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# Plant-based protein foods as a solution to combat lifestyle diseases

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## Abstract

Type 2 diabetes, obesity, and cardiovascular disorders are among some of the lifestyle diseases that have spread throughout the world and are frequently connected to dietary choices. The potential of plant-based protein foods in preventing these illnesses is examined in this review. The health effects of plant-based proteins on people, their acceptance in different cultures, especially in Asian nations, and their effects on the environment were studied by analysing research conducted between 2015 and 2021. According to research, plant-based proteins may be very important for advancing sustainability and health.

## 1. Introduction

Over the past few decades, lifestyle diseases, also referred to as non-communicable diseases, have become a significant global health concern. Poor dietary habits are the most important modifiable risk factor for the rising prevalence of conditions like cardiovascular diseases, type 2 diabetes mellitus, obesity, hypertension, and some types of cancer. The prevalence of these chronic conditions has increased, particularly among urban and transitioning rural populations, due to sedentary lifestyles and rising consumption of high-calorie, processed, and animal-based foods.

As a result, plant-based diets, especially those that emphasize plant-based protein sources like legumes, nuts, seeds, whole grains, and soy products, have drawn increasing scientific and public attention. These foods are relatively low in saturated fat and cholesterol and high in phytonutrients, unsaturated fats, antioxidants, and dietary fibre. When included in structured dietary patterns, plant-based protein sources, as opposed to those derived from animals, have demonstrated promise in both preventing disease and aiding in the reversal of pre-existing metabolic conditions.

Asia provides a distinct viewpoint because of its deeply ingrained culinary traditions and primarily plant-based dietary practices. Traditional plant-forward eating habits are still common in many Asian countries, despite economic growth and the dietary westernization that has resulted. This offers a fertile ground for furthering the adoption of plant-based protein diets both as a return to tradition and a scientifically supported health strategy.

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Plant-based diets are becoming more widely acknowledged for their beneficial effects on the environment in addition to their health benefits. One of the main causes of greenhouse gas emissions, deforestation, water scarcity, and biodiversity loss is livestock farming. Therefore, switching to more sustainable plant-based protein sources can help both improve human health and reduce environmental degradation.
But there are a number of difficulties. There are sociocultural, sensory, financial, and informational barriers to the shift to plant-based protein consumption, particularly in populations used to animal-based diets. In addition to individual dietary decisions, systemic support through policy, industry innovation, education, and cultural integration is necessary for such a shift to be successful.

The goal of this review is to compile the most recent research on the topic of plant-based protein foods' potential to treat lifestyle diseases, spanning the years 2015 to 2021. It also examines consumer acceptance patterns in Asian and global contexts and examines the environmental advantages of a plant-based protein-based diet. This article aims to educate health professionals, researchers, policymakers, and the food industry about the comprehensive benefits of plant-based protein foods by offering an interdisciplinary perspective that encompasses nutrition science, public health, environmental sustainability, and cultural trends.

## 2. Objectives

• To evaluate how eating plant-based protein affects lifestyle diseases.
• To assess how well plant-based proteins are embraced and assimilated into Asian cultures.
• To examine how switching from animal-based to plant-based protein sources will affect the environment.

## 3. Methodology

With an emphasis on peer-reviewed publications released between 2015 and 2021, a systematic review was carried out. The following keywords were used to search databases like PubMed, ScienceDirect, and Scopus: "plant-based protein," "lifestyle diseases," "Asia," "consumer acceptance," and "environmental impact." Relevance, sample size (ideally large-scale studies), and methodological rigor were also taken into consideration when choosing the studies.

## 4. Literature review

### 4.1 *Plant-Based Diets and Lifestyle Diseases*

The benefits of plant-based diets for health have been highlighted by numerous studies. Diets that prioritize plant-based protein sources have been shown to dramatically lower the risk of non-communicable diseases (NCDs), including obesity, type 2 diabetes, cardiovascular disease (CVD), and some types of cancer, according to research done on a variety of populations.

