

## ETHICAL AND SUSTAINABLE PRACTICES IN THE NUTRITION INDUSTRY: INNOVATIONS AND FUTURE GROWTH

### Abstract

**Background:** As India progresses towards its vision of Viksit Bharat @2047, the nutrition industry faces increasing pressure to adopt ethical and sustainable practices. This review examines the current state of the industry, explores recent innovations, and projects future growth trends aligned with ethical and sustainability goals.

**Aims:** The specific objectives of this review are to analyse the ethical challenges and sustainability issues prevalent in the nutrition industry, to identify and evaluate innovative practices and technologies promoting sustainability and ethical standards and further to predict future trends and growth opportunities in the nutrition sector within the framework of Viksit Bharat @2047.

**Methodology:** A comprehensive review of literature from academic journals, industry reports, and policy documents was conducted. Case studies of companies were reviewed, best practices implemented by the companies were analysed to provide a holistic view of the current and future landscape.

**Results:** The review identifies several key areas of ethical concern, including labour practices, sourcing of raw materials, and transparency and ethical responsibilities in labelling. Innovations such as plant-based proteins, sustainable packaging, and blockchain for supply chain transparency have shown significant potential. The industry is also seeing a shift towards localized production and circular economy models. Projections indicate robust growth driven by consumer demand for ethically produced and environmentally sustainable products.

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**Conclusion:** The nutrition industry in India is at a pivotal point where ethical and sustainable practices are not only a moral imperative but also a strategic advantage. Innovations in technology and changes in consumer behaviour are accelerating this shift. By embracing these changes, the industry can contribute significantly to India's vision of Viksit Bharat @2047, ensuring a healthier population and a sustainable future.

**Keywords:** Ethical Practices, Sustainable Nutrition, Innovations in Nutrition, Future Growth, Viksit Bharat @2047, Sustainable Development

## I. INTRODUCTION

The nutrition industry plays a pivotal role in shaping public health and socio-economic development (FAO, Muonde et al., 2024). In a country like India, where diverse dietary practices coexist with significant nutritional challenges, the importance of ethical and sustainable practices in the nutrition industry cannot be overstated (Namkhah et al., 2023). As India strives towards achieving its vision of Viksit Bharat @2047, a developed and prosperous nation, the need for a robust, ethical, and sustainable nutrition sector becomes even more critical.

Viksit Bharat @2047 envisions a future where economic growth, social justice, and environmental sustainability are harmoniously balanced. Within this framework, the nutrition industry must address several pressing issues, including malnutrition, food security, and environmental sustainability. Ethical considerations, such as fair labour practices, equitable resource distribution, and transparency in operations, are equally crucial.



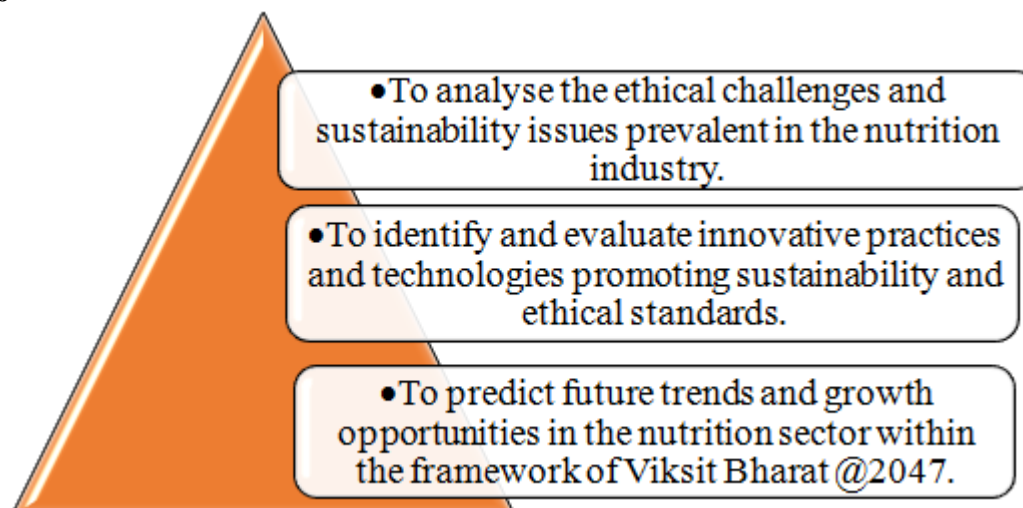
**Figure 1:** Logo of Viksit Bharat Abhiyaan by GOI

