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Analysis Of Demand For Hydroponic Vegetables In Kendari

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Abstract

This study aims to determine the level of demand for hydroponic vegetables and to analyze the factors influencing the demand for hydroponic vegetables in Kendari City. The study was conducted at Nuri Horti Hydroponics and Faperta Hydroponics, which were selected through purposive sampling because they have a relatively large number of customers. Data collection took place from May to June 2024. The study employed a quantitative approach with a sample size of 31 respondents selected through accidental sampling. The data used consisted of primary data obtained through observation and interviews using a questionnaire, as well as secondary data obtained from the Central Statistics Agency (BPS), relevant agencies, and various supporting literature. Data analysis was performed using quantitative descriptive analysis and multiple linear regression. The results of the study indicate that the level of demand for hydroponic vegetables in Kendari City is relatively high, as evidenced by the majority of consumers making purchases 1–3 times per month with a purchase volume of less than 1 kg per month. The most widely consumed type of hydroponic vegetable is lettuce, accounting for 96.7% of total consumers. Regression analysis results indicate that the factors significantly influencing the demand for hydroponic vegetables are the prices of other vegetables and consumer preferences, while consumer income and the price of hydroponic vegetables do not have a significant effect. Thus, the increase in demand for hydroponic vegetables in Kendari City is more influenced by the availability of substitute products as well as consumer preferences regarding the quality, health benefits, and characteristics of hydroponic products.

Keywords: demand, hydroponic vegetables, consumer preferences, vegetable prices, Kendari City

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INTRODUCTION

The agricultural sector plays a vital role in food security and meeting the nutritional needs of the population. One of the rapidly growing agricultural subsectors is horticulture, particularly vegetable production. Vegetables are a staple food required daily and hold promising prospects as the population grows, living standards rise, and public awareness of the importance of a healthy lifestyle increases. Advances in agricultural technology have also spurred various cultivation innovations, one of which is the hydroponic system. According to Susilawati (2019), the development of hydroponic agriculture is driven by the public's need to cultivate horticultural crops more efficiently. Hydroponics is a method of plant cultivation that does not use soil as a growing medium but instead utilizes nutrient-enriched water and oxygen to support plant growth (Irawan et al., 2020).

Growing public awareness of health has become one of the factors driving the increase in consumption of hydroponic vegetables. Data from the Central Statistics Agency (2021) shows that vegetable consumption tends to rise as people's income levels increase. Although the price of hydroponic vegetables is relatively higher than that of conventional vegetables, many consumers still choose hydroponic products because they are considered more hygienic, fresher, and free of pesticide residues. Additionally, shifts in lifestyle—with people increasingly prioritizing food quality—have also boosted demand for hydroponic vegetables. This trend indicates that hydroponic vegetables have significant market potential and are poised for continued growth in the future.

The city of Kendari is one of the areas with great potential for the development of hydroponic farming. According to Asriani (2020), the people of Kendari City have shown considerable interest in hydroponic farming due to its promising market opportunities, ease of cultivation, minimal use of pesticides, and relative stability during both the rainy and dry seasons. This growth is evident in the increase in hydroponic vegetable production over the past five years. Data from the Kendari City Agriculture Office (2021) shows that hydroponic lettuce production increased from 21 tons in 2017 to 78 tons in 2021. This increase in production indicates that hydroponic farming is growing and receiving a positive response from both the public and business operators in Kendari City.

On the demand side, the rise in consumption of hydroponic vegetables is influenced by various factors related to consumer characteristics and market conditions. Factors such as income level, the price of hydroponic vegetables, the price of substitute vegetables, consumer preferences, product quality, and product availability are key aspects that determine consumer purchasing decisions. Syahrizal (2019) states that producers need to consider price, production

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volume, product availability, and quality in meeting market demand. Furthermore, Rezkita and Tobing (2019) emphasize that the interrelationship among these factors plays a vital role in supporting sustainable agricultural development. Therefore, understanding the factors influencing the demand for hydroponic vegetables is essential to assist producers in formulating marketing strategies and business development plans.

Several previous studies have shown that the demand for hydroponic vegetables is influenced by various economic and social factors. Dwiwanti (2022) found that promotions, household income, and price have a significant effect on the demand for hydroponic vegetables at Griya Hidroponik Cirebon. Fatonah's (2022) study indicates that the price of hydroponic curly lettuce, the price of non-organic lettuce, income, and consumer preferences influence the demand for hydroponic curly lettuce at Super Holding Farm in Batu City. Furthermore, Savira and Prihtanti (2019) concluded that household income is a significant factor influencing the demand for hydroponic vegetables at PT Hidroponik Agrofarm Bandungan. Meanwhile, Hestiriani (2019) demonstrated that hydroponic vegetable farming is viable with a R/C ratio ( ) of 2.16. Nevertheless, research specifically examining the factors influencing the demand for various types of hydroponic vegetables in Kendari City remains relatively limited. In fact, consumer characteristics, socioeconomic conditions, and market developments in Kendari City may result in demand patterns that differ from those in other regions. Therefore, research on "Analysis of Hydroponic Vegetable Demand in Kendari City" is important to identify the factors influencing the demand for hydroponic vegetables as a basis for decision-making by producers, business operators, and the government in developing sustainable hydroponic agribusiness.

