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Going Organic: Empirical Study on Awareness of Organic and Aquaponically Grown Vegetables

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ABSTRACT

In a world of constantly changing dynamics of lifestyle and health-culture, it has become necessary for individuals to constantly keep a check on their diet and its contents. Increasing levels of pollution and stress negatively affects both, the health and longevity of an individual. Owing to a decline in average health, more and more people today have started looking for alternatives that could make their diet cleaner and healthier. One such alternative identified is organic produce, which is 100% chemical free, and therefore healthier than conventionally produced food products. However, organic produce is highly expensive, making it less attractive to the masses. Aquaponics, is one such technique of producing organic vegetables in a sustainable manner, thereby reducing its cost. This paper aims to understand the awareness levels of Aquaponics as a technique of organic agriculture. The study performs various tests in order to understand the levels of awareness of Aquaponically grown organic produce within the country. The findings of the study prove that factors such as the prices of organic vegetables, their availability and brand recognition play a major role in influencing the purchase decision made by consumers. On the other hand, factors such as education levels of the consumers or their income levels do not have a major impact on their purchase patterns of organic vegetables. Further analysis revealed that greater awareness about Aquaponics in general, and increased production of organic vegetables through Aquaponics also has a positive impact on the purchase of such vegetables.

KEYWORDS: aquaponics; organic; awareness; proximity; purchase pattern

Introduction

Agriculture in India has survived for centuries; it has stood the test of time and thrived well even in extreme circumstances. It has undergone various changes to keep up with the fast pace of technology, opportunity and sustainability. For thousands of years, agriculture in India was practiced without the use of any chemicals. The advent of technology helped increase produce on a massive scale with the help of fertilizers and pesticides*(Government of Punjab – Human Development Report, 2004; Section – ''The Green Revolution'')*. This produce, although helped India become self-sufficient, stripped our lands of the essential nutrients required for plant growth, thereby demanding greater quantities of chemical fertilizers and pesticides. India today, ranks at 76 of 113 major countries in the world in terms of Food Security *(Food Security Index, 2018)*.

The agricultural sector of India is the single largest employer in the country, accounting for about 50% of the total working population of our nation, as of 2018*(Madhusudan L)*.This sector contributes to about 18% to the country's GDP, with an ever growing rate of production *(Department of Economics and Statistics)*. Agriculture and allied activities have witnessed major changes in terms of the White Revolution, the Green Revolution, the Blue Revolution and the Yellow Revolution, as an effort to promote growth in the various sectors of Agriculture in the country *(Indian Government)*.However, due to the depleting qualities of soil and increasing levels of chemical in food produce, farmers wish to shift back to primitive methods of food production that are chemical-free *(Indian Government – Department of Agriculture)*, and such chemical free produce is called 'organic' produce. The state of Kerala *(The Hindu, 2016)*, and Sikkim *(The Hindu, 2012)*, were the first in the country, to shift to being 100% Organic in their agricultural techniques. Although Organic Food products have started making an appearance in the Indian Market, the underlying question is 'How much of the market is

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aware of the presence, health and environmental benefits of Organic Products?'

Various articles presented in different forums state that the Indian Population is highly unaware of Organic Food Products. As much as we are aware of the existence of organic products, most Indians only know about the fact that organically grown plants are healthier. People are not aware of the factors that make such produce more fit for consumption and neither do they know the reasons behind the high prices of such produce. Organically grown produce is better for both, the land and the people who consume such produce. It is economically sustainable and helps in nurturing the soil on which such produce is grown. Organically grown produce provides both, food quality and safety *(Suryatapa, Annalakshmi, Tapan Kumar; 2020)*. Presently, Indian farmers have been hesitant towards organic farming due to reasons involving its high costs. Soil that has been fertilized using chemicals for decades takes time to heal and provide similar quality of output when fertilized using organic products, the costs of organic seeds is higher and the absence of supportive policies towards the same is a major setback.