### 1. Background and Rationale

India is at a crossroads in its development journey, facing both opportunities and challenges in its nutrition sector (Prakash & Shanmugan, 2019). The country's population is expected to reach 1.5 billion by 2047, significantly increasing the demand for nutritious and safe food (Ministry of Commerce and Industry, 2023). At the same time, India grapples with high rates of malnutrition, including both undernutrition and rising obesity rates. These dual burdens of malnutrition necessitate innovative and sustainable solutions that can provide equitable access to healthy food for all segments of the population (Singh et al., 2023).

Furthermore, the global shift towards sustainability has highlighted the environmental impact of food production. Traditional agricultural practices contribute to deforestation, water scarcity, and greenhouse gas emissions, exacerbating climate change (Ritchie et al., 2022). The nutrition industry must, therefore, evolve to adopt practices that minimize environmental harm and promote sustainability.

## 2. Objectives



**Figure 2:** Objectives of the study

## 3. Methodology

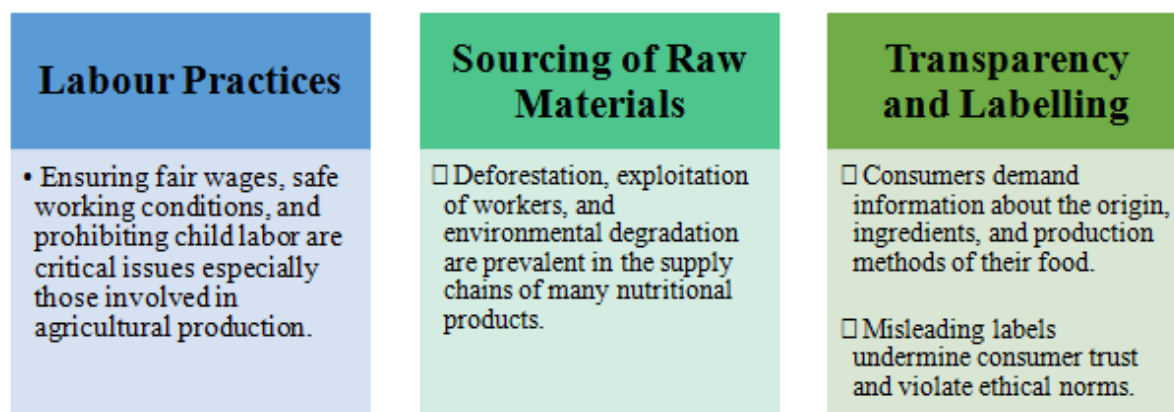
The methodology for review involved a comprehensive and scientific approach to analyze the current state, innovations, and future growth trends in the nutrition industry with a focus on ethical and sustainable practices. A thorough literature review was conducted to gather existing knowledge and insights on ethical and sustainable practices within the nutrition industry. Peer-reviewed articles from databases such as PubMed, ScienceDirect, and Google Scholar were reviewed to identify key themes, trends, and findings related to ethical and sustainable practices in the nutrition industry. Reports from Food and Agriculture Organization (FAO) and industry-specific publications in the field of Food Science and Technology provided insights into global and regional trends. National and International policy documents, guidelines, and frameworks were examined to understand regulatory and policy-driven initiatives promoting sustainability and ethical standards.

## II. RESULTS

By employing this comprehensive methodology, the review provides a detailed and nuanced understanding of the ethical and sustainable practices in the nutrition industry, identifying both current challenges and future opportunities aligned with the vision of Viksit Bharat @2047.

