hypertension	Shear stress; endothelial injury	Accelerates nephropathy; CAD; stroke (Fabris <i>et.al.</i> , 2025)
Dyslipidaemia	Atherogenesis	Coronary and peripheral arterial disease (Fabris <i>et.al.</i> , 2025)

Table 1. Comparison Table of Vascular Complications

Complication Type	Typical Manifestations	Key Preventive Strategies
Macrovascular Coronary disease Stroke PAD	Angina; myocardial infarction; ischemic stroke; claudication	Glycemic control; BP control; statin therapy; smoking cessation; antiplatelet therapy when indicated; SGLT2i/GLP1-RA for high-risk patients.
Microvascular Retinopathy	Visual impairment; retinal hemorrhages	Tight glycemic control; BP control; regular retinal screening.
Microvascular Nephropathy	Albuminuria; progressive CKD	Glycemic control; RAAS blockade for albuminuria; SGLT2 inhibitors to slow progression
Microvascular Neuropathy	Sensory loss; foot ulcers; autonomic dysfunction	Glycemic control; foot care; neuropathic pain management.

Clinical Implications Screening and Management

Screening and Risk Assessment

- Risk estimation should include assessment of traditional cardiovascular risk factors and use of validated tools to estimate 10-year ASCVD risk. Guidelines recommend integrating diabetes-specific risk into management decisions.

- Microvascular screening: annual retinal exams, urine albumin-to-creatinine ratio, and foot examinations are recommended to detect early disease (Sah et.al., 2025).

Therapeutic Strategies

- Glycemic control. Individualized HbA1c targets reduce microvascular complications; intensive control has more modest effects on macrovascular events and must be balanced against hypoglycemia risk.

- Blood pressure control. Lowering BP reduces both macrovascular and microvascular outcomes; targets should be individualized.

- Lipid management. Statin therapy for primary and secondary prevention is a cornerstone of ASCVD risk reduction (Fabris et.al., 2025).

- Antiplatelet therapy. Aspirin for secondary prevention; selective use for primary prevention after individualized risk assessment.

- Glucose-lowering agents with cardiovascular and renal benefits. SGLT2 inhibitors and GLP-1 receptor agonists reduce major adverse cardiovascular events and slow kidney disease progression in high-risk patients and should be considered when indicated.

- Lifestyle interventions. Weight loss, dietary modification, and increased physical activity reduce progression from prediabetes to diabetes and improve cardiovascular risk profiles (Sah et.al, 2025).

Prognosis and Public Health Considerations

T2DM substantially shortens life expectancy primarily through cardiovascular disease. Population-level prevention targeting obesity,

physical inactivity, and unhealthy diets is essential to curb the rising incidence. Health systems must prioritize integrated care models that address multifactorial risk reduction, early detection, and equitable access to evidence-based therapies (Fabris et.al., 2025).

Conclusion

T2DM is a complex metabolic disorder whose major clinical burden arises from vascular complications. Prevention and mitigation require multidimensional strategies: addressing modifiable risk factors, implementing guideline-directed medical therapy for cardiovascular and renal protection, and ensuring systematic screening for microvascular disease. Coordinated public health and clinical efforts can reduce the individual and societal impact of diabetes-related vascular disease.

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Floral Biology and Pollinator Interactions: Integrating Nectar Dynamics, Breeding Systems, and Ecosystem Services in Selected Angiosperms : Mini Review

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Abstract

Floral biology is pivotal in shaping reproductive success in angiosperms through its influence on pollinator interactions, breeding systems, and nectar dynamics. This mini review synthesizes findings from selected medicinal and aromatic plants, including *Hygrophila auriculata*, *Salvia leucantha*, *Justicia betonica*, *Ocimum basilicum*, *Cymbopogon citratus*, and *Cinnamomum verum*, to evaluate structural and functional floral traits in relation to pollination ecology. Variations in morphology, nectar secretion, pollen presentation, and stigma receptivity strongly affect pollinator attraction and efficiency. Quantitative differences in nectar yield and sugar concentration enhance reproductive outcomes while contributing to apicultural value. Breeding systems range from self-compatibility to obligate outcrossing, with reproductive limitations often linked to pollinator availability and floral architecture. Low fruit and seed set in certain species may result from pollinator scarcity, phenological mismatches, or structural constraints. Pollinator behavior, particularly honey bees and other insects, mediates gene flow and ecosystem services. Integrating floral traits, nectar ecology, and pollinator dynamics underscores both ecological and economic significance.

Keywords : Conservation Biology; Floral Ecology; Medicinal Plants; Pollination Biology

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Introduction

Angiosperm floral biology underpins reproductive success by mediating interactions among floral morphology, nectar rewards, breeding systems, and pollinator behaviour. Nearly all animal pollinated plants rely on fine scale alignment of floral traits with pollinator assemblages, such that variation in corolla architecture, pollen presentation, and stigma receptivity can alter visitation rates, pollen

transfer efficiency, and ultimately fruit and seed set. Nectar quantity and sugar concentration are central components of this functional interface, shaping pollinator preferences while determining the apicultural and economic value of flowering resources. Recent work on nectar secretion in *Hygrophila auriculata* and *Salvia leucantha*, for example, demonstrates pronounced diurnal dynamics linked to temperature and humidity, with substantial honey production potential per

hectare (Roguz et al., 2025; Sage and van der Kooi, 2023; Bareke and Addi, 2022; Mitchell et al., 2009).

Medicinal and aromatic angiosperms of Acanthaceae and Lamiaceae, including *Hygrophila auriculata*, *Salvia leucantha*, *Justicia betonica*, *Ocimum basilicum*, *Cymbopogon citratus*, and *Cinnamomum verum*, provide ideal models for integrating floral biology with pollination ecology because they are melliferous, insect pollinated, and display diverse breeding systems from self compatibility to obligate outcrossing (Kumar, 2025; Rani et al., 2025; Rout and Kumar, 2025; Kumar et al., 2024; Hathurusinghe et al., 2023; Filipiak et al., 2022; Layek et al., 2022; Bareke and Addi, 2022; Prasifka et al., 2018; Bhowmik and Datta, 2013; Ma'ukanovi-Joci et al., 2007). In basil, for instance, protandry, bee mediated pollination, and complex foraging dynamics of *Apis* species highlight how floral phenology and pollinator behaviour jointly structure reproductive output (Kumar, 2025). Yet low fruit or seed set reported in several taxa suggests potential pollen limitation arising from pollinator scarcity, phenological mismatches, or structural constraints (López-Olvera et al., 2025; Yuan et al., 2025). This mini review synthesizes floral traits, nectar ecology, and breeding systems in selected medicinal and aromatic plants to elucidate their pollination mechanisms and associated ecosystem services, particularly for apiculture and sustainable agro ecosystems.

Discussion

Ceylon cinnamon, also known as *Cinnamomum verum* Blume (syn *Cinnamomum zeylanicum*), has drawn attention because of its special qualities and health advantages. Therefore, it is essential to maintain both the yield quantity and quality,

particularly for high-end value-added products. Commercial cultivation endeavours and the development of superior varieties depend on an understanding of flower behaviour and reproductive biology. However, limited information exists about floral biology of *Cinnamomum verum*. Hathurusinghe et al. (2023) evaluated two cultivars of *Cinnamomum verum* for pollination, floral growth, and seasonal flowering. Prior to and following pollination, information on male and female floral organs, pollination, and floral biology was gathered both at macroscopic and microscopic levels. *Cinnamomum verum* naturally evolved with protogynous dichogamy and has morpho-anatomical, structural, and physiological adaptations for cross-pollination between the two cultivars; type A (Sri Gemunu) and type B (Sri Wijaya) flowers. The female and male stages of the same tree, however, overlap for roughly 45 to 60 minutes due to changes in environmental conditions, which may indicate close pollination inside the same plant. Even during self-pollination, some of the pollens were seen to be hydrated throughout this occurrence. In the meantime, 4-8% of the flowers produced fruit following natural and hand-to-hand pollination between the male and female phases of the same tree. Despite being suited for cross-pollination, *Cinnamomum verum* can also naturally close-pollinate. The information points to the complexity of sexual reproduction of *Cinnamomum verum*. The development of superior *Cinnamomum verum* cultivars would be aided by carefully managed breeding efforts with regulated variables like temperature and humidity (Hathurusinghe et al., 2023).