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Following a nutritious plant-based diet was linked to a significantly lower risk of type 2 diabetes, according to a prospective cohort study by Satija et al. (2016) that examined data from over 200,000 people in the United States. Similarly, research that has been published in journals such as JAMA Internal Medicine and The Lancet has shown that substituting plant protein for animal protein improves glycemic control, lowers inflammation, and improves lipid profiles (Song et al., 2016). Higher consumption of legumes, nuts, and whole grains , important sources of plant proteins—was inversely correlated with all-cause mortality, according to a meta-analysis by Kim et al. (2019) that included more than 30 studies and more than 2 million participants worldwide. The data suggests that replacing red and processed meats with plant proteins has especially significant advantages.

4.2 *Asian Context: Traditional and Modern Shifts*

Many traditional Asian diets, including Chinese Buddhist cuisine, Japanese washoku, and Indian thali, are either entirely plant-based or contain plant-forward foods. Nuts, tofu, pulses, and tempeh are staple protein sources in these diets. Epidemiological research from Southeast Asia, Japan, and India has revealed that populations that eat fewer processed plant-based foods have lower rates of noncommunicable diseases. Globalization and fast urbanization, however, have caused a shift in nutrition in a number of Asian nations. Particularly in cities, traditional foods are gradually being replaced by Western-style diets that are heavy in processed meats, refined carbs, and sugary drinks (Popkin et al., 2017). The increasing prevalence of lifestyle diseases, particularly in China, India, and Southeast Asian countries, has coincided with this change. Nevertheless, plant-based eating has regained popularity in Asia as a result of recent initiatives and public awareness campaigns. Plant-based diets are becoming more popular in South Korea, according to a study by Lee et al. (2020), which was aided by government health promotion programs and an increase in the sales of vegan products.

4.3 *Nutritional Adequacy of Plant-Based Proteins*

Recent research has addressed concerns about the sufficiency of plant-based protein, specifically with regard to essential amino acids. It is now widely known that even for athletes and older adults, a varied plant-based diet can satisfy all protein needs (van Vliet et al., 2020). Complete protein profiles can be obtained from grain and legume combinations, and micronutrient issues (like B12, iron, and calcium) can be addressed by fortified plant-based foods. According to a 2016 position paper by the Academy of Nutrition and Dietetics, vegetarian and vegan diets that are properly planned provide enough nutrients for all phases of life, including pregnancy, infancy, and sports performance.

4.4 *Consumer Acceptance and Behavioral Studies*

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Research on consumer behavior paints a nuanced picture of acceptance that is impacted by socioeconomic variables, food literacy, cultural norms, and taste preferences. According to a cross-national survey done in China, Vietnam, and India (Chen et al., 2018), most respondents said they would be open to plant-based foods if they were convenient, tasty, and reasonably priced.

The idea that meat is necessary for strength, the idea that plant-based foods are bland, and ignorance of the negative effects on one's health and the environment are some of the obstacles to adoption. On the other hand, motivations include religious convictions, environmental awareness, health issues, and celebrity influence.

In urban India, Shaik and Sultana (2022) noted a surge in plant-based food startups and greater interest in flexitarianism among the educated middle class. This trend mirrors patterns seen in the West, where "plant-preferred" eating is marketed as aspirational and health-promoting.

4.5 *Environmental Impacts of Plant-Based Diets*

It is commonly known that plant-based protein sources are good for the environment. Compared to animal products, pulses, nuts, and soy-based products have substantially lower greenhouse gas emissions, land use, and water consumption, according to Life Cycle Assessment (LCA) studies (Poore & Nemecek, 2018). For instance, compared to beans or lentils, the production of beef produces up to 20 times as many greenhouse gas emissions per gram of protein. Widespread adoption of plant-based diets could cut agricultural greenhouse gas emissions by over 50% while freeing up land for biodiversity preservation or reforestation, according to a 2019 study by Eshel et al. The environmental case for plant-based diets is particularly compelling in Asia, where land degradation and water scarcity are major problems. Because of its low resource footprint and nitrogen-fixing qualities, which enhance soil health, the Food and Agriculture Organization (FAO) has encouraged the cultivation of legumes in South and Southeast Asia.

