

## Review on Emerging Dietary Pattern - Veganism

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### ABSTRACT

Veganism is the fastest growing food trend in western countries. It has also started to spread its wings in India. It is essential to see and understand the nature, scope, advantages, and disadvantages of the system before it flourishes with unanticipated consequences. Limited literature could be seen on this emerging concept with an Indian perspective. Thus; this paper explores all possible impacts of the vegan diet on multiple aspects like agriculture, dairy sector, health, climate and environment, economy, and the emergence of new agro-based industries. Several national and international research and review articles, annual reports and internet contents were collected and reviewed for this paper. Vegan dietary pattern equally has both pros and cons in terms of health, environment, and economy. Thus most in-depth research and proper investigation are required to streamline the emerging concept to reap maximum benefits.

### HIGHLIGHTS

- The study throws a light on the impact of the animal husbandry sector on climate, environment, health, economy, and agro-based industries.
- The paper also provides a deeper insight into various types of dietary patterns and their importance.

**Keywords:** Vegan, Veganism, India, Impact, Health, Environment, Economy, Plant based products, plant based meat, plant-based alternatives

Well-known types of the menu for many of us are vegetarian and non-vegetarian menus. But the classification extends more than seven. There are different types of eaters based on the menu they prefer; they are vegan (only plant-based Products), Raw vegan (a type of vegan who avoids processed foods and overcooking), Ovo-vegetarian (avoids fish, meat, and dairy but takes egg), Lacto-Vegetarian (avoids fish, meat and egg but have dairy products), Ovo-Lacto-Vegetarian (avoids fish and meat but takes egg and dairy), Flexitarian (occasionally omnivorous in nature), and Pescatarian (eats only fish and sea foods but avoids

other meats). Additionally, there are Pollotarian who eat poultry and veg foods but not other meat and Reductarian who gradually reduce consumption of animal-sed products (Mulvany *et al.* 2019). However, Vegan followers and veganism set on fire in various countries as a trending food system. It's the right time to analyze and understand the grounds, impact, pros, and cons in terms of health, psychological, sociological,

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economic, and environmental aspects. Thus this article attempts to understand the multiple dimensions of Vegan foods and veganism.

### **What is Vegan food or veganism?**

The term Vegan was first used in the UK in 1944. Vegan is a restrictive diet that includes fruits, veggies, cereals, pulses, nuts, etc that are only plant based and strictly exclude animal-based products such as meat, fish, egg, and dairy products. Veganism is a state of mind that restricts oneself from animal-based foods and products. Yes, you heard it right; it could extend up to saying no to silk, honey, leather-based boots, jackets and wallets, and even cosmetics with bee wax. The main motives for the shift to vegan foods could be explained under the following motives: the realization of animal rights, understanding the health issues due to animal-based foods, religious and spiritual ideas, and environmental concerns. Among which the primary motive is found to be the concern towards the environment.

### **Types of Vegan Diet**

According to Sutter (2017) there are different types of vegan diet. They are explained as follows first type is 'Rastafarian Vegan', also called as 'ital diet' that indicates persons use only natural products other than processed or value-added products. This method even avoids iodized or non-kosher salt. They are also restricted by religious or spiritual beliefs. Secondly, Raw Vegan diet takes food raw without heating and processing. Next is the standard vegan diet comprises the method to follow a vegan diet along with food supplements like micronutrients, amino acids, vitamins, etc. Natural Vegan diet the final category is a combination of the first two types.

### **Veganism leading to Social Change**

Even though exact data on Vegan population in India is not available due to the sheer novelty of this dietary and lifestyle choice, there are ample proof to picture the unprecedented shift towards veganism. However, several countries have started focusing on this fastest-growing food trend. Studies show that about 1% of

the US population is identified to be Vegan, and the impact of inclining adoption rate has a drastic change on societal attitudes and food industries. According to Cooper *et al.* (2018), it was accounted to be 542,000 people who are found to be vegan in the UK during 2016, which was found to be in a rush to grow from 150,000 in 2006, which was roughly three and a half times a faster growth rate in the past 10 years. The majority of the Vegan followers, the majority of the Vegan followers, seem to be of age ranging from 15 to 34 years (The Vegan Society, 2016). The popularity among the young and middle-aged groups is found increasing. The sense of being unique, innovativeness, adventure to explore new options of taste and food, concern for health, environment and ethical issues, and influence of peers and social media could have been the spread and acceptance of veganism among young people. Studies also reveal that the spending percentage of persons high economic range on meat has also declined by 5%. The meat consumption is also falling back faster in urban areas than rural areas due to easy access to multiple non-meat options. According to Lusk *et al.* (2016), the reason for restricting oneself from enjoying omnivorous or any other type of food other than vegetarian foods could be personal taste, health, animal welfare, sub-culture identity, and environmental considerations.