Pollinators are essential to the sustainability of agriculture, biodiversity, and ecosystem services. A common aromatic grass in tropical

and subtropical climates, is *Cymbopogon citratus* (DC.) Stapf. It is also known as lemongrass, and is significant both economically and medicinally. Although lemongrass is primarily recognized for its essential oil production and vegetative propagation, little is known about the role of insect visits in its reproductive ecology and associated ecosystem services. Rout and Kumar (2025) documented and examined the variety of pollinators that visit *Cymbopogon citratus*, emphasising their ecological significance and taxonomic makeup. Representatives of the Diptera, Hymenoptera, and Coleoptera were included in the reported assemblage, highlighting the role that both wild and managed insects play in plant-pollinator networks and conservation approaches. The hoverflies *Helophilus pendulus*, *Episyrphus balteatus*, and *Allograpta obliqua* were regularly seen visiting the inflorescences, engaging in active hovering and feeding. Their frequent visits implied a deep attraction in the floral resources that *Cymbopogon citratus* had to provide. Two kinds of honey bees, *Apis cerana* and *Apis mellifera*, both of which are members of the Apidae family, served as representatives of the Hymenoptera. These species collected pollen and nectar from the blooms as part of their consistent and deliberate foraging activity. Both natural (*Apis cerana*) and managed (*Apis mellifera*) pollinators were present, suggesting that *Cymbopogon citratus* is a useful feed plant for a variety of pollination guilds. There was only one species of Coleoptera, *Chrysolina staphylaea* (family Chrysomelidae). Even though it didn't visit very often, the beetle was seen feeding on flower components, which helped with inadvertent pollination. Thus, a variety of insect pollinators primarily flies and bees are supported by *Cymbopogon citratus* (Rout and Kumar, 2025).

In addition to its significance as a decorative plant, *Justicia betonica* L. is used medicinally to treat a number of human complications. West Bengal is one of the Indian states where the plant species population size and abundance are extremely low. Moreover, pollination ecology and breeding system of *Justicia betonica* are still unknown. To provide crucial information for the sustainability of species, some reproductive factors were thus examined by Layek et al. (2022). Flowering took place from December through May, peaking in February and March. In April and May, flower blooming time was significantly earlier (5:00 to 8:00 a.m.) than on a cold day (10:00 a.m. to 12:00 p.m. in December and January). The time of anther dehiscence coincided with the flower opening time; however, the stigma became receptive later. The plant species is self-compatible but dependent on pollinators for fruit and seed sets. Members of different insect groups like ants, bees, butterflies, flies, moths and wasps visited the flowers. Among them, *Allorhynchium metallicum* and *Halictus acrocephalus* were the primary pollinators (based on the "relative pollinator service"). The plant species showed a significant pollination deficit (coefficient of pollination deficit $[D] = 0.32$) in the open condition. Larvae of the florivorous moth *Gatesclarkeana erotias* significantly reduced reproductive success by eating their floral parts, ovules and immature seeds. In conclusion, combining the pollination deficit and the feeding activity of phytophagous insects (moth larvae) may reduce the reproductive fitness of *Justicia betonica* in the study regions. In summary, the pollination deficit and the feeding behaviour of phytophagous insects (moth larvae) may work together to lower *Justicia betonica* reproductive fitness (Layek et al., 2022).

Bareke and Addi (2022) measured the dynamics of nectar secretion and the ability of *Hygrophila auriculata* and *Salvia leucantha* to produce honey. To measure the volume of accumulated nectar, a group of flowers was covered with mesh bags the day before nectar collection. Additionally, measurements of nectar volume, concentration, temperature, and humidity were made every three hours. One-way ANOVA and linear regression were used to evaluate the gathered data. At varying times of day, the nectar secretion dynamics of two species changed significantly (at $p < 0.05$).

For both *Hygrophila auriculata* and *Salvia leucantha*, the nectar volume that became available during the two subsequent measurements (three-hour intervals) ranged from 1.5 to 2.5 μ l/flower and 4.1 to 5.5 μ l/flower, respectively. Both species showed a favourable correlation between temperature and nectar content. But for *Hygrophila auriculata*, the temperature had a negative correlation with nectar volume, while for *Salvia leucantha*, the temperature was nearly at equilibrium (Bareke and Addi, 2022).

Table 1: Floral Biology, Pollinator Interactions, and Nectar Dynamics in Selected Angiosperms

Plant Species	Breeding System / Floral Biology	Key Pollinators	Abiotic Influences	Reproductive Success / Yield	Ecosystem Service Implications
<i>Cinnamomum verum</i> (Hathurusinghe et al., 2023)	Protogynous dichogamy; overlap of male & female phases (45–60 min); capable of cross- and close-pollination	Not specified in detail; adaptations favor cross-pollination	Temperature & humidity regulate pollination success	4–8% fruit set under natural & hand pollination	Complex reproductive biology; potential for cultivar improvement via controlled breeding
<i>Cymbopogon citratus</i> (Rout & Kumar, 2025)	Primarily vegetative propagation; insect visits enhance reproductive ecology	Hoverflies (<i>Helophilus</i> , <i>Episyrphus</i> , <i>Allograpta</i>); honey bees (<i>Apis cerana</i> , <i>Apis mellifera</i>); beetle (<i>Chrysolina staphylaea</i>)	Not emphasized	Supports diverse pollinator guilds	Feed plant for wild & managed pollinators; strengthens pollinator networks
<i>Justicia betonica</i> (Layek et al., 2022)	Self-compatible but pollinator-dependent; flowering December–May	<i>Allorhynchium metallicum</i> , <i>Halictus acrocephalus</i> ; other insects (ants, bees, butterflies, flies, moths, wasps)	Flowering time varies with temperature (earlier in warmer months)	Pollination deficit ($D = 0.32$); florivory by moth larvae reduces seed set	Vulnerable species with reduced reproductive fitness due to pollination deficit + herbivory

<i>Hygrophila auriculata</i> & <i>Salvia leucantha</i> (Bareke & Addi, 2022)	Nectar secretion dynamics vary by time of day	Not specified (focus on nectar traits)	Temperature: negative correlation with nectar volume (<i>Hygrophila</i>), equilibrium in <i>Salvia</i> ; Humidity: negative correlation with concentration, positive with volume (<i>Hygrophila</i>)	Nectar volume: 1.5–2.5 µl (<i>Hygrophila</i>), 4.1–5.5 µl (<i>Salvia</i>); Honey potential: 29.88 kg (<i>Hygrophila</i>), 60.2 kg (<i>Salvia</i>)	Demonstrates abiotic regulation of nectar traits; high honey production potential
<i>Ocimum basilicum</i> (Kumar, 2025)	Entomophilous; diverse pollinator community (17 species, 5 orders)	Dominant: <i>Apis mellifera</i> , <i>Apis dorsata</i> , <i>Apis cerana</i> ; solitary bees, hoverflies, non-bee hymenopterans	Temperature & sunshine (+); wind & humidity (–)	OP > BP > PE; PE caused 300% seed yield reduction & 61% germination drop	Bees critical for productivity & sustainability; highlights role of managed pollinators

In both species, humidity had a negative correlation with nectar concentration, while in *Hygrophila auriculata*, it had a positive correlation with nectar volume. Nonetheless, for *Salvia leucantha*, the correlations between humidity and nectar volume were nearly at balance. Depending on the size of the plants, the species' mean honey production potentials were calculated to be 29.88 kg for *Hygrophila auriculata* and 60.2 kg for *Salvia leucantha* (based on the average quantity of nectar sugar produced by the plants) (Bareke and Addi, 2022).

