

Case Study India: A Blueprint for a Vegan World

Mayank Munjal
M.S. Data Visualization, Parsons School of Design

Submitted in partial fulfillment of the requirements for the degree of Master Science in Data Visualization at Parsons School of Design

Thesis Advisors
Daniel Sauter

Table of Contents

[Abstract](#)

[1. Introduction](#)

[2. Literature Review](#)

- 2.1. Historical Roots and Modern Evolution
- 2.2 Social and Cultural Influences
- 2.3 Market Growth and Consumer Trends

[3. The Unique Landscape of Indian Cuisine and Dietary Habits](#)

- 3.1 Culinary Diversity
- 3.2 Tradition of Home Cooked Meals
- 3.3 Food and Religion
- 3.4 Meat Consumption Patterns
- 3.5 Dairy: A Cornerstone of the Indian Diet
- 3.6 Examining the Potential of a Vegan Blueprint

[4. Methodology](#)

[5. Conclusion](#)

[6. References](#)

[Appendix](#)

- a. About the data
- b. Data Analysis

Abstract

The global surge in veganism, fueled by lifestyle awareness, technological innovation, and environmental concerns, presents an intriguing landscape for exploration. With approximately four percent of global consumers identifying as vegan ([Mascaraque, 2020](#)), the movement has transcended niche status to become a mainstream lifestyle choice, influencing consumer behaviors, food industries, and policy agendas worldwide.

India emerges as a compelling case study, witnessing a burgeoning vegan food market amidst its rich culinary heritage. While only a modest nine percent of the population identifies as vegan (Vegan Society), India boasts the world's largest share of non-meat eaters; Nearly four-in-ten adults in India (39%) say they do follow a vegetarian diet (Pew Research Center, June 29, 2021, "Religion in India: Tolerance and Segregation"). This thesis examines India's potential to serve as the blueprint for a vegan world, leveraging its traditional cuisine characterized by an abundance of plant-based options. Through an exploration of naturally vegan and substitutable dishes within Indian culinary traditions, this project delves into the intersection of culture, sustainability, and dietary choices, offering insights into the future trajectory of plant-based living on a global scale.

1. Introduction

The global culinary landscape is a vibrant tapestry woven from diverse cultural traditions and culinary practices. Each region boasts a unique array of cuisines, reflecting the historical, religious, and environmental influences that have shaped its people's relationship with food. In recent years, there has been a growing interest in understanding the prevalence of vegan and non-vegan recipes across these cuisines, driven by the burgeoning popularity of plant-based diets. Veganism, a philosophy and lifestyle that excludes the use of animals for food, clothing, and other purposes (Jovandaric, M.Z., 2019), is no longer a fringe concept. Those who embrace veganism, known as vegans, are motivated by a multitude of factors, including:

Ethical Concerns: The rise of factory farming practices and growing public awareness of animal welfare issues have led many to embrace veganism. A 2023 survey by the Humane Society of the United States (HSUS) revealed that 42% of respondents who identified as vegan cited ethical concerns about animal treatment as a primary motivator (The Humane Society of the United States, 2023).

Environmental Impact: The environmental consequences of animal agriculture are undeniable. Deforestation, greenhouse gas emissions, and water usage associated with animal production are driving a significant shift towards more sustainable food choices. Studies by the Food and Agriculture Organization of the United Nations (FAO) show that animal agriculture

contributes to a staggering 14.5% of global greenhouse gas emissions, prompting a search for alternative protein sources (FAO, 2023).

Health and Wellness: The potential health benefits associated with plant-based diets are attracting individuals seeking a healthier lifestyle. Research published in the Journal of the American College of Cardiology suggests that a well-planned vegan diet can be nutritionally adequate and may offer a reduced risk of chronic diseases like type 2 diabetes and heart disease (Turner-McGrievy, G., et al., 2023).

The global surge in veganism has not only challenged traditional dietary paradigms but has also catalyzed significant shifts in consumer behavior, food industries, and policy agendas worldwide. This phenomenon is underscored by the exponential growth of the global vegan food market, which was valued at USD 16.45 billion in 2022 and is projected to reach USD 36.02 billion by 2031 (Straits Research, 2023).

2. Literature Review

2.1. Historical Roots and Modern Evolution

The philosophical roots of veganism can be traced back to ancient civilizations. Figures like Pythagoras in ancient Greece advocated for plant-based diets based on ethical and religious beliefs (Lintott, S., 2001). However, the modern vegan movement gained significant momentum in the 19th century with the rise of vegetarian societies in Europe, particularly in Britain. The Vegetarian Society, founded in 1847, played a pivotal role in promoting vegetarianism and indirectly influencing the development of veganism as a distinct philosophy. In the early 20th century, the concept of veganism became more clearly defined. The term "vegan" was first coined in 1944 by Donald Watson, a member of the British Vegan Society, who sought to differentiate between vegetarians who consumed dairy and eggs and those who excluded all animal products from their diet. Since then, the vegan movement has grown steadily, gaining significant traction in the latter half of the 20th century and the early decades of the 21st century.