India being the vegetarian capital of the world, has 30% population to be vegetarian, according to Chittilapally (2019). However, the majority of them fall under Lacto-Vegetarian group as dairy consumption and cow rising are integral parts of the culture. Many people prefer meat for health and nutrition, and above all, they find it an enjoyable and pleasurable part of one's meal. However, the rise of veganism has set fire in India also. Several social activists, vegan influencers, ongoing campaigns, events, programs, and challenges are in line to promote veganism in a greater extent in India. Even renowned Multinational companies in food retail like Mc Donalds, Café Coffee Day etc., in India have realized the growing demand for vegan foods and have introduced vegan options to their menu (Flock, 2009). Metropolitan cities in India have widened the vegan food options, yet those are found costlier. Even a tiny pack of Tofu costs ₹ 150.

## Impact of Vegan Diet on Agriculture and Dairy Sector

India being the largest producer and consumer in the milk and meat industry with dairy as a vital part of diet in both rural and urban lifestyle, must pay attention to this concept. Several types of research show that the impact on the dairy and animal sector was still little and have declined only by a small margin so far, but there is no sign of slowing down in the spread of veganism. It creates competition among Agri and dairy farmers and even consumers. Vegan is synonymous with healthy foods, and people choose organic foods to be healthy, thus creating a drastic demand for organic foods. Studies quote that the demand for organic foods and snacks has grown by 40%, but the land under cultivation to meet the demand is 1%. This places extreme pressure on the farmers and could even shackle the economy.

Moreover, dealing with organic farming in a large scale also creates complications in terms of process, production, availability of resources etc. Also, vegan users are hyper hyper-aware of the products they use to ensure no animals are harmed. Thus, the producers need to be extra cautious to prove the quality of their produces and make the supply chain more transparent to gain the consumers' trust.

## Impact of Veganism on Climate and Environment

According to Coelho (2011) and Cooper *et al.* (2018), animal animal-based products and animal husbandry contribute 18% of Green House Gas Emission, leading to Global warming. It is estimated that it takes 2.2 kcal of fossil fuel to produce 1 kcal of plant protein while 4 to 57 kcal of fuel for 1 kcal of animal protein. Rearing of animals and grazing causes deforestation. Researchers point out that beef production is 34 times climate pollution-intensive compared to beans and lentils production, and a shift from omnivore to vegan diet reduces carbon footprint by 1.5 tonnes of CO<sub>2</sub>eq. A carnivorous diet could pose a threat to the biodiversity of terrestrial and aquatic also. 30 percentage of the space occupied for livestock was once wildlife habitat. Animal farming uses 70% of available arable land; thus, veganism could reform the land use pattern.

Similarly, Coelho (2011) also quoted that 32% of marine fishes were overexploited, and 53% was fully exploited. It is predicted that the marine fish status will be collapsed by 2048 owing to overfishing. Even aquaculture could also be equally dangerous as the escaped fish from the farm and the waste released into oceans and sea could destroy the stability in the bio-diversity. It is also reported that 8% of the global water available for human consumption is used for livestock. The water required to produce 1 kg of animal product is 100 times higher than to produce 1 kg of plant-based products.

Most importantly, the animal waste released into the environment also seems to be a severe water polluter. Plant farming could prevent soil erosion while no data was reported on the contribution of livestock on soil erosion. Thus the plant-based foods are more environmentally friendly and reduce emissions than rearing cattle. Another study by Cleveland *et al.* (2017) reported that the animal husbandry sector has 42 times more land use, 2 times more water use, and four times more nitrogen, while it generates 3 times more GHGEs than the staple plant foods. However, Cottle (2018) claimed that animal husbandry is the only potential sector to consumes the by-products or waste produced from agriculture as inputs. Straws and stalks could be fed to the livestock. It could even be used to thatch roofs but requires many effort. Ultimately the stand solution used for the disposal of waste products would be far more cost-effective forms. A practice that accounts for 11% of artificial methane emissions, not to mention a good portion of CO<sub>2</sub> emissions. According to Chai *et al.* (2019), the environmental impact on land and water differs significantly among vegan, lacto-ovo-vegetarian, and omnivorous diets. The level of water usage was found higher with two diets other than the vegan diet.

## Impact of Vegan Foods on Health

All the benefits to the environment is found to be optimal for the environment with less GHG emission. However, a sustainable diet is one with less environmental impact, protective and respectful of biodiversity and ecosystem, nutritionally adequate, safe, healthy, culturally acceptable, and economically affordable. Several study results make it obvious that overweight and obesity

are predominant among omnivores while underweight is prevalent among vegans. According to Clarys *et al.* (2014), the vegan diet includes low total energy intake, low sodium intake, better intake of good fat, low protein, and high dietary fiber. But Vegan diet has a high risk of Cobalamin, Calcium, Vitamin D, Iodine, and Selenium deficiency that must be supplied through external supplements. At the same time, it is a higher amount of Folate and the same amount of Potassium and Magnesium compared to other diet forms. Children need a higher amount of protein during the early growth stage, but it is comparatively less than an omnivore diet. Thus the growth of children is slightly smaller than omnivores.