Kumar (2025) sought to: (i) investigate the diversity of insect pollinators on *Ocimum basilicum* flora; (ii) estimate the relative abundance, foraging rate, and speed of honey bees on *Ocimum basilicum* and their correlation with meteorological parameters; and (iii) investigate the impact of pollinators on seed yield and quality. The study identified 17 insect species that visited *Ocimum basilicum* verticillasters, representing 13 genera, 11 families, and 5 insect orders: Diptera, Hemiptera, Lepidoptera, Coleoptera, and Hymenoptera. The most prevalent order

was the Hymenoptera, with important pollinators being identified as *Apis mellifera*, *Apis dorsata*, *Apis cerana*, *Ceratina* sp., and *Megachile* sp. The species with the highest relative abundance was *Apis mellifera*. There was ecological balance and diversity in the pollinator community, as indicated by the Shannon-Wiener Diversity Index ($H' = 2.75$). Emphasising the ecological richness of the *Ocimum basilicum* agroecosystem were the presence of solitary bees, hoverflies (*Episyrphus* sp.), and non-bee hymenopterans such *Campsomeriella annulata*. The foraging speed and rate of *Apis mellifera*, *Apis dorsata*, and *Apis cerana* were measured. *Apis dorsata* foraged more slowly than *Apis cerana*, which had the greatest mean foraging rate. *Apis mellifera* was the next. *Apis mellifera*, however, had the fastest foraging speed. Temperature and sunlight were found to have a positive correlation with bee abundance, relative abundance, and foraging rate, while wind speed and relative humidity had a negative correlation, suggesting that pollinator activity was strongly influenced by abiotic factors. The crucial role that bee pollination plays in

increasing productivity was demonstrated by pollination experiments employing three treatments: Open Pollination (OP), Bee Pollination (*Apis mellifera*) (BP), and Pollinator Exclusion (PE). The OP plots outperformed the BP plots in terms of seed yield, pod number, test weight, and germination rate. Bee activity, particularly by *Apis mellifera*, was strongly linked to successful fertilisation and seed development, as evidenced by the stark 300% decrease in seed output and 61% decrease in germination that occurred in PE plots. The pollinator community supported by *Ocimum basilicum* was incredibly diversified and numerous, with *Apis mellifera* being the most dependable and effective pollinator. These results highlighted the relevance of regulated pollinators in improving agricultural productivity and sustainability in the face of changing climate conditions and advanced knowledge of pollination dynamics in medicinal plants (Kumar, 2025).

Integrative Insights

This mini review highlights how floral biology, nectar dynamics, and breeding systems jointly govern reproductive success and pollination efficiency in selected medicinal and aromatic angiosperms. A summary of reviewed literature is displayed in Table 1. Some insights gained from the review is presented below.

1. Breeding systems: Range from self-compatible but pollinator-dependent (*Justicia*) to protogynous dichogamy (*Cinnamomum*).
2. Pollinator diversity: Bees dominate, but flies, beetles, and wasps also contribute significantly.
3. Abiotic regulation: Temperature, humidity, and sunshine strongly influence nectar secretion and pollinator activity.

4. Ecosystem services: Pollinators enhance seed yield, germination, and honey production potential.
5. Challenges: Pollination deficits and florivory reduce reproductive success in vulnerable species.

Floral morphology and anatomical adaptations regulate nectar secretion patterns, which determine pollinator attraction. Pollinator behaviour and foraging efficiency interact with the plant's breeding system and pollen dynamics to influence effective pollination. Successful pollen transfer ultimately determines reproductive outcomes such as fruit and seed set. These reproductive processes contribute not only to plant fitness but also to ecosystem services including honey production and biodiversity conservation (Figure 1).

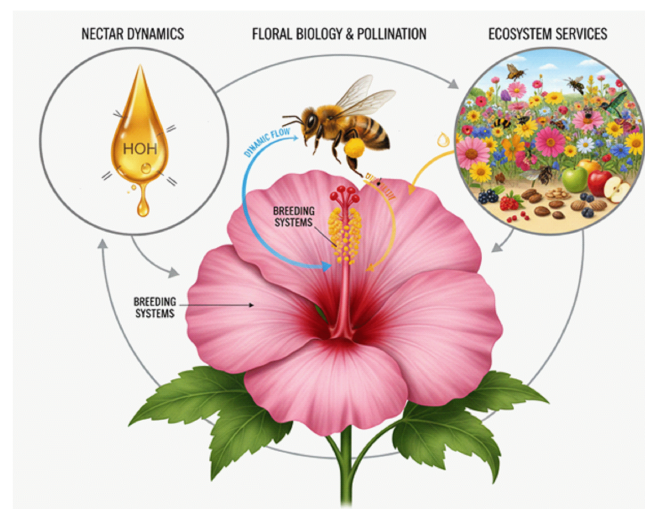


Figure 1: Integrative Framework of Floral Traits, Nectar Ecology, and Pollinator Interactions (representative figure)

Conclusions

This mini review highlights how floral biology, nectar dynamics, and breeding systems jointly govern reproductive success and pollination efficiency in selected medicinal and aromatic angiosperms. Structural traits, temporal patterns of nectar secretion, and quantitative variation in nectar sugars strongly modulate pollinator attraction, behavior, and pollen transfer, thereby influencing fruit and seed set as well as apicultural value. Evidence of pollen and pollinator limitation in several taxa underscores the vulnerability of these species to declines in pollinator abundance, phenological shifts, and habitat disturbance. At the same time, the studied species provide critical ecosystem services by supporting diverse pollinator assemblages and contributing to honey production and landscape-level biodiversity. Integrating floral trait biology with pollinator ecology in these plants can inform conservation strategies, optimize their use in agro ecological designs and apiculture, and guide future research on climate sensitive plant-pollinator interactions in medicinal and aromatic crops.

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Assessment of Molluscs Population in Wetlands of Champaran District, North Bihar

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Abstract

Wetlands of Champaran in north Bihar are biologically rich ecosystems that support diverse aquatic fauna and provide important ecosystem services to local communities. Recent regional studies highlight the ecological significance of Champaran wetlands and their role in supporting aquatic biodiversity. Objective of our manuscript is to assess species composition, abundance, spatial distribution, and habitat associations of molluscs (Gastropoda and Bivalvia) across representative wetlands in Champaran, and to evaluate environmental drivers and conservation implications.

Keywords : Mollusca; wetlands; Champaran; biodiversity; habitat assessment; water quality.

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Introduction

Wetlands are highly productive for the natural growth and propagation of Mollusca fauna. The productivity of a wetland depends mainly on the morphometric features and soil and water quality. However the productivity of mollusks also depends on the availability of food upon which they depend. Generally the in Macro invertebrates of swamps belonged to Annelida, Gastropoda and Coleoptera. In fact the shallow standing water with macrophyte provides a variety of niches for several insect larvae adopted for boring into stems and leaves of plants and substrate for benthos. Floating and submerged macrophytes second to support larger invertebrate fauna than emergent vegetation.

The fluctuation in the density of macro invertebrate populations depends upon various factors, stages of life-cycle of

particular group, water depths and vegetation conditions that control directly the physico-chemical conditions of water and different relationship existing between biotic components in the form of interspecific and intraspecific competition and prey predator interactions and animal plant relationship (Dhivaharan, 2021).

Depending upon the degree of association of Macro invertebrate with aquatic macrophytes (Plate 1) they can easily be differentiated into two groups (a). The fauna closely associated with submerged macrophyte parts of vegetation the annelids Chironomids, Odonata and ephemeroptera and (b). Other comparatively less associated or generally free moving types (Gastropoda, Nemiptera and Coleoptera).