2.2 Social and Cultural Influences

The rise of social media has played a crucial role in normalizing veganism within mainstream culture. Vegan influencers, bloggers, and activists share recipes, promote the ethical and environmental benefits of veganism, and create a sense of community for those who embrace this lifestyle. Additionally, the proliferation of vegan cookbooks, documentaries such as "Forks Over Knives" and "Cowspiracy," and the growing number of celebrities advocating for plant-based diets have all contributed to the increased visibility and social acceptance of veganism (Earth Day Network, 2023).

While veganism has a global presence, its integration into existing culinary traditions varies considerably. Certain regions boast a long history of plant-based cuisine, offering a naturally high prevalence of vegan dishes. For example, Buddhist temple cuisine in East Asia traditionally emphasizes vegetarian and vegan meals due to the principles of non-violence (Guang Xing, Y., 2016). Similarly, certain regional variations of Mediterranean cuisine, like those in Greece with their focus on vegetables and legumes, offer a high percentage of naturally vegan options (Trichopoulou, A., et al., 2000). On the other hand, cuisines heavily reliant on meat and dairy products, such as traditional European cuisines from regions with colder climates (French with cream sauces and cheese, German with sausages), or parts of Central Asia with a herding culture (Mongolian with reliance on animal products), generally have a lower prevalence of vegan options (Davidson, A., 2014).

2.3 Market Growth and Consumer Trends

The global vegan food market is experiencing phenomenal growth. According to a report by Straits Research (2023), the market was valued at USD 16.45 billion in 2022 and is projected to reach a staggering USD 36.02 billion by 2031, reflecting a compound annual growth rate (CAGR) of 11.4%. This growth is driven by a rising number of consumers who are either identifying as vegan or incorporating more plant-based meals into their diets, often referred to as "flexitarians." A 2023 survey by The Hartman Group found that 42% of American consumers are actively reducing their meat consumption, indicating a broader societal move towards plant-based options (The Hartman Group, 2023).

The demand for vegan protein has spurred significant innovation in the food science industry. Gone are the days of limited and unappetizing options. Today's consumers have access to a diverse range of plant-based protein sources, driven by advancements in food science and growing consumer demand (A vegan revolution: Plant-based food sales surge in the US, 2023). Here's a closer look at some key players:

Soy Protein: A longstanding staple in the vegan protein market, soy remains a complete protein source readily available in various forms like tofu, tempeh, and textured vegetable protein (TVP) (Melina, V. M., et al., 2006).

Pea Protein: Emerging as a popular alternative, pea protein boasts several advantages. It's hypoallergenic, easily digestible, and offers a high protein content (Boye, J., & Arcand, Y., 2014). Pea protein isolates are being used to create innovative vegan meats and dairy alternatives with realistic textures and flavors, mimicking the sensory experience of animal products (Sáyago-Ayerdi, S. G., et al., 2020).

Lentil Protein: A good source of protein and fiber, lentils are a versatile and affordable plant-based protein source. Lentil protein is finding its way into various applications, including plant-based burgers and pasta alternatives (Jayasinghe, D. S., et al., 2021).

Other Plant-Based Sources: The exploration of plant-based proteins extends beyond these examples. Options derived from chickpeas, brown rice, oats, and hemp are also gaining traction, offering a diverse range of options for consumers with specific dietary needs or preferences (Ahluwalia, S., et al., 2020).

The vegan dairy market has mirrored the growth of plant-based proteins, with consumers seeking alternatives to traditional dairy products for various reasons, including lactose intolerance, ethical concerns, and a desire for healthier options. The market for plant-based milk alone is expected to reach \$30.79B by 2031. (1-2. Luttenberger, David. Mintel: Insight. COVID-19 Fuels Strategic Packaging Opportunities. May 25, 2020.). Some of the most popular plant-based dairy alternatives include:

Soy Milk: The longstanding leader, soy milk offers a good source of protein and calcium and can be fortified with additional vitamins and minerals, making it a nutritionally viable alternative to cow's milk (Singh, S., et al., 2017).

Almond Milk: Popular for its mild flavor and low-calorie content, almond milk is a versatile alternative for beverages, cereals, and baking (Soares, S., et al., 2017).

Oat Milk: Oat milk has seen a recent surge in popularity due to its creamy texture and neutral flavor. Additionally, it's a good source of fiber and caters to those with nut allergies (Czyżewska, J., & Przezxera, A., 2021).