The Indian economy accounts for 20% of the entire population in the world; however, it represents less than 1% of the world's total Organic Consumption *(Pankaj Agarwal, 2018)* despite having a large Organic Farmland. An independent study carried out in the Trichy district of Tamil Nadu concludes that about 76% of the respondents have prior knowledge about Organic Products and about 63% of them purchase Organic Food Products on a regular basis *(Rock Britto, Puhalenthi, Gayathri; 2017)*. On the other hand, a research carried out on such awareness in the city of Coimbatore, Tamil Nadu states that only 14% of a population of 550 respondents surveyed have high levels of knowledge about Organic Products *(M. Jayanthi, 2015)*. As according to N Balasubramanian, CEO of 24 Organic Mantra, the market for such produce is expected to increase at a rate of about 25% as more and more people become aware about the necessity of lifestyle changes. He believes that people would be willing to pay a premium of up to 40-50% for such products in the near future *(SayantanBera, May 2018)*.

The technique of aquaponics allows farmers to grow vegetables year-around using comparatively lesser quantities of both land-space and water. This technique of farming is highly energy efficient and makes it possible to grow a variety of crops in regions where conventional farming would not be a possibility *(2017)*. Furthermore, the system produces its own nutrient-rich fertilizer from the excreta of the fish and also requires substantially less labor, making it more efficient *(2018)*. The system and produce are both environmentally sustainable, and helps consumers improve their overall health. The produce does not use any chemicals in the form of fertilizers or pesticides and also enables agriculturalists to produce more quantity than that produced in conventional farming *(David, Jillian, Laura; 2014)*.

Literature Review

Owing to the changes in lifestyle patterns, Organic consumption is becoming increasingly popular within the country. More and more consumers are shifting to chemical-free products, not only for direct consumption, but also for indirect consumption in the form of beauty products, textile and food-garnishing. Organic farming in India has been encouraged by the government through various schemes, due to which large amounts of land have been dedicated to organic cultivation *(EY – The Indian Organic Market)*. India currently has about 3.56 million hectares of land under organic cultivation, making the land area under cultivation, the ninth largest in the world *(FIBL & IFOAM, Year Book 2018)*. In the year 2017-18, India produced about 1.7 million metric tons of certified organic produce; India thus ranks first in the number of organic producers in the world *(Agricultural and Processed Food Products Export Development Authority)*. At the same time, consumption in the country has improved in the past five years due to various factors such as the fast paced growth in the e-commerce sector and the low-cost availability of internet services, coupled with higher literacy rates and awareness *(RishabhChokhani, CEO Naturevibe Botanicals, 2018)*.

With an increase in disposable income, consumers have started shifting to healthier options in order to improve their health and lifestyle *(Justin Paul, Consumer Behaviour and Purchase intention for organic food)*. The Indian Organic Consumer Market is currently estimated at INR40,000 million and is expected to experience an increase of up to INR100,000 to 120,000 million by 2020, with a similar growth in the export sector *(Dilip Kumar Jha, Business Standard 2017)*. One reason for the upward trend in the organic sector in terms of production is the profit margin of up to 40% as compared to conventionally produced food products *(Arpita Mukherjee, Promoting Organic Food Products and Exports, 2017)* that encourages producers and suppliers to enter this sector.

It has been identified that most farmers in the country shift to organic cultivation majorly due to the premium prices, and the additional health benefits available with the same. On the other hand, lack of knowledge and awareness and institutional support are discovered to be the barriers to organic cultivation *(Panneerselvam, Niels Halberg; 2011)*. Consumers of organic produce state that the various factors that affect their purchases to be the reputation of the retailer, the utility of organic produce, and availability of certification related information *(SomnathChakrabarti, Factors Affecting Organic Purchase in India)*. Most consumers understand the benefits of organic produce in terms of lower concentrations of pesticides required for production as compared to traditionally produced crops *(Marcin Baranski, Effects of Organic Food Consumption on Human Health, 2017)*, which in turn reduces the health risk of organic produce *(Only Organic, Organic News; 2014)*. What few consumers realise is the benefit of organic production on the environment in terms of improvement in soil quality, conservation of water and biodiversity and an improved carbon footprint that significantly reduces green gases *(Food and Agriculture Organization of the United Nation)*. Given these understandings among the community of consumers, the Organic packaged foods and beverages market has been emerging in the country with a market of INR533 million in the year 2016, growing at a rate of 17% per year *(Seetharaman, 2017)*. India has also been

increasingly exporting organic products to other countries worth about US $299 million (2015-16), majorly to the United States, Canada, Europe and New Zealand *(Agricultural and Processed Food Products Export Development Authority)*.