### 1. Ethical Challenges in the Nutrition Industry

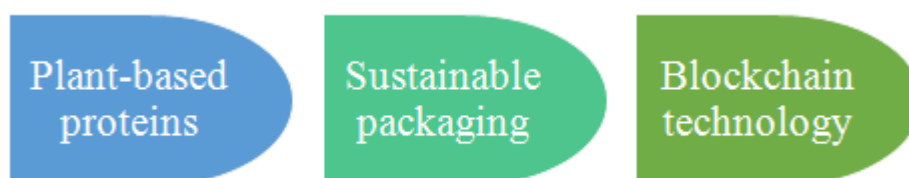
The nutrition industry is fraught with various ethical challenges that must be addressed to ensure fair and just practices:



**Figure 3:** Ethical Issues in Nutrition Industry (Rucker & Rucker, 2016; Food-Recruit; FAO)

## 2. Innovations and Technological Advancements

The nutrition industry is undergoing a transformative phase, driven by innovations and technological advancements aimed at promoting sustainability and ethical standards. These innovations not only address pressing environmental concerns but also cater to the growing consumer demand for ethical and sustainable products.



**Figure 4:** Three significant areas of innovation in the nutrition industry

- a. **Plant-Based Proteins:** Plant-based proteins require significantly fewer natural resources compared to animal proteins. For instance, producing plant-based proteins consumes less water and land, and generates lower greenhouse gas emissions. The cultivation of plants for protein emits fewer greenhouse gases than raising livestock (Arora et al., 2023). This shift can substantially reduce the overall carbon footprint of the food industry. They also come with added health benefits, such as being lower in saturated fats and free from cholesterol. Companies are investing in research and development to create plant-based protein products that mimic the taste, texture, and nutritional profile of animal-based products. Innovations include the use of novel plant sources like peas, lentils, chickpeas, and even algae and fungi, which are rich in protein and environmentally sustainable (Tahir et al., 2023).
- b. **Sustainable Packaging:** Traditional plastic packaging contributes significantly to environmental pollution and landfill waste. Sustainable packaging solutions aim to reduce this impact by using materials that are biodegradable, compostable, or recyclable (Song et al., 2009). Research is being conducted on alternative materials such as bioplastics, derived from renewable sources like corn starch, and other natural

fibres that can decompose more easily than conventional plastics. These materials break down naturally over time, reducing the long-term environmental impact. They are often made from plant-based sources, such as polylactic acid (PLA) derived from corn (Moshood et al., 2022). Innovations in recyclable packaging include improved designs and materials that are easier to recycle, ensuring that packaging can be reprocessed into new products rather than ending up in landfills. Development of edible packaging made from natural ingredients, which can be consumed along with the food product, eliminating waste entirely. These initiatives are often part of broader corporate social responsibility (CSR) goals.

- c. **Blockchain Technology:** Blockchain technology enables detailed tracking of products through every stage of the supply chain. Each transaction or movement of the product is recorded in a secure, immutable ledger, providing complete traceability from farm to table. By offering transparent and verifiable information about the origin, handling, and journey of food products, blockchain helps build consumer trust and ensures adherence to ethical standards. Blockchain can be used to verify certifications such as organic, fair trade, and non-GMO, ensuring that products meet specified ethical standards. This verification is particularly important in preventing fraud and ensuring authenticity (George & Al-Ansari, 2023). The immutable nature of blockchain records means that any unethical practices or deviations from standards can be easily identified and addressed, promoting higher accountability among suppliers and manufacturers.

### III. CONCLUSION

The innovations in plant-based proteins, sustainable packaging, and blockchain technology are reshaping the nutrition industry, driving it towards a more sustainable and ethical future. These advancements not only mitigate environmental impact but also align with the evolving expectations of consumers and regulatory bodies. By adopting these innovations, the nutrition industry can significantly contribute to the vision of Viksit Bharat @2047, fostering a healthier population and a sustainable environment. The industry is also witnessing several innovations aimed at promoting sustainability and ethical standards such as shifting towards localized production and adopting circular economy models are crucial strategies for achieving sustainability:

The future of the nutrition industry in India is promising, driven by several key trends. Increasing consumer awareness and demand for ethically produced and environmentally sustainable products are compelling companies to innovate and adopt ethical practices. Advances in technology are facilitating the development of sustainable solutions, such as precision agriculture and innovative food processing techniques. Government policies and regulations are increasingly supportive of sustainable practices, providing incentives for sustainable farming, regulating labelling, and promoting research and development in sustainable technologies.

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