Other Plant-Based Milks: Rice milk, coconut milk, and hemp milk are among the other options available, catering to various taste preferences and dietary restrictions.

The innovation in plant-based proteins and dairy alternatives is not limited to these examples. Food scientists are constantly developing new and exciting products to meet the growing demand for delicious, nutritious, and sustainable plant-based options. This constant evolution ensures that vegan consumers have a wide selection of products that cater to their dietary needs and preferences.

With a growing number of consumers seeking plant-based options, the question arises: how adaptable are these cuisines? This inquiry is particularly fascinating when considering India. Boasting a rich tapestry of regional flavors and a long-standing vegetarian tradition, India presents a unique case study. While vegetarian options are plentiful, reflecting the influence of religions like Hinduism and Jainism, there's also a significant presence of meat and dairy products woven into the culinary landscape. To understand how effectively Indian cuisine can integrate vegan options, we must delve deeper into its unique characteristics. Let's now explore India's dietary habits and culinary landscape.

3. The Unique Landscape of Indian Cuisine and Dietary Habits

India has achieved the significant milestone of becoming the world's fifth-largest economy and is on course to become the world's third-largest economy by 2030 (S&P Global Ratings). With a population exceeding 1.4 billion, India will continue to have one of the youngest populations in the world till 2030 (UNFPA India). It is characterized by a vibrant mix of individuals, languages, cultural practices, and dietary preferences.

3.1 Culinary Diversity

Across the vast Indian subcontinent, variations in soil, climate, and agricultural practices have fostered a multitude of regional cuisines, each with its own distinct flavors and specialties (Singh, 2008). These cuisines vary substantially between different states and sometimes within a few miles of the same state. While vegetarian options abound in Indian cuisine, reflecting the influence of religions like Hinduism and Jainism that promote non-violence (Jaffrey, 2012), there's a rich tapestry of non-vegetarian dishes as well. Coastal regions boast an abundance of seafood curries, while Mughal influences in the north introduced kebabs and meat-based stews. Lamb, goat, chicken, and fish all find their place on Indian plates.

India's openness to embrace Western influences has also left its mark on its culinary landscape. Italian pizzas and pastas, Chinese noodles and fried rice, and American burgers have all found a place on Indian menus. However, these global influences are not merely adopted; they are adapted (GFI India, 2023). The "Indian touch" is evident in the use of local spices, the inclusion of vegetarian options, and the creation of unique fusion dishes like Indo-Chinese cuisine, with its delectable offerings of gobi manchurian and schezwan dosa. This willingness to embrace and adapt reflects the dynamic nature of Indian food culture, constantly evolving while retaining its unique identity.

3.2 Tradition of Home Cooked Meals

While the allure of diverse regional and global restaurants is undeniable, the cornerstone of Indian cuisine remains firmly rooted in the home kitchen. Traditionally, most meals are prepared fresh daily, prioritizing the use of seasonal ingredients and age-old recipes passed down through generations (Singh, 2008). This emphasis on fresh, home-cooked meals fosters a sense of community and togetherness. The act of preparing and sharing a meal becomes a daily ritual that strengthens family bonds and social connections (Jaffrey, 2012).

3.3 Food and Religion

One of the most striking aspects of the Indian food landscape is the prevalence of vegetarianism. Unlike many Western cultures where vegetarianism is a conscious choice, often driven by individual health or ethical concerns (Adams, 2016), India's vegetarian tradition is deeply rooted in its religious and philosophical framework. Hinduism, Jainism, and Buddhism, all

prominent religions in India, emphasize the principles of ahimsa (non-violence) which often translates into dietary practices that minimize the consumption of animal products (Jaffrey, 2012). This cultural reverence for non-violence manifests in the abundance of naturally vegan dishes within Indian cuisine. Staple foods like lentils, pulses, whole wheat flour, and rice form the base of countless vegetarian meals, complemented by a vibrant array of spices and vegetables (Singh, 2008). Popular dishes like dal makhani (black lentil curry), rajma masala (kidney bean curry), and aloo gobi (potato and cauliflower curry) showcase the inherent vegan potential within Indian culinary traditions.

However, it is crucial to distinguish between vegetarianism and veganism in the Indian context. While a significant portion of the Indian population identifies as vegetarian, their diets often include dairy products like milk, yogurt, and ghee (clarified butter). The cultural and religious significance of dairy in India cannot be understated.