Organic cultivation has for the past few years been encouraged in the country. Various individuals and organizations have taken up the responsibility of educating farmers of all age-groups on the benefits and techniques involved in organic agriculture *(Surabhi, Rachel; 2012)*. Studies suggest that organic agriculture is economically sustainable as it allows for greater reliance on human and natural resources. It ensures growth of plants in areas of lesser rainfall and insufficient soil fertility. It also ensures better health of consumers and is hence accepted by consumers more easily *(Prabha, Mohan; 2005*).

Aquaponics is a system of agriculture that thrives on a symbiotic system between fish and plants using aerobic mineralization to convert fish excreta into plant absorbable nitrates *(Waterfarmers Aquaponics)*.Aquaponics is a sustainable system integrating the processes of aquaculture and hydroponics in order to produce fruits and vegetables for consumption *(Maria Jose Palma, Urban Forestry and Greening, Vol 20, 2016)*. It reuses water and nutrients for cultivation making it a very promising alternative to traditional agriculture *(Shafeena T, 2016)*. As a system, Aquaponics uses 90% less water and also has a significantly lower carbon footprint *(Waterfarmers Aquaponics),* and is also scalable since it can be set up almost in every land type and terrain*(The Aquaponic Source)*.There are various techniques that can be followed for Aquaponic production; including Deep Water Culture, Nutrient Film Technique, Media Beds and Vertical Aquaponics; each of which enable the cultivation of different varieties of fruits and vegetables *(The Aquaponic Source)*. Various initiatives of Aquaponics have been identified across the globe in various terrains, land types and weather conditions, thus providing evidence to its versatility, and scalability. Systems have been set up in both, domestic and commercial spaces thereby making it a flexible operating system *(Relevance of Aquaponics in New Zealand, John Hambrey, 2013)*. Aquaponics, all in all is both energy efficient, and water efficient; it allows production all through the year and promotes the cultivation of diverse crops making the system efficient on its own.

Aquaponics has been identified as a sustainable technique of cultivation (*SimonGoddek, Challenges of sustainable and commercial Aquaponics, 2015)* with reference to the definition as given by *Lehman and Francis* who respectively state that sustainable forms of agriculture are those that do not deplete any natural, non-renewable resources that prove to be essential and of material nature in order to sustain agriculture and its processes; and those systems of production that can be designed such that they provide a closure to nutrient cycles. Aquaponics, as a system of agriculture allows for the reuse of various resources such as soil and water, thereby saving humungous amounts of both; it uses about $1/8^{th}$ of land and $1/10^{th}$ of water that would be required in traditional cultivation *(Farming for the Future – Aquaponics in India)*. The technique of recirculating water in Aquaponics, allows for water reuse of about 95-99%, eliminating only the amount that gets evaporated (*SimonGoddek, Challenges of sustainable and commercial Aquaponics, 2015)*. Aquaponics, therefore is highly sustainable and is a lucrative technique of food production.

Aquaponic systems, along with saving water and soil, enable the harvest of a larger number of crops with greater harvest cycles throughout the year, thereby increasing production manifold as compared to traditional farming. Aquaponic cultivation requires one acre of farmland for six acres required in traditional farming *(Jackson McLeod, Dresden)*. Aquaponics is a highly futuristic farming technique that contributes to regional and national self-sufficiency, ensures greater sustainability through 0% emissions, 100% water conservation, 0% residue and 100% chemical-free produce *(GiriDayakar-Jagmohan, 2017)*.