These associations depends upon different relationship & existing between biology of both plants and animals. At first while I visited

the study area we observed that a band of boys are hanging bags on their shoulders and collecting Pila and Bivalves for their lively hood rather depending on wetland resources. The broken material of molluscan population is being sold for commercial use and flash and meat is sold in the market as a meat material. Considerable works have been done in the field of molluscan productivity of wetland (Dudani et al 1998; Singh and Munshi, 1992; Tonapi 1971) but no work has been done on the productivity of molluscs in relation to water quality of this wetland.

Material And Methods

For estimation of molluscan productivity, the area under study was investigated. Water samples were analysed by following the methods of APHA (1995). Molluscs were collected with the help of Ekmen's dredge and identified by following the method of Subbarao and Mitra (1989). Surveys were conducted seasonally at multiple wetland sites selected to represent lakes, marshes, and slow-flowing water bodies. Sampling combined timed-searches, quadrat sampling for benthic assemblages, and hand-collection along littoral zones (Yadava, 1988). Water quality parameters (temperature, pH, dissolved oxygen, conductivity, turbidity) and habitat variables (substrate type, macrophyte cover, anthropogenic disturbance) were recorded at each site. Specimens were identified to the lowest practicable taxonomic level using standard keys and museum comparisons; relative abundance and diversity indices (Shannon, Simpson, Pielou) were calculated. Field methods followed protocols used in regional wetland assessments.

Results And Discussion

The water of the wetland is transparent with rich macrophyte infestation. The physical chemical properties are already given in text. Altogether 16 species of mollusks were recorded from the study area. They were *Bellamyabengalensis*, *Pilaglobosa*, *Digoniostomopulchella*, *Lymnaea acuminata*, *Indoplanorbis exustus*, *Gyraulus euphraticus* recorded higher during winter season and lowest during Monsoon season. Out of 16 species of molluscs collected from the study area only four species of *Parreysia favidens*, *R. favidens* Var. *Pinax*, *marcensy* and *Lamellidens corrianus* attach much commercial importance for shell fisheries of this area. Therefore, it is quite apprehended for over exploitation of this



Fig. 1.(a) Grazed leaves of *Nelumbo nucifera*
(b) Abundance of molluscs in wetland water.

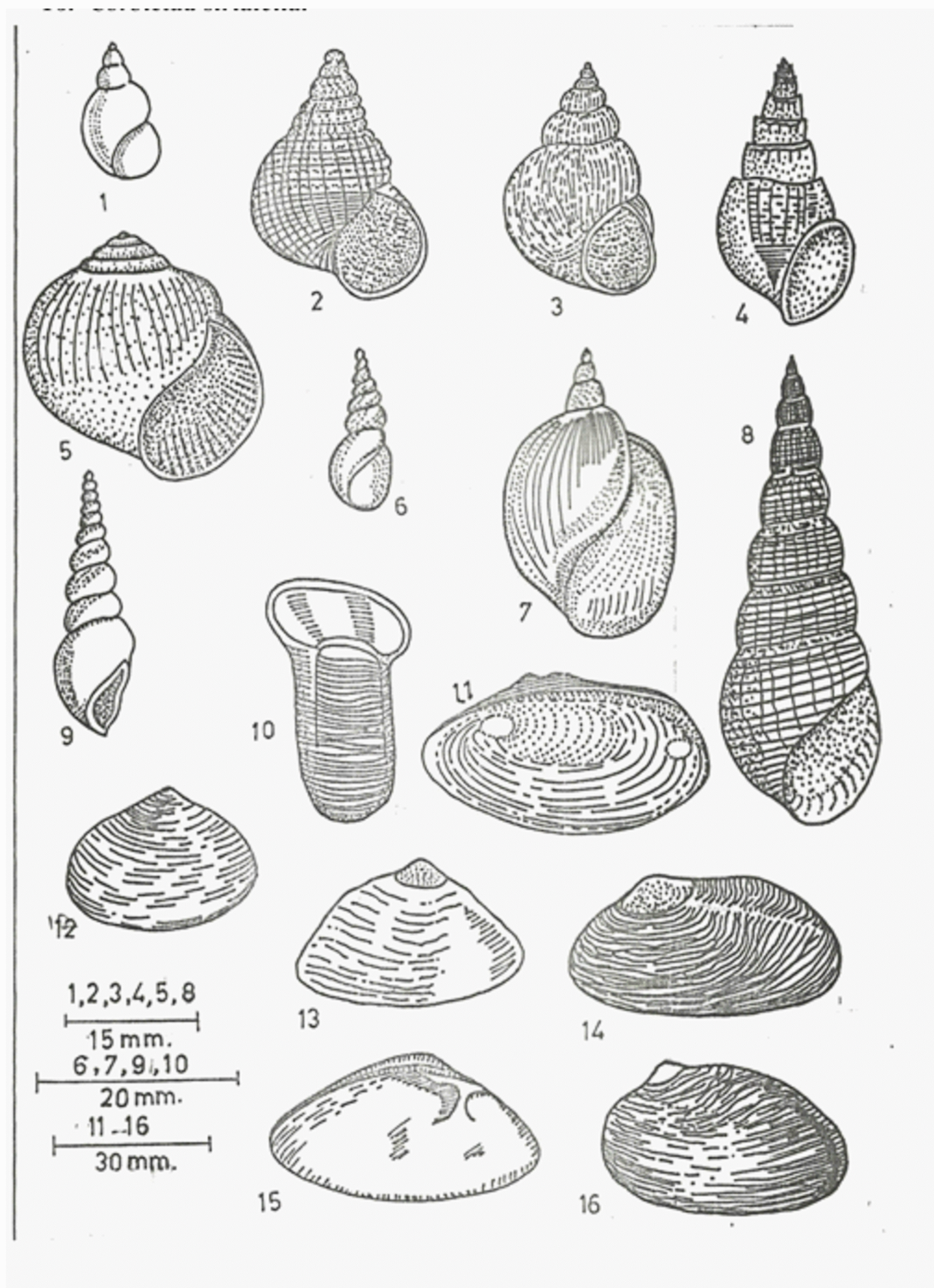


Fig. 2. Vegetation of Mollusca in Wetland of Champaran District near North Bihar (1. *Bellamy a bengalensis*; 2. *Bellamy a bengalensis* f. typical; 3. *Bellamy a dissimilis*; 4. *Pila globosa*; 5. *Tbiara scabra*; 6. *Thiara tuberculata*; 7. *Thiara lineate*; 8. *Brotia cosata*; 9. *Lymanaca accuminata*; 10. *Indoplanorbis exustus*; 11. *Lamellidens marginolis*; 12. *Lamellidens corrianus*; 13. *Parreysia fain dens*; 14. *Parreysia favidens* var. *pinax*; 15. *Parreysia favidens* var. *marcens*; 16. *Corbicida striatella*

The observation reveals that this wetland has potentiality for production of mollusks. The muddy bottom with high organic matter content deposition on the lake bottom is highly favorable for the establishment of Mollusca community in this ecosystem. The water quality of Mollusca fauna, the higher level of conductivity, calcium nitrate and phosphate favor their production and growth as also observed by Dudani et al.(1988). Mollusca production showed inverse relationship with calcium nitrate and phosphate content as the level of these nutrient lower in winter while production of molluscs were higher during these season. On the contrary during summer the level of nutrients in water gradually increased and molluscs population decreased. Dhivaharan (2021) have also reported inverse relationship between molluscs and calcium content of water. During winter molluscan population increases so they utilize the nutrients of water while during summer the Mollusca population decreases due to their decomposition owing to low water level process the nutrients is again released to the water (Subba Rao, 1989). However, during monsoon the lowest Mollusca population recorded may be due to heavy rain fall which disturb the ecosystem and establishes a new ecological niches, for their growth. During monsoon the young stage of Mollusca species were found in abundance as during this season they breed. The dense macrophytic vegetation in this wetland is most suitable for the growth of Mollusca macro invertebrates as they provide food, shelter and differential niches for their propagation and growth.