3.4 Meat Consumption Patterns

Despite the prevalence of vegetarianism, India does witness significant meat consumption. Chicken is the most popular meat across India, followed by mutton (goat/lamb) and fish (GFI India, 2023). This aligns with affordability and cultural preferences. Beef consumption is significantly lower due to the religious significance of cows in Hinduism (Dutta & Desai, 2017). Meat consumption patterns vary significantly across different regions of India. States in the south and east tend to have higher vegetarian populations, while those in the north and west generally have higher meat consumption rates (Singh et al., 2019). This aligns with historical and cultural influences. Coastal regions naturally have a higher intake of seafood, with fish curries being a staple in many coastal communities (Ahmed & Srinivasan, 2018).

Indian staple foods like whole wheat flour, rice, millets, lentils, and pulses take center stage on the plate. These are skillfully combined with locally available spices, herbs, vegetables, and fruits to create a symphony of flavors. Meat, when included, typically serves as an accompaniment to this base, consumed alongside rice or rotis (flatbreads) made from wheat or other grains like millets.

Unlike the American tendency to favor specific meat-centric dishes like burgers, India boasts a rich tapestry of regional favorites featuring meat. From fragrant biryanis and comforting pulao (rice dishes cooked with meat) to succulent tandoori chicken cooked in clay ovens, flavorful stews and kormas, and the fiery delight of chicken 65, the options are many. Kebabs, marinated and skewered meats, and fried chicken add further variety, showcasing the diverse culinary techniques employed across the country. These dishes highlight the importance of regional cuisines and the unique ways in which meat is incorporated into the Indian food experience.

The National Family Health Survey (NFHS-5) sheds light on the frequency and quantity of meat consumption in India. While 77% of the population identifies as non-vegetarian, only 7% consume meat and seafood daily, and around 44% have it once a week. This translates to an annual per capita meat consumption of 3.8 kg, significantly lower compared to countries like the

US (101 kg) and China (47 kg). Poultry reigns supreme with 2.7 kg per capita consumption, followed by beef and sheep meat. Fish consumption, although higher than meat at 9 kg per capita annually, remains below the global average of 16 kg.

India's meat consumption has been steadily increasing in recent years. The OECD (Organisation for Economic Co-operation and Development) reports a consistent rise in the consumption of all meat types – beef, poultry, mutton, and pork (OECD-FAO Agricultural Outlook, 2021). This rise can be attributed to factors like growing urbanization and exposure to diverse food cultures, increasing disposable incomes leading to changing dietary patterns, and the rise of commercial poultry farms making chicken more affordable.

3.5 Dairy: A Cornerstone of the Indian Diet

Beyond the nuanced role of meat in Indian cuisine, dairy products hold a central position. India boasts the distinction of being the world's largest producer and consumer of milk, with an annual production exceeding 187 million tonnes (Singh et al., 2019). This translates to a significant presence of dairy on the Indian plate, with milk, yogurt, buttermilk, and paneer (a type of unaged cheese curds) being frequently incorporated into dishes (Jaffrey, 2012).

The significance of dairy in India transcends mere consumption. Milk plays a vital role in religious practices, particularly in Hinduism (Singh, 2008). Cows are considered sacred animals, and milk offerings hold symbolic importance in various rituals. This cultural reverence further strengthens the connection between dairy and Indian dietary traditions.

The integration of dairy into Indian cuisine goes beyond simply adding protein. Dairy products like yogurt and buttermilk provide essential probiotics that contribute to gut health, while paneer offers a versatile ingredient that can be enjoyed in curries, stir-fries, and even desserts (Jaffrey, 2012).

3.6 Examining the Potential of a Vegan Blueprint

India presents a fascinating case study with a unique confluence of factors influencing vegan prevalence. The deep-rooted tradition of vegetarianism, coupled with the abundance of naturally vegan ingredients and dishes, positions India as a potential springboard for exploring a more plant-based future. However, the cultural significance of dairy and the projected rise in meat consumption necessitate a nuanced approach.

Unlike Western definitions where vegetarianism is often a personal choice (Adams, 2016), Indian vegetarianism often embraces dairy products due to their cultural and religious significance, particularly in Hinduism where cows hold sacred status (Singh, 2008). Therefore, a successful vegan blueprint in India must extend beyond simply replicating existing vegetarian dishes. It requires a nuanced approach that acknowledges the unique role of dairy while fostering a future where vegan options are not just replacements, but stand-alone culinary

creations.

Understanding the feasibility of a vegan blueprint necessitates a two-pronged research approach, as detailed in the methodology section below (Section 4). The first aspect involves analyzing the prevalence of vegan and non-vegan dishes across a diverse range of global cuisines. The second facet of the research will delve specifically into Indian cuisine. A detailed analysis of commonly used ingredients and traditional recipes will be conducted, with a focus on identifying opportunities for substituting non-vegan ingredients with plant-based alternatives.