In order to understand better, the trend in the Organic Market, and to establish a pattern in the Aquaponics sector, the researchers have conducted a study on the awareness of Organic Products in order to answer the following questions:

1. What is the level of awareness of Organic Products among the Indian citizens?
   It is evident from previous literature that Indian consumers have minimal knowledge about organic products and the reason why they are better than those grown conventionally. Therefore, it becomes necessary to understand the degree of awareness about the availability of such consumables in the market and the willingness of consumers to accept such produce for their daily consumption needs. The level of awareness and the depth of knowledge possessed by Indian consumers will raise further questions with regards to what aspects of organic produce they are aware about and whether they would want to expand their knowledge on this subject. Furthermore, it is essential to identify key factors that the consumers are unaware of but are of material importance in making their purchase more valuable. Therefore, this question is a window to the perception of the consumers of India.
2. What are the various factors that affect the purchase of organic products?
   Among consumers of daily grocery, it is essential to understand the various factors that have an impact on their purchase decision. Key factors such as price of the produce, its quality, availability and brand value play an important role in altering the mindset of the consumer and hence need to be understood. Most consumers today refrain from purchasing organic products because they feel that such products are highly priced but hold similar nutritional value. This is also a major reason as to why farmers hesitate form producing organic vegetables; they incur higher costs of production, but consumers are unwilling to purchase at such high prices. Therefore, it is necessary to understand the various factors that impact the purchase of organic products.
3. How strong is the influence of these factors on the purchase of Organic products in the country?
   Once the factors affecting purchase decision have been identified, it is necessary to rate them in an order to understand the degree to which each factor impacts purchase decision. This enables us to formulate strategies in order to control the impact of

each factor and to educate the consumers about them. The degree of impact also allows us to study the nature of these factors and the psychological impact of each of them, thereby enabling a deeper understanding of why and how each factor influences the purchase decision of a potential consumer.

4. What is the level of awareness of Aquaponics in India?
   Aquaponics being a relatively new technique of agriculture is not very widely known in our country. This is why it is difficult to market aquaponically grown produce as the concept hasn't yet reached the masses. This study focuses on understanding the degree of awareness of aquaponically grown produce or the technique of aquaponics. This data will help establish alternate methods of marketing so as to educate the consumers and to bring the product into the market.
5. Is Aquaponics a feasible and scalable technique of cultivation for the future?
   Finally, it is essential to understand whether a technologically advanced method of farming that requires heavy setting up expenses would be feasible and scalable for the future. Being environmentally sustainable, it is evident that such a method of farming would allow the country to make progress and would also provide sustainable income to the farming community. However, the setting up expenses may refrain farmers from using this technique for production. This dilemma is one that needs to be solved one step at a time. Therefore, this research shall provide the base for further study in this field – a study that might help analyze how feasible modern agriculture would be for a country like ours.
   This research aims to understand the extent to which Indian consumers have knowledge on organic produce. This paper strives to determine the various factors that influence the purchase decisions of consumers. Hence, the hypotheses must revolve around such possible factors that may alter the decisions of consumers. These may include income of the consumer, price of produce, quality of produce, and brand value in the minds of consumers.

Hypotheses Development

A theoretical framework has been developed in order to assess the role of factors influencing the demand of organic vegetables in the market, and more specifically, the demand of Aquaponically produced vegetables in the Indian market. The various factors influencing the demand are divided into demographic, knowledge-related and financial factors. These factors are further divided into the following:

- Demographic factors are divided into age levels of consumers, availability of organic products and perceived reliability of the produce,
- Knowledge related factors are divided into education levels of consumers, and methods to spread awareness about the produce
- Financial factors include costs of the produce and income levels of consumers.

The theoretical framework of this study has been derived through a thorough analysis of the literature review. A study of the various factors affecting the purchase of organic vegetables and the factors contributing to the spread of awareness about Aquaponics as a technique of production, have led to the development of the following hypotheses.

H1: Availability has a positive impact on the purchase of organic vegetables.

Availability of organic produce refers to the proximity between the place of sales and the consumer. It has been identified that ease in availability of organic vegetables has made people comparatively more attracted to trying out the product rather than when it is not conveniently available. Therefore, it is reasonable to believe that a vendor selling organic vegetables closer to residential areas would record more sales than one who does not. Such proximity to the store would induce in people, the drive to experiment on a product that claims to be better than its traditionally produced counterparts, thereby positively influencing purchases.

H2: Reliability on selling brand has a positive influence on the purchase of organic vegetables.