Calcium deficiency is attributed to a higher risk of fracture among vegans of 30%. The iron intake in vegan women is comparatively higher than omnivorous women. However, it will not automatically result in optimal iron status since non-haem iron absorption is less efficient. The Zinc uptake could also be minimal due to deficiency of Selenium. Pregnant vegan mothers are recommended to take DHA supplements. Generally, cow's milk is the reason for vegan kids to be smaller than non-vegan kids. According to Sutter (2017), cow's milk usually increases IGF-1 (Insulin-like growth factor 1) that elevates 20-30% insulin in the blood and ultimately leads to overweight and Type-2 diabetes, prostate and breast cancer, premature menarche, and acne. Thus Vegan foods could be a possible alternative to avoid this. However, few claims that the benefits could be attained only with the help of experts and not by the layman as a vegan diet can be adequate, complete, and sustainable only on proper planning and supplementation by the caretakers.

### **Impact of Veganism on Economy**

According to Green Plant Survey conducted during 2015, one-third of Americans chose to leave meat; thus, 15% and 37% of the decline was evident in red meat sales and milk consumption, respectively. According to the Australian Bureau of Statistics 2013-14, the total income generated through agriculture plant plant-based products contributes to about 55%, while animal-based products contribute about 45% of total income and 7%

of total export. According to an Annual report from the Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture & Farmers Welfare, Government of India (2018), about 20.5 million people in India depend upon livestock for their livelihood. Livestock contributed 16% to the income of small farm households as against an average of 14% for all rural households. India has vast livestock resources. The livestock sector contributes 4.11% GDP and 25.6% of total Agriculture GDP. In general, employment is generally reported as a whole for a plant, animal, forestry, fishery, and supporting service sectors. Livestock provides livelihood to two-third of rural communities. It also employs about 8.8 % of the population in India. Thus a drastic shift in food diet could cause a decline in countries GDP and livelihood of the citizens depending on animal husbandry. However, employment status could remain static as animal product-based companies could shift to produce plant-based alternatives.

According to Lusk *et al.* (2016) a partial vegetarian who eats meat occasionally on average spends up to \$148 per week on food while it's \$11 per week, which is found to be 15% and 10% increase in saving compared to the results of Berners-Lee *et al.* (2012) and Grabs (2015). Thus, the changing dietary pattern could bring changes in the economy in both micro and macro level. He also reported in 2009 that the cost for producing nutrients is also higher with livestock than plant-based nutrients. Similarly, the plant-based products used to feed livestock would face a fall in demand, in turn, would affect the cost, production, and area of cultivation. Moreover livestock-based processing sectors generally increase the values of agricultural products like corn, soybeans, and grass in economical ways. They take these plant-based products as inputs and convert them into high-value products like grounded meat, pork chops etc. Thus, the drop in the livestock sector would also cause an economic impact on a few crop-based sectors (Lusk *et al.* 2009).

### **Budding of New Vistas of Agro-based Industries**

Vegan diet has ultimately led to the development of several new plant-based foods and industries. First, to know what is Plant-Based Food, it is a direct replacement

for animal-based proteins such as plant-based meat, seafood, eggs, and dairy products. These are produced through a bio-mimicry approach to replicate the taste and texture of animal-based foods. This business is taking off in several Western countries. Foods used as a supplement are jackfruit, seitan, tofu, tempeh, chickpea, kale, fungi, fungi, and algae-based products. Plant based meat, milk, egg, egg substitutes, Mayo, other dairy alternatives (cheese, yogurt, curd, butter, ice-cream, dips, dressings, sour-cream, frozen desserts, creamers) etc. According to Cameron and Neil (2019), it has been estimated that \$17.1 billion is totally invested in the plant based food industry in the US, among which 233 are completed deals with 229 unique investors. In 2018, \$673 million was invested in these types of companies. According to Mulyany *et al.* (2019), the rise of the veganism concept has catalyzed emergence of several industries producing alternatives to animal-derived products with billion-dollar investments like non-dairy milk and cheese, imitation beef, chicken, fish and pork, and leather made from pineapple leaves or apple peel.

## CONCLUSION

Vegan is a restrictive diet that strictly says no to - based foods and products, understanding the health, environment, and ethical issues underlying the carnivorous diet. Irrespective of the benefits, utmost knowledge, care, and attention are essential to successful with a Vegan diet. Many people still believe an omnivorous diet to be more tasty, entertaining, nutritious, healthy, complete, and balanced. Apart from the environmental hazards caused by animal husbandry, it also has socio-cultural solid roots in our country. It severs to be the base of organic farming, natural farming, etc. The livestock sector can utilize the waste from the farming sector as potential inputs and convert it into beneficial outputs. However, the internet-savvy generation takes up this trend of food to severe heights. Thus the forthcoming social change is inevitable. A sudden shift from the traditional form of diet to a new system of diet could collapse the stability of the ecosystem, food chain, and lifestyle, thus the pros and cons of this trending modern diet concept in terms of multiple dimensions, including production, processing,

marketing, employment, economy, environment, health, etc., about Indian conditions must be studied and should prepare the nation to face the consequences.

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