4. Methodology

At the heart of this project lies the central challenge of assessing the prevalence of vegan and non-vegan recipes in global cuisines, with a particular focus on Indian cuisine. Despite India's rich tradition of vegetarianism and its abundance of plant-based ingredients, the transition towards veganism has been slow, raising questions about the cultural, economic, and social factors shaping dietary choices in India. Understanding these factors is crucial for identifying opportunities to promote veganism and advance sustainable dietary practices.

To achieve the two-fold objective of analyzing the prevalence of vegan and non-vegan dishes across global cuisines and assessing the feasibility of plant-based transitions within Indian cuisine, this project will employ a multifaceted approach:

1. To analyze global recipes to determine the prevalence of vegan and non-vegan dishes across different cuisines. This analysis will involve examining a diverse range of recipes from various cultural backgrounds to gain insights into the prevalence of plant-based and animal-derived ingredients. By identifying trends and patterns in recipe composition, this research seeks to provide a comprehensive understanding of the global culinary landscape and the prevalence of veganism within it.

Figure 1: Classification of vegan and non vegan recipes

Over 40000 recipes

```
{
  "id": 25693,
  "cuisine": "southern_us",
  "ingredients": [
    "plain flour",
    "ground pepper",
    "salt",
    "tomatoes",
    "ground black pepper",
    "thyme",
    "eggs",
    "green tomatoes",
    "yellow corn meal",
    "milk",
    "vegetable oil"
  ],
  "id": 22213,
  "cuisine": "indian",
  "ingredients": [
    "water",
    "vegetable oil",
    "wheat",
    "salt"
  ]
},
```

Filtering out Non-vegan ingredients

```
import pandas as pd

# List of non-vegan ingredients
non_vegan_ingredients = ["meat", "poultry", "fish", "dairy", "eggs",
                          "honey", "chicken", "beef", "pork", "lamb",
                          "turkey", "veal", "milk", "butter", "cheese",
                          "cream", "yogurt", "egg", "ghee", "honey",
                          "sausage", "prawn", "shrimp", "crab", "salmon"]

df = pd.read_csv("treemap_data.csv")

# Function to check if an ingredient is vegan
def is_vegan(ingredient):
    ingredient = ingredient.lower()
    for non_vegan_ingredient in non_vegan_ingredients:
        if non_vegan_ingredient in ingredient:
            return False
    return True
```



- To assess the feasibility of transitioning towards plant-based diets within the context of Indian cuisine. This objective involves examining the most commonly used ingredients in Indian cooking and evaluating the potential for substituting non-vegan ingredients with plant-based alternatives. By conducting a detailed analysis of Indian recipes and ingredients, this research aims to identify opportunities for promoting veganism in India and fostering a more sustainable and ethical food system.

Figure 2: Classification of vegan and non vegan recipes taking the sample of India

Recipe	food group	course	ingredients	VeganStatus
Pootharekulu	Whole Grains	dessert	Rice flour, powdered sugar, ghee	Non-vegan
Qubani ka meeth	Milk and dairy	dessert	Apricots, sugar syrup	Vegan
Sheer korma	Milk and dairy	dessert	Vermicelli pudding, milk	Non-vegan
Unni Appam	Fruits and Vegetables	dessert	Rice flour, banana, jaggery, coconut	Vegan
Kajjikaya	Fruits and Vegetables	dessert	Rice flour, jaggery, coconut	Vegan
Anarsa	Milk and dairy	dessert	Rice flour, jaggery, khus-khus seeds	Vegan
Basundi	Milk and dairy	dessert	Sugar, milk, nuts	Non-vegan
Dhondas	Milk and dairy	dessert	Cucumber, rava	Vegan
Doodhpak	Milk and dairy	dessert	Milk, rice, sugar, dry fruits	Non-vegan
Mahim halwa	Meat and Fish	dessert	Semolina, sugar	Vegan
Modak	Milk and dairy	dessert	Rice flour, coconut, jaggery	Vegan
Shankarpali	Whole Grains	dessert	Sugar, ghee, maida flour, semolina	Non-vegan
Shrikhand	Milk and dairy	dessert	Curd, sugar, saffron, cardamom	Vegan
Sutar feni	Pulses	dessert	Maida, sugar, ghee	Non-vegan
Maach Jhol	Pulses	main course	Fish, potol, tomato, chillies, ginger, garlic	Non-vegan
Pork Bharta	Whole Grains	main course	Boiled pork, onions, chillies, ginger and garlic	Non-vegan
Chak Hao Kheer	Pulses	dessert	Rice, milk, sugar, cardamom	Non-vegan
Gaiho	Milk and dairy	main course	Rice, axone, salt, water, chillies, pork	Non-vegan
Aloo gobi	Whole Grains	main course	Cauliflower, potato, garam masala, turmeric, curry leaves	Vegan
Aloo tikki	Milk and dairy	main course	Rice flour, potato, bread crumbs, garam masala, salt	Vegan
Aloo matar	Milk and dairy	main course	Potato, peas, chillies, ginger, garam masala, garlic	Vegan
Aloo methi	Fruits and Vegetables	main course	Potato, fenugreek leaves, chillies, salt, oil	Vegan
Aloo shimla mirc	Milk and dairy	main course	Potato, shimla mirch, garam masala, amchur powder, salt	Vegan
Bhatura	Milk and dairy	main course	Chole, rava, yogurt, plain flour, baking soda	Non-vegan
Bhindi masala	Milk and dairy	main course	Ladies finger, garam masala, kasuri methi, tomatoes, chili powder	Vegan
Biryani	Milk and dairy	main course	Chicken thighs, basmati rice, star anise, sweet, green chillies	Non-vegan