Brand recognition often plays a vital role in creating and/or altering the perception of potential consumers about a particular product. The more recognized and popular a brand is, the higher is likely to be the trust of consumers on its products. Consumers tend to incline their preferences towards more popular brands as they are aware of their reach and also believe that a greater reach can be achieved only through greater reliability. Thus, it can be stated that brand recognition depends heavily on the reliability quotient of the brand; and such reliability, renders a positive influence on the purchase of organic vegetables.

H3: Education levels of consumers have a positive impact on purchase of organic vegetables.

Education in the broader sense refers to the degree of awareness and knowledge possessed by potential consumers. Higher levels of education, drives humans to gather greater information through research and analysis in order to understand and discover better and more efficient ways of living. It has been studied and proved by many, that higher levels of awareness motivate people to accept new ideas, products and technology. Furthermore, such acceptance leads to purchase and true utilization of new products and technology.

H4: Income levels of the consumer have a positive effect on the purchase of organic vegetables.

The earning capacity of an individual often determines his lifestyle. The greater the earnings, the higher is the standard of living, the motivation to care about one's health and longevity, and the more expensive are the means to achieve good health. It has been repeatedly observed that the rich, more often than the poor are motivated enough to pay a premium on the purchase of such a basic necessity as food. Therefore, it would be reasonable to believe that the upper middle class and the rich are the consumers of organic vegetables in

the narrow sense and organic products in the wider perception.

H5: Prices of the products positively influence the purchase of organic vegetables.

The selling price of a commodity is what truly defines the buyer it attracts – prices of materials have more often than not, played a decisive role in the purchase of any commodity. The higher the price of a commodity, the lesser its demand; is true, in most of all cases, indicating why organic products currently have only a few buyers. The entire study on consumer behaviour emphasizes on one common trait of a majority of buyers; to look out for the least expensive product with the highest quality. This, in light of other evidences effectively indicates a relation between price of a commodity and purchase behaviour of consumers.

H6: Aquaponic production will positively impact purchase of organic vegetables.

Aquaponics as a technique of production is expected to increase the volume of production and at the same time, to reduce costs. This theory has been validated in the various existing Aquaponic farms across the globe. Aquaponics does reduce expenses of production, which in turn would have a direct impact on the selling price of these products. As the prices of Aquaponically grown organic vegetables begins to fall below that of traditionally produced organic vegetables, more and more people get attracted to it therefore increasing purchases. Thus, it is reasonable to believe that increase in production of organic products using the technique of Aquaponics will have a positive impact on the purchase of final organic vegetables.

Table 1: Age of respondents

Age	No. of Respondents
15-30	140
30-45	72
45-60	36

H7: Awareness about Aquaponics will positively impact purchase patterns of individuals.

Increasing awareness among citizen about the various products available in the market enables consumers to make better judgements regarding the same, thereby ensuring quality in decision making. Education and awareness about products available in the market, helps create a better understanding about the same, and thus impacts the decisions related to purchase. A positive opinion about products creates in the minds of consumers, the urge to experiment with a purchase.

Methodology

The present study is descriptive in nature. Convenience sampling was used to contact the sample respondents with the intent of generating more responses. An online questionnaire was forwarded to potential respondents along with a reminder in order to ensure speedy response. A response rate of 62% has been recorded with 248 out of 400 responses.

The questionnaire was divided into three sections: Section A consisted of closed-ended questions relating to demographic variables, Section B included the questions on awareness and purchase of organic products, while Section C had questions on awareness of aquaponically grown vegetables. Both the sections B and C used 5-Point Likert scale (1-Strongly Disagree, 5 – Strongly Agree) for developing options for the statements.

Results and Discussion

The participants of the study belong to different parts of the country thereby ensuring a variety of responses that are not restricted to limited boundaries. The study sample has been represented in Table 1. A majority of the respondents as recorded belong to the age group of 15 to 20 years accounting for the informed population of our country.