Conclusion and Implications

Molluscs in Champaran wetlands reflect habitat quality and are sensitive indicators of ecological change. Conservation priorities include protecting macrophyte-rich littoral

zones, reducing siltation and pollution inputs, and integrating mollusc monitoring into wetland management and fisheries planning. Baseline data from this assessment can guide targeted restoration and community-based conservation to sustain wetland biodiversity and livelihoods.

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Phytochemical Profiling and Antioxidant Activity of Pollen grains of *Carthamus tinctorius* L. (Safflower)

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Abstract

Safflower (*Carthamus tinctorius* L.) is a widely cultivated Asteraceae species with well documented uses for its seeds and florets in food, dye, and traditional medicine. Recent interest has turned to less studied tissues such as pollen as potential reservoirs of bioactive compounds. Aim of this manuscript combining safflower phytochemistry and medicinal uses with a detailed, reproducible experimental plan for phytochemical analysis of safflower pollen grains. Our approach is Systematic review of phytochemistry and ethnomedicine, followed by a proposed experimental workflow including sample collection, extraction, qualitative and quantitative assays, chromatographic and spectrometric profiling, and bioactivity screening.

Keywords : *Carthamus tinctorius*, Asteraceae, Pollen grains, Phytochemical Analysis

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Introduction

Safflower is used traditionally for cardiovascular, gynecological, anti inflammatory, and circulatory disorders. Modern phytochemical and pharmacological studies have identified flavonoids, phenolics, fatty acids, and other secondary metabolites in various safflower tissues, which underpin many reported activities (Bai et.al., 2025). There is a Knowledge gap regarding Pollen grains are metabolically active microstructures that often concentrate pigments, volatiles, and defensive metabolites. Despite extensive work on seeds and florets, pollen phytochemistry and its medicinal potential remain undercharacterized (Lamichhane et al., 2022). Therefore, objective of this manuscript is to Review known phytochemicals and medicinal uses of *C. tinctorius* and Provide a validated experimental protocol for extraction and

analysis of pollen phytochemicals.with Recommend bioassays to link chemical profiles to medicinal activities.

Materials and Methods

Sample collection and preparation: Collect pollen from healthy, field grown *C. tinctorius* plants at peak anthesis. Pool pollen from multiple plants to reduce individual variation. Air dry under shade to constant weight, store at 20°C in airtight vials with desiccant (Barhate et.al., 2025). **Extraction strategy:** Sequential solvent extraction: Use solvents of increasing polarity: hexane (nonpolar lipids), ethyl acetate (medium polarity), methanol (polar phenolics/flavonoids), and water (polar polysaccharides). Standardized ratio: 1 g pollen : 20 mL solvent, sonication 30 min, centrifuge, repeat twice, combine extracts, evaporate under reduced pressure. Total protein and carbohydrate: Bradford assay and

phenol-sulfuric acid method respectively. Phytochemical classes likely to be detected are Flavonoids (quercetin and kaempferol derivatives), phenolic acids, terpenoids, small amounts of lipids and proteins, and volatile aldehydes and aromatics. These classes have been reported in safflower tissues and are plausible in pollen (Wu et al., 2021).

Result and Discussion

Safflower preparations are traditionally used to promote blood circulation and treat

ischemic conditions. Modern studies report anticoagulant and cardioprotective effects linked to flavonoids and other phenolics. Ethnomedical applications include treatment of pain and inflammation. Phytochemicals such as flavonoids and terpenoids are plausible active constituents. Traditional use for menstrual irregularities and to promote uterine blood flow is reported in multiple systems of traditional medicine.

Phytochemical analysis table - Carthamus tinctorius (safflower) pollen and related tissues

Phytochemical class	Representative compounds	Extraction solvent(s)	Analytical methods	Reported bioactivities
Flavonoids	Quercetin derivatives; Kaempferol derivatives; Rutin	Methanol; Ethanol; Ethyl acetate	HPLC-DAD; LC-MS/MS; TLC	Antioxidant; anti-inflammatory; cardioprotective
Phenolic acids	Caffeic acid; Gallic acid; Chlorogenic acid	Methanol; Water	Folin–Ciocalteu (TPC); HPLC; LC-MS	Antioxidant; radical scavenging
Terpenoids / Sesquiterpenes	Monoterpenes; Sesquiterpenes; Sterols	Hexane; Ethyl acetate	GC-MS; GC-FID; LC-MS	Antimicrobial; aroma/pollinator cues
Fatty acids / Lipids	Linoleic acid; Oleic acid; Palmitic acid	Hexane; Soxhlet extraction	GC-MS (FAME analysis)	Nutritional value; membrane/stress roles
Volatile aromatics	Benzaldehyde; Hexanal; Terpenoid volatiles	Headspace SPME; Hexane extracts	GC-MS (HS-SPME)	Pollinator attraction; antimicrobial properties

Characterizing pollen phytochemistry fills a botanical and pharmacognostic gap and may reveal tissue specific metabolites with unique bioactivities (Bai et.al., 2025. Use orthogonal analytical platforms (HPLC DAD, LC MS/MS, GC MS, NMR) to ensure comprehensive coverage. Standardize collection time and plant phenology to reduce variability. Prioritize safety profiling and dose response

studies before any human use claims (Fristiohady et.al., 2023; Jadarat et.al., 2024). Consider pollen allergenicity in risk assessments. Comparative studies across cultivars, environmental conditions, and developmental stages; in vivo efficacy and toxicity studies for promising extracts or isolated compounds.

Conclusion

Safflower pollen grains are a promising but understudied source of phytochemicals. A rigorous, multi platform analytical approach combined with targeted bioassays can reveal compounds that support traditional medicinal uses of safflower and identify novel bioactive leads. The proposed experimental workflow provides a reproducible path to characterize pollen chemistry and evaluate medicinal potential.

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Socio-Cultural Values and Maternal Nutrition: Participation of Scheduled Caste Women in Achieving Sustainable Development Goals (A Study in Bhagalpur District)

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Abstract

Indian maternal nutrition is a complicated socio-cultural issue that affects women's health, rights, and socioeconomic standing, especially Scheduled Castes. Adequate maternal nutrition is essential for mother and baby health and development. However, socio-cultural norms, economic adversity, and poor healthcare access strongly influence marginalized mothers' diets. Maternal nutrition is linked to SDGs, Zero Hunger, Good Health, Well-being and Gender Equality. Scheduled Caste women in rural Bhagalpur, Bihar, confront food taboos, limited decision-making power, gender discrimination, poverty, and nutritional ignorance during pregnancy and lactation. These factors prevent them from fully benefiting from government assistance programs including PMMVY, JSY, and Integrated Child Development Services (ICDS) Anganwadi facilities. This study analyses how socio-cultural values affect maternal nutritional behaviour and how Scheduled Caste women might help achieve health, nutrition, and gender equality SDGs. To reduce maternal malnutrition in marginalised groups, the study emphasizes community awareness, women's empowerment, and policy execution. Studies show that enhancing education, health services, and socio-cultural transformation can boost maternal nutrition and sustainable development.

Keywords : Social-cultural values, Scheduled Caste, Sustainable Development Goals, Bhagalpur, maternal nutrition.

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Introduction

Maternal nutrition has a big effect on maternal health, pregnancy outcomes, and child development. Adequate nutrition during pregnancy and lactation not only promotes healthy fetal development but also reduces the risk of maternal illness and mortality (Black et al., 2013). Maternal malnutrition is a significant public health concern in developing countries such as India, particularly among socially

disadvantaged populations, including Scheduled Castes and Scheduled Tribes.

Sociocultural conventions, practices, and gender roles have a big effect on how women eat and how they take care of their health. These cultural behaviours often affect how food is shared in families, how women make decisions about what to eat, and how easy it is to get medical care (Kumar & Gupta, 2019). Pregnant women in rural areas often can't eat certain

foods because of traditional beliefs, which could mean they don't get enough nutrients.