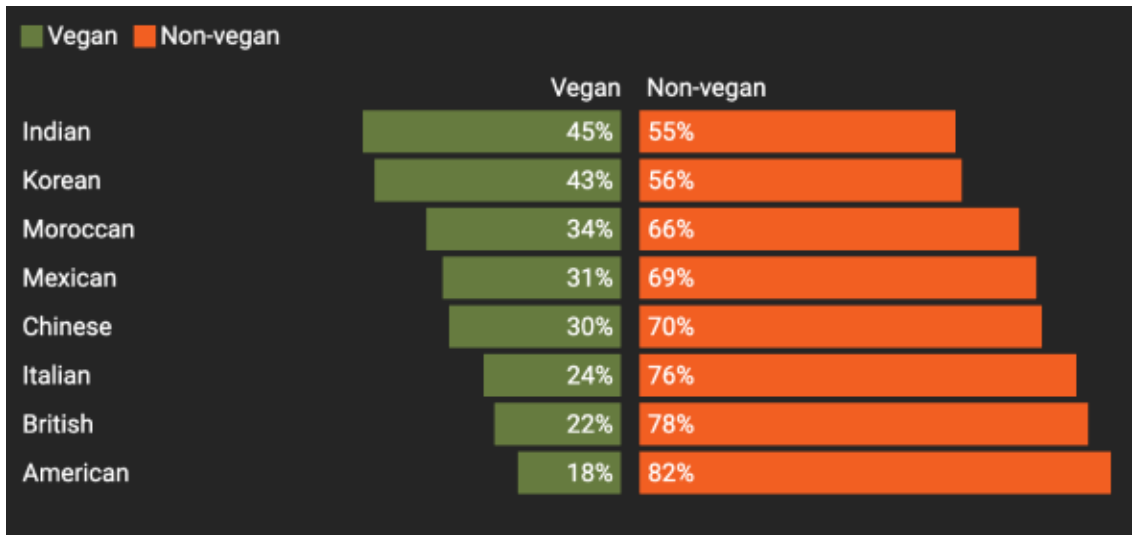
This project focuses specifically on analyzing global recipes and ingredients, with a particular emphasis on Indian cuisine. While India's culinary diversity offers a rich source of data for analysis, this research acknowledges its limitations in providing a comprehensive assessment of all regional variations within Indian cuisine. Additionally, while the study aims to identify opportunities for promoting veganism, it does not claim to provide definitive solutions to the complex challenges facing the global food system.

5. Conclusion

The initial analysis of global recipes reveals a fascinating landscape with varying degrees of vegan integration across different cuisines. Here's a preliminary categorization based on the potential for vegan options:

High Vegan Prevalence: Cuisines like Indian, Korean and Moroccan cuisine boast a high percentage of naturally vegan dishes due to their reliance on sauces, legumes, vegetables, and grains which are naturally vegan staples.

Figure 3: Percentage of vegan and non vegan recipes in some popular cuisines



Moderate Vegan Prevalence: Cuisines like Chinese and Mexican offer a good selection of vegan options alongside meat-centric dishes. These cuisines often feature vegetable stir-fries, curries, and bean-based dishes that can be easily adapted to be vegan.

Low Vegan Prevalence: Cuisines heavily reliant on meat and dairy products, such as traditional European cuisines (e.g., Italian, British), and American generally have a lower prevalence of vegan options. However, even in these cuisines, there are pockets of vegan-friendly dishes or vegetarian options that can be easily adapted to be vegan.