Among the 248 respondents, it has been observed that 48% were males and 54% of the respondents have

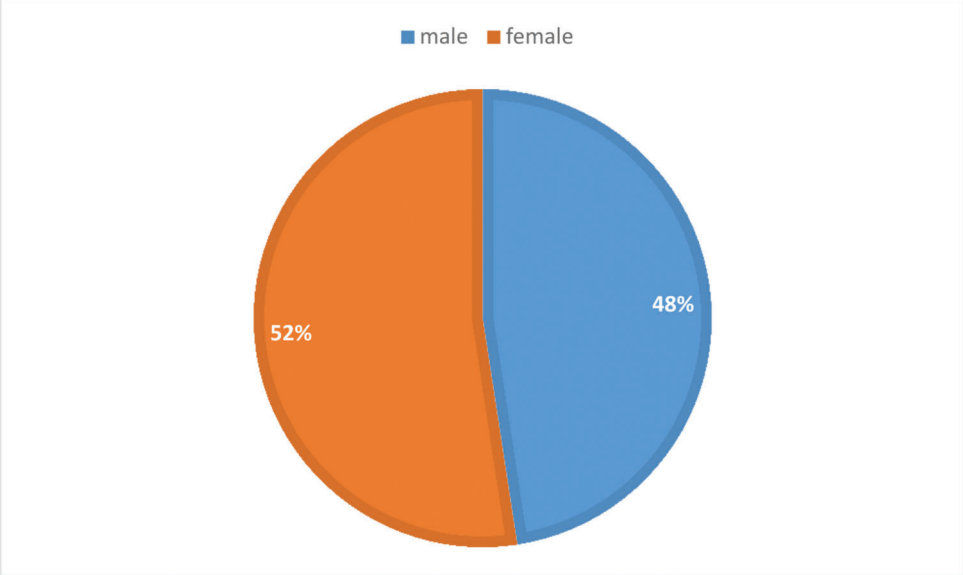

Figure 1: Gender count of respondents

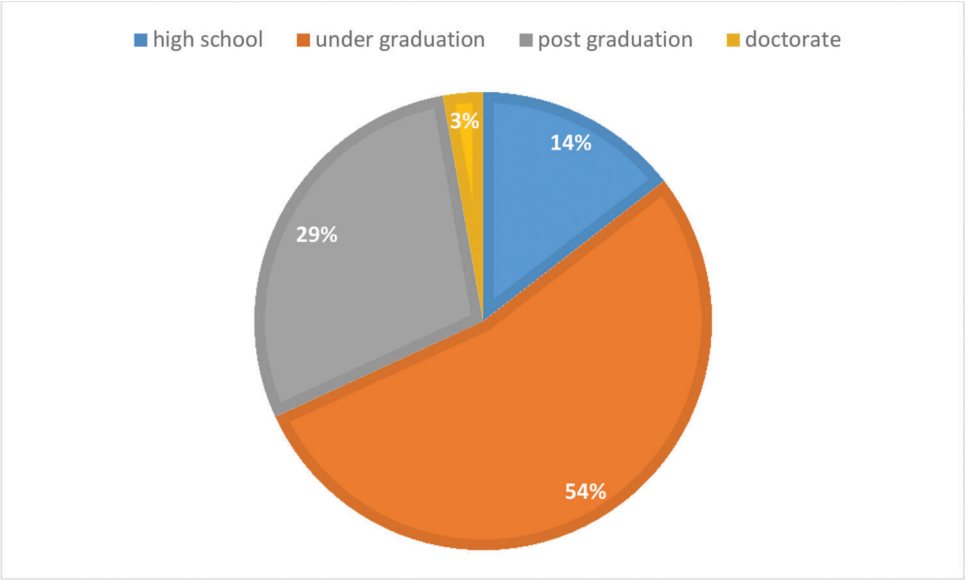

Figure 2: Educational qualification of respondents

Table 2: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.486[a]	.237	.214	.855

a. Predictors: (Constant), Awareness, Pricing, Availability, Educational Qualification, Brand Recognition, Monthly Income, Aquaponic Production

acquired at least an under-graduation certificate. 95.6% of our respondents have some knowledge about organic products thereby ensuring authenticity of responses.

The questionnaire used for the study was drafted post an extensive analysis of the existing and past market conditions for organic products. Variables have been assigned such that conclusions can be drawn with an ease of understanding. Questions regarding the wide organic market and the specific technique of Aquaponics were included in order to provide a better understanding to our respondents and to ensure real responses.