Through a number of social programs and policies, India has worked hard to make mothers healthier. The Pradhan Mantri Matru Vandana Yojana (PMMVY), Janani Suraksha Yojana (JSY), and Integrated Child Development Services (ICDS) are all programs that aim to improve the health and nutrition of mothers. Even with these efforts, there are still differences in maternal health outcomes among marginalised communities.

Women from Scheduled Castes often face several problems, such as being poor, not being able to get to healthcare facilities, being discriminated against in society, and not having many chances to go to school. These social and cultural factors lead to poor mother nutrition and bad pregnancy outcomes.

The United Nations' Sustainable Development Goals (SDGs) provide a global framework for addressing issues related to gender equality, nutrition, and health. SDG aims to eliminate hunger and improve nutrition, SDG focuses on ensuring healthy lifestyles and promoting well-being, while SDG emphasises gender equality and women's empowerment (United Nations, 2015). To reach these global development goals, we need to improve the nutrition of mothers who are on the margins.

Sociocultural norms and financial constraints significantly impact maternal feeding habits among Scheduled Caste women in Bihar's Bhagalpur district. So, to make policies and initiatives that work, you need to know about these sociocultural elements.

Review of Literature

Many researches have shown the relationship between maternal nutrition and socio-cultural

practices in underdeveloped countries. Smith and Haddad (2015) contend that maternal nutritional status directly affects child growth, cognitive development, and long-term health outcomes.

Black et al. (2013) said that roughly 20% of all cases of low birth weight and stunted growth in infants around the world are caused by mothers who don't eat enough. Not getting enough nutrients when pregnant can lead to complications including anemia, giving birth too soon, and poor growth in the womb.

In India, socio-cultural attitudes often prevent pregnant women from eating some nutritious foods, such as eggs, fish, and green vegetables, since they believe that pregnancy is hard (Patel et al., 2016). These kinds of dietary restrictions might make it challenging to receive enough vitamins, iron, and protein, which are all vital nutrients.

Rao et al. (2018) conducted a study demonstrating that women from lower socio-economic backgrounds are more vulnerable to maternal malnutrition due to limited access to healthcare services and inadequate awareness of nutritional requirements.

Studies in Bihar indicate that women, in contrast to Scheduled Castes, typically possessed lower levels of education and diminished autonomy in making decisions regarding their households. This affects their ability to get medical attention and eat healthy foods while pregnant (Kumar & Gupta, 2019).

Government programs like ICDS and JSY have improved institutional deliveries and maternal healthcare services, however not all social classes have profited equally from these programs (NFHS-5, 2021).

So, cultural and social barriers are still a key reason why maternal health and nutrition are terrible in regions that are already poor.

Objectives of the Study

- The main objectives of this research are:
- To examine the socio-cultural factors influencing maternal nutrition among Scheduled Caste women in Bhagalpur district.
- To analyze the level of awareness and utilization of government maternal nutrition programs.
- To study the role of women's participation in improving maternal health and nutrition.
- To explore the relationship between maternal nutrition and the achievement of Sustainable Development Goals.

Research Methodology

This study utilises a descriptive research approach to investigate the socio-cultural variables of maternal nutrition among Scheduled Caste women. The research was carried out in the rural regions of Bhagalpur district, Bihar, where a considerable portion of the population is comprised of Scheduled Caste people. Using purposive sampling, 120 Scheduled Caste women who were pregnant or had just given birth were chosen as a sample. We gathered both primary and secondary data. Structured interviews, questionnaires, and observations were used to get primary data. We got secondary data from government papers, NFHS (2021) data, research journals, and WHO publications.

We used descriptive statistics like frequency distribution and percentages to look at the data we collected. Qualitative analysis was employed to comprehend the socio-cultural influences on maternal nutrition.

Socio-Cultural Factors Affecting Maternal Nutrition

Socio-cultural traditions strongly influence the dietary patterns of women in rural communities. In many households, pregnant women eat last after other family members, which often results in inadequate food intake. Food taboos are common during pregnancy. Certain foods such as papaya, banana, and eggs are sometimes avoided due to cultural beliefs that they may harm the fetus. These misconceptions reduce the intake of important nutrients. Gender inequality is another significant factor affecting maternal nutrition.

Government Programs Supporting Maternal Nutrition

Several government initiatives aim to improve maternal nutrition in India.

Integrated Child Development Services (ICDS), Janani Suraksha Yojana (JSY), Pradhan Mantri Matru Vandana Yojana (PMMVY).

Despite these programs, awareness among Scheduled Caste women remains limited.

Maternal Nutrition and Sustainable Development Goals

Maternal nutrition is directly linked with several Sustainable Development Goals.

SDG 2: Zero Hunger: Ensuring adequate maternal nutrition helps reduce malnutrition and improves food security.

SDG 3: Good Health and Well-being: Improved maternal nutrition reduces maternal mortality and promotes healthier pregnancies.

Results & Data analysis:

No. of respondents (N) = 120

SDG 5: Gender Equality: Empowering women through education and decision-making opportunities enhances their ability to maintain proper nutrition.

Table 1: Dietary Practices During Pregnancy

Dietary Practice	Yes	No	Percentage (%)
Consumption of green vegetables regularly	54	66	45.0
Consumption of milk daily	39	81	32.5
Consumption of eggs	36	84	30.0
Taking iron & folic acid tablets	72	48	60.0
Eating three or more meals daily	58	62	48.3

The table reveals that nutritious food intake is relatively low among respondents. Only 32.5% consumed milk daily and 30% consumed eggs, indicating protein deficiency risks. However, 60% reported taking iron and folic acid tablets,

suggesting moderate utilization of government health services. Cultural food restrictions may explain the limited intake of protein-rich foods.

Table 2: Food Taboos During Pregnancy

Restricted Food Item	Frequency	Percentage (%)
Papaya	74	61.7
Banana	52	43.3
Eggs	46	38.3
Fish	41	34.2
No restrictions	18	15.0

A large proportion of women avoided certain foods due to traditional beliefs. Papaya (61.7%) and banana (43.3%) were the most commonly

restricted foods. Such food taboos can reduce nutrient intake during pregnancy and contribute to maternal malnutrition.

Table 3: Awareness of Government Maternal Health Programs

Government Scheme	Aware	Not Aware	Percentage Aware (%)
ICDS (Anganwadi services)	83	37	69.2
Janani Suraksha Yojana	71	49	59.2
PMMVY	48	72	40.0

Awareness was highest for ICDS services (69.2%), likely because Anganwadi centres are locally available. However, awareness of

PMMVY (40%) was relatively low, suggesting gaps in information dissemination among Scheduled Caste women.

Table 4: Participation in Maternal Health Services

Service Utilization	Frequency	Percentage (%)
Regular antenatal check-ups	67	55.8
Occasional check-ups	33	27.5
No check-ups	20	16.7

Table 5: Relationship Between Education and Maternal Nutrition Awareness

Education Level	High Awareness	Low Awareness	Total
Illiterate	9	33	42
Primary	15	21	36
Secondary	17	11	28
Higher Secondary+	11	3	14
Total	52	68	120

Chi-Square Test

χ^2 calculated = 14.82

df = 3

Critical value (0.05 level) = 7.81

Since $14.82 > 7.81$, the relationship between education and maternal nutrition awareness is statistically significant.

Table 6 : Perceived Barriers to Adequate Maternal Nutrition

Barrier	Frequency	Percentage (%)
Poverty	64	53.3
Lack of awareness	52	43.3
Food taboos	47	39.2
Limited decision-making power	38	31.7
Lack of healthcare access	29	24.2

The most significant barrier was poverty (53.3%), followed by lack of awareness (43.3%) and food taboos (39.2%). These findings highlight that maternal nutrition problems are not only medical but also social and cultural issues.

Overall Findings of the Study

- Maternal nutrition among Scheduled Caste women is influenced by education, cultural beliefs, and economic status (WHO, 2020).

- Food taboos and poverty significantly reduce nutrient intake.
- Government schemes like ICDS and JSY are moderately utilized, but awareness of PMMVY remains low.
- Education significantly improves maternal nutrition awareness, as shown by the chi-square analysis.