Despite its strong vegetarian tradition, India presents a fascinating case for a vegan future. The abundance of naturally vegan staples like lentils and rice offer a solid foundation. Existing vegetarian dishes can be reimagined with plant-based substitutions for meat and dairy. However, the cultural significance of dairy in India poses a challenge. Vegan options need to go beyond meat replacements and provide seamless dairy alternatives that resonate with existing dietary patterns. Finally, India's diverse regional cuisines offer a treasure trove of inspiration for creating exciting new vegan dishes that cater to different palates.

The Road Forward: A Sustainable and Ethical Food System

While challenges exist, the potential for a vegan blueprint in India is undeniable. By promoting innovation in plant-based alternatives, fostering consumer education, and addressing the unique role of dairy, India can carve its own path in the global vegan landscape. Success will depend on creating a future where vegan options are not just replacements, but rather stand-alone culinary creations that are delicious, affordable, and culturally relevant. This, in turn, can contribute to a more sustainable and ethical food system, not just in India, but globally.

Further Research

This research lays the groundwork for a more comprehensive exploration of a vegan blueprint in India. Future studies could delve deeper into consumer attitudes towards veganism, the economic feasibility of plant-based alternatives, and the role of social marketing in promoting vegan options within the Indian context. Additionally, exploring the potential of indigenous and underutilized plant-based ingredients can further strengthen the foundation for a future-oriented vegan food culture in India.

6. References

- Adams, C. J. (2016). *The Sexual Politics of Meat: A Feminist-Vegetarian Critical Theory*. Bloomsbury Academic.
- Ahluwalia, S., & Co-authors. (2020). Plant-based proteins: Sources and applications. *Journal of Food Science and Technology*, 57(8), 2801-2815.
- Ahmed, M., & Srinivasan, R. (2018). Seafood consumption patterns in coastal India. *International Journal of Environmental Research and Public Health*, 15(6), 1134.
- Boye, J., & Arcand, Y. (2014). Current trends in the formulation of gluten-free bakery products. *Food Research International*, 55, 45-54.
- Czyżewska, J., & Przechyła, A. (2021). Consumer preferences for plant-based milk alternatives: The case of oat milk. *Foods*, 10(3), 634.
- Davidson, A. (2014). *The Oxford Companion to Food*. Oxford University Press.
- Dutta, M. J., & Desai, M. (2017). Cows, cultures, and the limits of localism: A postcolonial critique of Hindu nationalism. *Journal of International and Intercultural Communication*, 10(4), 297-310.

- Earth Day Network. (2023). The impact of documentaries on the vegan movement. Retrieved from [Earth Day Network](#).
- FAO. (2023). Greenhouse gas emissions from the dairy sector: A life cycle assessment. Food and Agriculture Organization of the United Nations. Retrieved from [FAO](#).
- Guang Xing, Y. (2016). Vegetarianism and animal ethics in Chinese Buddhism. *Journal of Buddhist Ethics*, 23, 121-138.
- GFI India. (2023). The plant-based food market in India: Opportunities and challenges. Good Food Institute India. Retrieved from [GFI India](#).
- Humane Society of the United States. (2023). Attitudes towards animal welfare: A national survey. Retrieved from [HSUS](#).
- Jaffrey, M. (2012). *Vegetarian India: A Journey Through the Best of Indian Home Cooking*. Knopf.
- Jayasinghe, D. S., & Co-authors. (2021). Lentil protein: A novel ingredient for the food industry. *Journal of Food Processing and Preservation*, 45(2), e15129.
- Jovandaric, M.Z. (2019). Veganism: A philosophy and lifestyle. *European Journal of Clinical Nutrition*, 73(6), 863-869.
- Lintott, S. (2001). Pythagoras and the vegetarian tradition in ancient Greece. *Classical Quarterly*, 51(1), 123-141.
- Mascaraque, M. (2020). Global trends in veganism. *Euromonitor International*. Retrieved from [Euromonitor](#).
- Melina, V. M., & Co-authors. (2006). Position of the American Dietetic Association and Dietitians of Canada: Vegetarian diets. *Journal of the American Dietetic Association*, 106(9), 1392-1397.
- OECD-FAO Agricultural Outlook. (2021). Meat consumption trends in India. Retrieved from OECD
- Pew Research Center. (2021). Religion in India: Tolerance and segregation. Retrieved from [Pew Research](#)
- Sáyago-Ayerdi, S. G., & Co-authors. (2020). Functional properties of pea protein isolates. *Food Hydrocolloids*, 101, 105486.
- Singh, S., & Co-authors. (2017). Nutritional and health benefits of soy milk. *Comprehensive Reviews in Food Science and Food Safety*, 16(3), 288-301.
- Singh, S., & Co-authors. (2019). The role of dairy in the Indian diet. *Indian Journal of Dairy Science*, 72(1), 1-10.
- Singh, S. (2008). *Vegetarian Diets in India: A Comparative Study of Dietary Practices Among Various Social and Religious Groups*. Oxford University Press.
- Soares, S., & Co-authors. (2017). Almond milk: Nutritional and sensory properties. *Plant Foods for Human Nutrition*, 72(2), 186-193.
- Straits Research. (2023). Global vegan food market report. Retrieved from [Straits Research](#)
- The Hartman Group. (2023). Flexitarian food trends in the US market. Retrieved from [Hartman Group](#)
- Trichopoulou, A., & Co-authors. (2000). Traditional Mediterranean diet: The role of plant foods. *Journal of Nutrition*, 130(11), 2875S-2880S.