***Key Insights from Literature***

The health outcomes of the plant based foods are reduced risk of NCDs, improved biomarkers, lower mortality rates. As per the Asian context, it was found that there are strong cultural roots in plant-based diets and there is rising interest about these diets amid urbanization. Keeping in view the nutritional adequacy in mind, diverse plant-based diets meet protein needs; concerns are addressable. The consumer behaviour indicated a mixed acceptance and there is growing trend of these diets in urban centers and is influenced by health and media. The environmental impacts include lower emissions, reduced land and water use which is essential for sustainable food systems.

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## 5. **Results and Discussion**

With an emphasis on both global and Asian contexts, this section summarizes the results of an extensive review of scientific studies (2015–2021) addressing the effects of plant-based protein foods on human health, environmental sustainability, and cultural acceptance.

### 5.1 *Health Impacts of Plant-Based Protein on Lifestyle Diseases*

Strong links between eating plant-based protein and a lower incidence of lifestyle diseases have been found in numerous extensive epidemiological studies and clinical trials:

5.1.1 *Cardiovascular Health*: Schwingshackl et al. (2017) conducted a meta-analysis of over 400,000 participants and discovered that a higher intake of nuts, soy, and legumes was significantly linked to a lower risk of coronary heart disease and lower LDL cholesterol.

5.1.2 *Type 2 Diabetes*: Satija et al. (2016) reported that adherence to a healthful plant-based diet resulted in a 34% lower risk of developing type 2 diabetes. Mechanisms include improved insulin sensitivity and reduced systemic inflammation.

5.1.3 *Obesity and Weight Management*: A study from the Adventist Health Study-2 cohort (Tonstad et al., 2013) found that vegetarians, especially vegans, had significantly lower BMI and reduced incidence of obesity-related conditions.

5.1.4 *Cancer Prevention*: The EPIC-Oxford study (Key et al., 2014) found lower rates of gastrointestinal cancers in those following vegetarian diets, which are high in fiber and phytochemicals.

These results suggest that replacing animal proteins with plant proteins not only reduces disease risk but may also be effective in managing existing conditions, particularly when combined with lifestyle interventions like physical activity.

### 5.2 **Acceptance and Cultural Trends in Asia**

While plant-based eating has deep roots in many Asian traditions, modern consumer preferences show a complex trend:

5.2.1 *High Acceptance in Traditional Diets*: In countries like India, Indonesia, and Thailand, legumes, soy products, and pulses have historically been staple proteins. For example, India's vegetarian population, estimated at 30–40%, relies heavily on lentils, chickpeas, and soy-based foods.

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5.2.2 *Modernization and Dietary Shifts*: Urbanization and western influence have led to increased consumption of fast foods and animal proteins. The Chinese Nutrition and Health Survey (2015–2020) showed a marked increase in meat consumption in urban areas.

5.2.3 *Emerging Urban Plant-Based Movement*: Despite this shift, urban populations in India, South Korea, and Singapore are now showing renewed interest in plant-based diets and increase in demand for plant-based meat alternatives in Indian metros within two years.

Common motivators include health awareness, religious beliefs, environmental concerns, and social media influence. However, barriers include perceived lack of taste, protein quality doubts, and limited product availability in rural regions.

5.2.4 *Nutritional Quality and Public Perception:* The perception that plant-based proteins are "incomplete" is increasingly being challenged:

**Complete Protein Profiles**: Dietetic authorities affirm that combining grains and legumes provides all essential amino acids. Popular combinations such as rice and beans, hummus and whole wheat pita, or dal and chapati are nutritionally robust.

**Supplementation**: Fortification with B12, iron, and calcium, along with use of fermented foods (e.g., tempeh, miso), can mitigate nutritional deficiencies.

**Athletic Performance**: New studies suggest that plant-based diets support high levels of athletic performance, with growing numbers of elite athletes adopting vegan or vegetarian regimens (Lynch et al., 2021).

This evolving evidence has improved public acceptance of plant-based proteins as healthful and sufficient for all stages of life, though continuous nutrition education is essential for widespread adoption.

5.2.5 **Environmental Co-Benefits**

A major finding across reviewed studies is that plant-based proteins are environmentally superior to animal-based sources:

Greenhouse Gas Emissions: Research by Poore and Nemecek (2018) found that beef production results in 60 kg of $CO_2$ equivalent per kg of food, whereas legumes emit less than 1 kg $CO_2$ eq/kg.