These findings support the argument that empowering women through education and community awareness programs is essential for improving maternal nutrition and achieving SDGs.

8. Discussion

The findings of this study highlight that socio-cultural traditions significantly influence maternal nutrition among Scheduled Caste women in Bhagalpur district. Limited education, poverty, and gender discrimination further exacerbate the problem. Although government programs are designed to address maternal health issues, their effectiveness depends on community participation and awareness. Promoting nutrition education, strengthening healthcare infrastructure, and encouraging women's empowerment are essential steps toward improving maternal nutrition.

9. Conclusion

Nutrition is crucial to maternal and newborn health. Scheduled Caste women in Bhagalpur district still struggle to embrace healthy nutritional practices due to socio-cultural views, economic restraints, and lack of information. Multi-dimensional maternal nutrition improvement requires education, healthcare, social empowerment, and government welfare program execution.

Scheduled Caste women's participation in community development can help achieve health, nutrition, and gender equality Sustainable Development Goals. Policymakers, health professionals, and community organisations must work together to improve healthcare access, decrease socio-cultural barriers, and raise awareness.

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वंदे मातरम विवाद : तथ्य और सत्य

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सारांश

बदलते राजनीतिक परिदृश्य में सत्तारूढ़ भाजपानीत गठबंधन अपनी जड़ों को मजबूत करने तथा आगामी चुनावों में मतों के धुवीकरण करने को लेकर राष्ट्रवाद के प्रतीक रहे वंदे मातरम को सरकारी कार्यालयों, संस्थानों में राष्ट्रगान के साथ तीन मिनट का पूर्ण गायन की अनिवार्यता को लेकर जो दिशा-निर्देश जारी किया है उसे लेकर विपक्षी दलों, बुद्धिजीवियों, शिक्षाविदों, मुख्यधारा के पत्रकारों और आमजन में पुनः एक नई बहस छिड़ गयी है। विदित हो कि इसके निहितार्थ काफी गहरे हैं। भाजपा का पितृ संगठन राष्ट्रीय स्वयं सेवक संघ तथा पूर्ववर्ती हिंदू महासभा की वैचारिकी का संयुक्त तथा समन्वित दृष्टिकोण समय-समय पर अपनी बातें मजबूती से राजनीतिक पटल पर रखते आया है, भले ही यह संविधान सम्मत नहीं हो। देशहित के जरूरी मुद्दों यथा-सतत् विकास वैज्ञानिक दृष्टिकोण, गुणवत्तापूर्ण शिक्षा, उच्चकोटि के स्वास्थ्य सेवा की सार्वभौमिक उपलब्धता, बढ़ती आर्थिक असमानता, जनाधिक्य की समस्या, विश्वस्तरीय शैक्षिक व अनुसंधान प्रतिष्ठानों की स्थापना आदि को छोड़कर अनावश्यक रूप से वंदे मातरम नारे के पवित्र भाव को तूल देने का कोई मतलब नहीं है। इसी से जुड़ा ध्वज यात्रा (कन्याकुमारी से कश्मीर) भी है। भारत का राष्ट्रीय स्वतंत्रता संग्राम अपनी विविधता तथा बहुआयामी सांस्कृतिक दृष्टिकोण के कारण विश्व इतिहास में अन्यतम स्थान रखता है। इस आंदोलन के दौरान अनेक नारे गढ़े गए जो भारतीय जनमानस को प्रतिबिंबित करते हैं।

बीज शब्द:- देशभक्ति, राष्ट्रवाद, वंदे मातरम, तर्कशीलता गदर, नफरत, समन्वय, संकल्प

एक ऐतिहासिक तथ्य है कि जब राजनीतिक सत्ता डगमगाती अथवा कमजोर होती है तब वह धर्म और राष्ट्रवाद का सहारा लेती है। मौजूदा राजनीतिक संदर्भ में भी यह बात पूरी तरह परिलक्षित होता है। वर्तमान संसदीय लोकतंत्र झंझावातों का सामना कर रहा है। स्वस्थ बहस, असहमति, संवाद जैसे तत्व धूमिल पड़ गए हैं। सत्ता पक्ष को विपक्ष शत्रूत नजर आने लगा है। जिसका कोई औचित्य नहीं है। लोक राजनीति तथा नागर समाज के लोग मसलन-कवि साहित्यकार, शिक्षक, रंगकर्मी, लेखक, सामाजिक कार्यकर्ता आदि का राजनीति में सकरात्मक हस्तक्षेप पूर्व की तुलना में कम हुआ है। इस क्रम में कईयों ने शासन के दमन को बर्दाश्त किया तथा कईयों ने अपनी जानें दी। इनमें तर्कवादी गोंविंद पानसारे, नरेंद्र दाभोलकर उल्लेखनीय हैं। भारतीय उपनिषद परंपरा में तर्कशीलता को लेकर खूब चर्चाएं हुई हैं।

नोबेल पुरस्कार विजेता अमर्त्य सेन की पुस्तक तर्कशील भारतीय इसी की कड़ी है। लोकतंत्र की आत्मा न्यायालय, के कुछ फैसलों ने इसकी निष्पक्ष भूमिका पर गंभीर सवाल खड़े किए हैं। यू.ए.पी.ए. के तहत उमर खालिद, शरजील इमाम, सुधा भारद्वाज, नताशा नरवाल जैसे लोगों के लेखन, भाषण को साजिश के आधार पर लंबे समय तक जेल में रखा गया। इसके विपरित हत्या और बलात्कार के आरोप में सजा पाने वाले गुरुमीत राम रहीम को अनेक बार पैरोल पर जेल से बाहर आया। कुलदीप सेंगर जैसे दोषी को मुआवजे के बाद रिहा किया गया। ऐसे उदाहरण कानून की एकरूपता को नहीं दर्शाते हैं।

देशभक्ति और राष्ट्रवाद: देश प्रेम और राष्ट्रवाद बुनियादी रूप से अलग-अलग है। देशप्रेम अपने देश की सीमाओं

उसके संविधान से प्रेम, देश के कल्याण के प्रति समर्पण भाव आदि को इंगित करता है। यह अंतरतम से उत्पन्न होने वाली चेतना को भी निरूपित करता है; वहीं राष्ट्रवाद विशिष्ट लोगों का वैसा समूह जो अपने इतिहास परंपरा, भाषा, जातीयता एवं संस्कृति के आधार पर एकीकृत करता है। पुनः एक देशभक्त जब अंधश्रद्धा, अंधभक्ति का अनुसरण करने लगता है तब वहाँ राष्ट्रवाद का जन्म होता है। इसके अंतर्गत हम श्रेष्ठ हैं कि भावना के आगे तर्कसम्मत विचारों का कोई स्थान नहीं होता। इतिहास गवाह है कि राष्ट्रवाद के ज्वार में बहकर मानव जाति दो महायुद्ध सहित कई युद्धों की मर्मन्तक पीड़ा झेल चुकी है। राष्ट्रवाद के साथ पूँजीवाद का घनिष्ठ संबंध है। इस परिप्रेक्ष्य को डॉ.बी.आर. अम्बेडकर ने आम जनता के लिए घातक बताया है। इस प्रकार देशभक्ति की उदात्त भावना राष्ट्रवाद से श्रेयस्कर है।