The questionnaire was drafted post consultation and was corrected for any sensitive and redundant information. It was then circulated through email and other online platforms. The responses have been discussed in order to understand its quality.

Testing of Hypotheses

Multiple regression model was employed for testing the hypotheses stated above. The relationship between multiple independent variables (predictor variables) and one dependent variable (criterion variable) is best explained by the multiple regression model. In our study, an attempt is made to explain the relationship between the purchase of organic products (Dependent Variable) and the predictor variables availability (Proximity), Brand Recognition, Education levels, Income levels, Prices of products, Aquaponic production and Awareness about the products. The model is arrived at using SPSS Version 21 Software.

Table 2 indicates how well a regression model fits the data. A value of 0.486 in the R column indicates a good level of prediction. The R square column represents the proportion of variance in the purchase of organic products (dependent variable) that can be explained by the independent variables availability (Proximity), Brand Recognition, Education levels, Income levels, Prices of products, Aquaponic production and Awareness about the products. We can see from our value 0.237 that our independent variables explain 23.7% of the variability of our dependent variable.

The F-ratio in the ANOVA table 3 tests shows that the overall regression model is a good fit. The independent variables availability (Proximity), Brand Recognition, Education levels, Income levels, Prices of products, Aquaponic production and Awareness about the products statistically significantly predict the dependent variable purchase of organic products with the values $F(7,240) = 10.621$, $p < 0.05$.

The general form of the equation to predict 'Purchase of organic products' from 'availability(Proximity)', 'Brand Recognition', 'Education levels', 'Income levels', 'Prices of products', 'Aquaponic production' and 'Awareness about the products', is:

Predicted 'Purchase of organic products' = 3.003 + (0.150 x availability) + (0.349 x Brand Recognition) – (0.039 x Education levels) + (0.021 x Income levels) + (0.122 x Prices of products) – (0.012 x Aquaponic production) – (0.252 x Awareness about the products)

This is obtained from the Coefficients table 4 as shown below. However, from the table 4 it is found that educational qualification and monthly income are not statistically significant predictors of the Organic Products Purchase.

Cohen et al., 2003; Pedhazur, 1997; Pedhazur & Schmelkin, 1991 have argued on the possibility of comparing the beta coefficients of the predictors with each other. According to them, it is possible to say that predictors with larger beta weights contribute more to the prediction of the dependent variable than those with smaller weights, based on the visual examination of the equation.

Table 5 indicates the results of hypothesis testing:

Table 3: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	54.351	7	7.764	10.621	.000[b]
	Residual	175.451	240	0.731		
	Total	229.802	247			

a. Dependent Variable: Purchase of Organic Prdts
b. Predictors: (Constant), Awareness, Pricing, Availability, Educational Qualification, Brand Recognition, Monthly Income, Aquaponic Production

Table 4: Coefficients[a]

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	3.003	.404		7.440	.000
	Availability	.150	.075	.115	1.994	.047
	Brand Recognition	.349	.063	.334	5.585	.000
	Educational Qualification	-.039	.088	-.029	-.446	.656
	Monthly Income	.021	.041	.035	.525	.600
	Pricing	.122	.061	.113	1.987	.048
	Aquaponic Production	-.12	.083	-.010	-.149	.008
	Awareness	-.252	.084	-.218	-2.984	.003

a. Dependent Variable: Purchase of Organic Products

Table 5: List of hypotheses

Hypothesis	Sig. value	Status
Hypothesis 1: *Availability has a positive impact on the purchase of organic vegetables*	.047	Accepted
Hypothesis 2: *Reliability on selling brand has a positive influence on the purchase of organic vegetables.*	.000	Accepted
Hypothesis 3: *Education levels of consumers have a positive impact on purchase of organic vegetables.*	.656	Rejected
Hypothesis 4: *Income levels of the consumer have a positive effect on the purchase of organic vegetables*	.600	Rejected
Hypothesis 5: *Prices of the products positively influence the purchase of organic vegetables*	.048	Accepted
Hypothesis 6: *Aquaponic production will positively impact purchase of organic vegetables.*	.008	Accepted
Hypothesis 7: *Awareness about aquaponics will positively impact purchase patterns of individuals.*	.003	Accepted

This study was aimed at understanding the behaviour of consumers towards organic vegetables as compared to the more economically priced traditionally cultivated vegetables. This study is of value to producers and retailers who can develop a better understanding of consumer psychology towards organic vegetables.