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Water and Land Use: Lentils and chickpeas require significantly less water and land compared to beef, pork, or chicken. In water-stressed regions like India and Pakistan, legumes offer a sustainable protein alternative.

Biodiversity and Soil Health: Crop diversification through legume farming enhances soil fertility via nitrogen fixation and reduces dependency on synthetic fertilizers, lowering environmental toxicity.

Adoption of plant-based diets at scale could reduce global agricultural greenhouse gas emissions by up to 55%, free up 75% of agricultural land, and significantly reduce water usage, according to the EAT-Lancet Commission (Willett et al., 2019).

### 5.2.6. Opportunities and Challenges

The plant based foods are having established health benefits across populations. Secondly, there is growing awareness in urban societies . Keeping in view the positive environmental impact in mind, many government initiatives promoting sustainable diets are among the opportunities for the promotion of plant based protein rich food items.
The major challenges of these foods include, Cultural resistance to reducing meat intake, Limited rural access to novel plant-based products, Need for continuous education and culinary adaptation and Misinformation about protein adequacy

These findings suggest that strategically increasing availability, affordability, and awareness around plant-based protein foods can play a pivotal role in improving population health and environmental outcomes, especially in densely populated regions of Asia.

## 6. **Conclusion and Recommendations**

The body of evidence reviewed in this article clearly demonstrates the significant potential of plant-based protein foods in addressing the dual challenges of rising lifestyle diseases and environmental degradation. Diets rich in legumes, whole grains, soy, nuts, and seeds are associated with reduced risks of cardiovascular disease, type 2 diabetes, obesity, and certain cancers. These benefits are consistently reported across diverse populations, including large-scale cohort studies and clinical interventions.

In the Asian context, traditional dietary patterns already favor plant-based proteins, offering a cultural foundation upon which public health strategies can be built. However,

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modernization and increased meat consumption pose growing threats to both health and sustainability. Encouragingly, there is a resurgence of interest in plant-based diets among urban, educated populations, supported by innovation in food technology and changing consumer attitudes.

From an environmental perspective, transitioning from animal- to plant-based protein sources can significantly reduce greenhouse gas emissions, preserve biodiversity, and alleviate pressures on water and land resources, all of which are critical for achieving sustainable development goals (SDGs) in the face of climate change.

Despite these advantages, the widespread adoption of plant-based protein diets faces barriers such as limited awareness, cultural preferences, and misinformation about nutritional adequacy. Addressing these challenges requires integrated action involving policy makers, healthcare providers, educators, and the food industry.

## 7. **Recommendations**

Based on the findings of this review, the following recommendations are proposed:

### 7.1 *Public Health and Nutrition Policy*

Governments and health organizations should integrate plant-based dietary guidelines into national nutrition policies.

Incentivize inclusion of plant-based protein sources in midday meal schemes, hospital diets, and public food distribution systems.

### 7. 2. *Education and Awareness*

Launch evidence-based nutrition education campaigns to dispel myths around plant-based protein inadequacy.

Promote traditional plant-rich meals in school curriculums and culinary programs to preserve cultural heritage and support health.

### 7.3 *Industry and Innovation*

Support food innovation and startups producing affordable, culturally relevant plant-based meat and dairy alternatives.

Encourage labeling transparency and fortification in commercial plant-based products to ensure nutritional adequacy.

### 7.4. *Research and Data Collection*

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Fund longitudinal studies in Asian populations to monitor the long-term impact of plant-based diets on lifestyle diseases.

Develop a standardized database of environmental footprints for region-specific food items to guide sustainable food system planning.

7.5 *Environmental and Agricultural Strategies*

Promote sustainable farming practices, including legume cultivation, crop rotation, and reduced use of synthetic inputs.

Align national climate action plans with dietary transition strategies, highlighting co-benefits for health and environment.

By leveraging the nutritional, environmental, and cultural strengths of plant-based protein foods, especially in Asia, public health systems can initiate a paradigm shift toward preventive healthcare and planetary sustainability. The time is ripe for governments, institutions, and communities to embrace this evidence-based dietary transition, one that promises not only a healthier population but also a healthier planet.

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