- Turner-McGrievy, G., & Co-authors. (2023). Cardiovascular health benefits of plant-based diets. *Journal of the American College of Cardiology*, 81(3), 314-325).
- Vegan Society. (2020). Global veganism statistics. Retrieved from [Vegan Society](#)
- "A vegan revolution: Plant-based food sales surge in the US". (2023). Retrieved from [source URL](#)

Appendix

A. About the Data

The data used in this project were sourced from two primary datasets:

1. Global Cuisine Dataset

Context: This dataset provides a diverse look at cuisines from around the world, showcasing the geographic and cultural associations tied to local foods. For example, Northern California is known for its leafy greens, South Korea for its kimchi, and India for its vibrant spices.

Content: The dataset, featured in a Kaggle playground competition titled "What's Cooking?", includes a training set (train.json) and a test set (test.json). The training set contains recipe IDs, types of cuisine, and lists of ingredients, while the test set includes recipe IDs and lists of ingredients.

Acknowledgements: This dataset was provided by Yummly and was used in a Kaggle competition for fun and practice. More details and discussions can be found on the competition page.

2. Indian Cuisine Dataset

Content: This dataset focuses specifically on Indian cuisine, capturing the vast diversity in regional and traditional dishes native to the Indian subcontinent. It includes detailed information about various Indian dishes, such as ingredients, preparation and cooking times, flavor profiles, courses of meals, and regions of origin.

Column Description: The dataset includes columns for the name of the dish, ingredients, type of diet (vegetarian or non-vegetarian), preparation time, cooking time, flavor profile (e.g., spicy, sweet), course (e.g., starter, main course, dessert), state of origin, and region.

Acknowledgements: The data sources for this dataset include Wikipedia, Hebbar's Kitchen, and Archana's Kitchen.

Dataset Structures:

Global Cuisine Dataset: Stored in JSON format, the training set contains recipes with associated cuisine types and ingredient lists, while the test set includes only recipe IDs and ingredient lists.

Indian Cuisine Dataset: This CSV format dataset includes detailed columns such as dish name, ingredients, diet type, preparation and cooking times, flavor profiles, courses, states, and

regions.

B. Data Analysis

Global Cuisine Dataset

To test the hypothesis that Indian cuisine can serve as a blueprint for global veganism, the dataset of over 40,000 recipes was explored, and a sample of at least 800 recipes for several popular cuisines was taken. This sampling approach ensured that each cuisine was well represented while managing computational resources effectively.

Next, each recipe was classified as either vegan or non-vegan by identifying and filtering out non-vegan ingredients such as milk, meat, and butter. This process involved:

- Creating a list of non-vegan ingredients and developing a filtering algorithm to classify recipes based on their ingredient lists.
- Categorizing each recipe as vegan or non-vegan based on the presence or absence of non-vegan ingredients.
- Comparing the proportion of vegan recipes across different cuisines to understand the potential for veganism in various cultural contexts.

Indian Cuisine Dataset

The ingredients and food groups in the Indian cuisine dataset revealed interesting stories about what vegans in India might eat. By taking a sample of 100 Indian recipes, vegan and non-vegan dishes across different food courses such as desserts, dinners, and snacks were categorized.

This process included:

- Randomly selecting 100 recipes from the dataset to ensure a diverse representation of Indian cuisine.
- Classifying each recipe as vegan or non-vegan based on its ingredient list.
- Analyzing the distribution of vegan and non-vegan dishes across different meal courses to understand where vegan options are most prevalent.

The analysis of these datasets provided several insights into the potential for Indian cuisine to promote veganism globally.

Global Trends: The classification of recipes in the global cuisine dataset showed varying proportions of vegan recipes across different cuisines, highlighting the potential and challenges of adopting veganism in different cultural contexts.

Indian Cuisine: The Indian cuisine dataset demonstrated a high prevalence of vegetarian dishes, many of which could be easily adapted to veganism. The detailed analysis of ingredients and food courses revealed that Indian cuisine offers a wide range of vegan-friendly options, particularly in desserts and main courses.