The analysis states a positive relationship between availability of organic vegetables and purchase patterns of consumers, thereby stating the importance of proximity from the consumer's place of residence on their purchase preferences. Most consumers believe that a relatively expensive purchase is worth the money only if the product is easily available. Availability has a strong positive impact on the purchase of organic vegetables.

Similarly, the price of such vegetables also has a major impact on purchase decisions. Highly priced organic products are purchased occasionally as compared to the more economically priced traditionally produced vegetables. Brand recognition also indicates a direct relationship with the motivation to purchase among consumers. A recognized brand name provides consumers with security and allows them to regard the payment of a premium as fruitful and worthy. The study provides ample evidence of the influence reliability has on the purchase pattern of consumers.

On the other hand, the study denies a positive influence of income levels upon the purchase of organic vegetables. Most consumers have stated that income levels of the family do not restrict them from purchasing organic vegetables, although such purchases might not be on a regular basis but may happen occasionally. The study also states that education levels do not pose as a barrier to the purchase of quality edibles. Such purchase does not require a consumer to acquire formal education.

Implications of the Study

This study contributes significantly to the existing body of literature on the production and marketing of organic vegetables while shedding significant light on a relatively new technique of organic production called Aquaponics. This study fosters an understanding of the emerging demand for organic edibles and also analyses the various factors that influence the purchase patterns of such products. In this context, the study offers meaningful insights to producers and retailers of organic vegetables as it allows them to understand the intricacies of

consumer behaviour when it comes to the purchase of organic vegetables that are generally priced at about 20% higher than traditionally grown vegetables. The existence of direct, positive relationships between the availability, reliability and prices of organic vegetables to the purchase of such vegetables indicates the various opportunities available to producers and retailers to maximize sales.

Further, the focus on Aquaponics as a modern method for the production of organic vegetables that can replace traditional methods of cultivation at lower expenses and greater productivity represents a novel value addition to the existing research on organic edibles. Aquaponics, in itself represents a self-sustainable model involving minimum quantities of water, land and absolutely no amounts of chemical pesticides, thereby opening a window of opportunity towards a modern revolution in agriculture. This study indicates a positive influence of greater education and awareness of Aquaponics as a technique of production on the opinions and future purchase decisions of consumers. The study also reveals that employment of Aquaponics for cultivation would open up new avenues for sustainability and would revolutionize the agricultural sector of India. The findings of this study benefit agriculturalists, and retailers by allowing them to understand the behaviour of their target markets and thereby improving sales.

Conclusion and Scope of Further Research

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On the other hand, the study denies a positive influence of income levels upon the purchase of organic vegetables. Most consumers have stated that income levels of the family do not restrict them from purchasing organic vegetables, although such purchases might not be on a regular basis but may happen occasionally. The study also states that education levels do not pose as a barrier to the purchase of quality edibles. Such purchase does not require a consumer to acquire formal education.

A limitation to this study is the sample size selection from the research population. This study has been conducted with limited participants whose preferences may or may not be representative of all Indian consumers. Furthermore, this study tries to create an understanding of the degree of awareness about organic and aquaponic produce. It does not dive in deeper into the subject, which makes it a strong and potential base for future research on the topic. Further study on the feasibility of introducing tech-based agricultural techniques on a large scale in the country would help understand the potential of the agricultural sector of the country. Moreover, an analysis of the degree of sustainability achieved due to the existing tech-based agricultural setups would help the country make informed decisions in the same field.

This study lays the foundation for research in the field of consumer behaviour towards organically produced vegetables, and provides insights into such behaviour towards the more recently developed technique of organic production, Aquaponics. A further continual research on Aquaponics and its efficiency in the Indian geography can be carried out in order to understand the feasibility of this technique of production in the Indian geographical and climatic conditions, thereby to revolutionize the Indian agricultural sector in order to direct the production activities of the nation towards sustainable methods.

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