1857 के गदर का सुनहरा अध्याय: भारत में ब्रिटिश सत्ता के खिलाफ पहली और मजबूत चुनौती 1857 के गदर के दौरान देखने को मिलता है जब हिंदु-मुस्लिम एकता की विराट उपस्थिति ने ब्रिटिश शासन को जड़ से हिला दिया था। य बात अलग है कि अपनी सैन्य ताकत, कूटनीति तथा संचार व्यवस्था के बूते ब्रिटिशों ने भारतीय विद्रोह का सफलता पूर्वक दमन कर अपनी नीति में व्यापक परिवर्तन करते हुए बाँटो और राज करो के फलासफा (दर्शन) को अपनाया था। स्मरणीय रहे कि गदर के दौरान केवल दिल्ली में 27000 (सत्ताइस हजार) मुस्लिमों को फाँसी दी गयी थी। इसी समय क्रांतिदूत अजीमुल्ला खाँ ने मादरे वतन का नारा दिया था। एक सफल विद्रोह के उपरांत उनका लक्ष्य धर्मनिरपेक्ष भारत का निर्माण था। उन्होंने 'पयाम ए आजादी' अखबार निकाला जो उर्दू हिंदी व मराठी में छपा। अजीमुल्ला के नारे में मातृभूमि के प्रति सम्मान का भाव कूट-कूट कर भरा हुआ था। आगे चलकर हसरत मोहनी ने इंकलाब जिंदाबाद का नारा दिया जिसे शहीद ए आजम भगत सिंह ने नई ऊँचाई दी। माँ भारती या भारत माता का संदर्भ पंडित नेहरू के 1936 के उत्तर प्रदेश के एक सार्वजनिक सभा में मिलता है। जब उन्होंने श्रोताओं से कहा-बेशक ये पहाड़

और नदियाँ, जंगल और मैदान सबको प्यारे हैं, लेकिन जो बात जानना सबसे जरूरी है वह यह कि इस विशाल भूमि में फैले भारतवासी सबसे ज्यादा मामले रखते हैं। भारत माता यही करोड़ों-करोड़ों जनता है और भारत माता की जय उसकी भूमि पर रहने वाले इन सबकी जय है। हिंदी कवि सुमित्रानंदन पंत द्वारा रचित 'भारतमाता ग्रामवासिनी' परतंत्रता काल की एक देशभक्ति पूर्ण कविता है। इसमें कवि ने भारत के ग्रामीण जीवन, गरीबी और भारत माता के शोषित स्वरूप का यथार्थ चित्रण किया है।

नेताजी सुभाष चंद्र बोस द्वारा किदया गया जय हिंद का नारा आज भी जन-मन में ऊर्जा के साथ समाहित है।

वंदे मातरम विवाद के विंदू:-सबसे पहले तो पूरा गीत संस्कृतनिष्ठ बांग्ला भाषा में है जो आम जन व अल्प शिक्षित बहुलांश आबादी द्वारा उच्चारित करने में कठिनतर है। यह गीत बंकिम चंद्र चटर्जी द्वारा रचित आनंद मठ उपन्यास से लिया गया है जिसमें मुस्लिमों को शत्रू बताया गया है जबकि जंग ए आजादी में इनके अवदान को नकारा नहीं जा सकता हैं। इस गीत में देवी वंदना है जो मुस्लिम समाज के एक बड़े वर्ग को धार्मिक कारणों से पसंद नहीं है। बंग-भंग (1905) के बाद इस गीत ने यदा-कदा साम्प्रदायिक रूख अख्तियार कर लिया था। 07 नवंबर 1875 को वंदे मातरम का प्रथम बार गायन हुआ और पहली बार 'बंग दर्शन' पत्रिका में इसका प्रकाशन हुआ। 1896 के कांग्रेस अधिवेशन में गुरुदेव टैगोर ने वंदे मातरम के प्रथम दो छंदों का गायन किया था। कांग्रेस ने अपने 50वें अधिवेशन फैजपुर में इस गीत के धार्मिक संदर्भों को हटाकर प्रथम दो छंद को सर्वस्वीकृति से अपनाया। स्वतंत्रता संग्राम के विभिन्न पड़ावों पर यह गीत क्रांतिकारियों के ओज भाव को प्रदर्शित करता रहा। नवंबर 2022 में दिल्ली उच्च न्यायालय में सरकार ने एक हलफनामा दायर किया जिसमें कहा गया कि राष्ट्रगान तथा वंदे मातरम का स्तर एक ही होगा जबकि संविधान में इस बाल का स्पष्ट उल्लेख नहीं है। देशभक्ति को परिभाषित करने के लिए वंदे मातरम के उद्घोष को अपरिहार्य बनाना समझ से परे है। देशभक्ति दिखावे की

वस्तु नहीं है। राष्ट्रवाद की भावना नारों बिंबो, प्रतीकों और ऐतिहासिक कथानकों की जरूरत महसूस करती है। करोड़ों लोगों अपने-अपने ढंग से देश की सेवा कर रहे हैं जिसे देशभक्ति की श्रेणी में ही रखा जाना चाहिए। आजादी से पूर्व ब्रिटिश शासन के खिलाफ लड़ाई तथा आजादी पश्चात् संविधान के प्रति सम्मान व अनुपालन ही असल में देशभक्ति ही है। संघ का मुख्यपत्र आर्गेनाइजर 30 नवम्बर 1949 के अंक में छापा कि यह संविधान अभारतीय है इसके बदले मनुस्मृति के मूल्य लागू होने चाहिए। पुनः 1937 में द्विराष्ट्र का सिंद्धात देने वाले विनायक सावरकर एकरंग वाले भगवा को पवित्र बताया। हिंदुत्व के पैरोकारों ने राष्ट्रीय आंदोलन से दूरी बनाने हुए, ब्रिटिशों की हर संभव मदद की। संघ के कार्यालय में 52 वर्षों तक तिरंगा नहीं फहराया गया। हिन्दु महासभा ने तब तीन प्रान्तों में मुस्लिम लीग के साथ मिलकर सरकार बनायी। वर्तमान में देश में भाईचारा, अखंडता खंडित करना, चुनावी लाभ हेतु नेताओं के जहरीले वक्तव्य, समुदाय विशेष को प्रताड़ित कहाँ की देश भक्ति है। इस मानसिकता से शीघ्रतिशीघ्र उबर जाना देशहित में बेहतर कदम साबीत हो सकता है। सत्ता प्रतिष्ठान द्वारा धार्मिक अतिवादिता तथा राजनीतिक प्रभूत्व को समुदाय विशेष के प्रति सुनियोजित राणनीति जिसमें नफरत, कुंठा व हिंसा का समावेश है, कहीं से भी लोकतांत्रिक मर्यादाओं के अनुरूप नहीं है। देश में धार्मिक मुद्दों से बड़ी बात जातिगत दुर्भावना की है जिसे दूर करना ज्यादा जरूरी है। मध्यकालीन इतिहास के पाठ्यक्रम से कई अध्यायों को हटाना, काँट-छाँट करना दरअसल मुस्लिम शासन व्यवस्था और संस्कृति को नजरअंदाज करने से है जबकि यह काल व्यापक रूप से सांस्कृतिक आदान-प्रदान एशियाई कला कौशल के अद्वितीय समन्वय के मील का पत्थर है।

विकसित भारत का संकल्प: आज जब सकल घरेलू उत्पाद का 2 प्रतिशत शिक्षा-स्वास्थ्य पर खर्च हो, खेती-किसानी पर 2.7%, चौथी बड़ी वैश्विक अर्थव्यवस्था पर GDP का 55% कर्ज, कुपोषण से ग्रसित आबादी का बड़ा हिस्सा। आबादी के 01 प्रतिशत लोगों के पास कुल संपदा का 40%

एकत्रण गरीबी, सर्वाधिक निरक्षर आबादी, भ्रष्टाचार का बढ़ता दायरा, वैज्ञानिक अनुसंधान में कमी तथा राजनैतिक परिवेश में असहमति को नकारने जैसी प्रवृत्ति की बढ़त है। ऐसे में 2047 में विकसित भारत का संकल्प कैसे पूरा होगा - यक्ष प्रश्न है?

अतएव, देश के विकास में समग्रता और नैरंतर्य हेतु भारतीय राजव्यवस्था के सामाजिक समरसता के साथ आग बढ़ने की जरूरत है तभी सबका साथ सबका विकास के मंत्र को अमली जामा पहनाया जा सकेगा।

संदर्भ

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