METHOD

This study was conducted in Kendari City, specifically at the Nuri Horti Hydroponics and Faperta Hydroponics businesses, which were selected through purposive sampling based on the consideration that both businesses have a substantial number of customers who actively purchase hydroponic vegetables. Data collection took place from May to June 2024. The study employed a quantitative approach, with the population consisting of all consumers of Nuri Horti Hydroponics and Faperta Hydroponics, the exact number of whom is unknown. Sampling was conducted using accidental sampling, meaning respondents who were encountered by chance and were willing to provide information. Using this technique, 31 respondents were selected as the research sample. The data used consisted of primary data obtained through observation and interviews using questionnaires administered to consumers, as well as secondary data obtained

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from various sources such as the Central Statistics Agency (BPS), relevant agencies, and literature relevant to the study.

Data analysis was conducted using quantitative descriptive analysis and multiple linear regression to identify the factors influencing the demand for hydroponic vegetables in Kendari City.

RESULTS AND DISCUSSION

Descriptive Analysis

Descriptive analysis was conducted to explain the level of demand and the factors influencing it. The information obtained is presented in the form of tables and descriptions to facilitate the interpretation of the research results. The first variable in this study is the level of demand, which is classified according to the frequency of purchases, purchase volume, and type of vegetable consumption. For further details, see Table 1 below.

Table 1. Consumer Demand for Hydroponic Vegetables at Nuri Horti and the Faperta Hydroponics Center in Kendari City in 2024

Variable	Category	Nuri Horti		Faperta Hydroponics	
		Total	%	Total	%
Purchase Frequency	1–3 times/month	8	57.1	11	64.7
	4–6 times a month	6	42.9	6	35.3
	> 6 times a month	0	0.0	0	0.0
Purchase Volume	< 1 kg/month	10	71.4	14	82.3
	1–2 kg/month	4	28.6	3	17.7
	> 2 kg/month	0	0.0	0	0.0
Types of Vegetables Consumed	Lettuce	14	100.0	15	88.2
	Pak Choi	14	100.0	16	94.1
	Spinach	8	57.1	5	29.4
	Chinese cabbage	0	0.0	0	0.0

Based on Table 1 above, it can be seen that the level of consumer demand for hydroponic vegetables at the two different study locations can be explained as follows;

1. Regarding the frequency of hydroponic vegetable purchases, the majority of consumers at Nuri Horti and Hidroponik Faperta buy hydroponic vegetables 1–3 times per month,

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accounting for 57.1% and 64.7%, respectively. Meanwhile, consumers who make purchases 4–6 times per month account for 42.9% at Nuri Horti and 35.3% at Hidroponik Faperta. These results indicate that the frequency of hydroponic vegetable purchases tends to be low to moderate. Consumers who buy 1–3 times per month generally adjust their purchases to household needs, consumption levels, and financial conditions. Conversely, consumers who buy more frequently incorporate hydroponic vegetables into their daily consumption patterns because they appreciate their quality and freshness. Thus, purchase frequency is influenced by consumption habits, food preferences, and the economic capacity of each consumer.

2. In terms of purchase volume for hydroponic vegetables, the majority of consumers buy less than 1 kilogram per month. The percentage of consumers in this category reached 71.4% at Nuri Horti and 82.3% at Hidroponik Faperta. Meanwhile, consumers purchasing 1–2 kilograms per month account for only 28.6% at Nuri Horti and 17.7% at Hidroponik Faperta. No consumers purchase more than 2 kilograms per month. This indicates that hydroponic vegetables are generally purchased in small quantities to meet daily household consumption needs. Additionally, the perishable nature of vegetables and consumers' habit of purchasing fresh food on a regular basis are reasons why purchase volumes are relatively low.
3. The most commonly consumed hydroponic vegetables among Nuri Horti and Faperta Hydroponics customers are lettuce and pak choi. Pak choi is the most sought-after commodity, with a consumer percentage reaching 96.8%, followed by lettuce at 93.5%, while spinach is consumed by only 41.9% of consumers and caisim is not consumed by respondents. The high interest in lettuce and pak choi is supported by their high nutritional content, such as vitamins, minerals, and fiber that are beneficial for health. Additionally, both types of vegetables have a fresh taste, are easy to prepare into various dishes, and have become part of the community's dietary habits. According to Cahyono (2014), Chinese cabbage contains various essential vitamins, such as vitamin C, vitamin B1, and vitamin B2, which the body needs. Therefore, lettuce and pak choi are the most sought-after hydroponic vegetable commodities and have the highest consumption rates among consumers in Kendari City.

Table 2. Summary of Income Levels of Respondents in the Horticulture and Hydroponics Program at the Faculty of Agriculture, Kendari City, in 2024

No.	Income (IDR/month)	Nuri Horti		Faperta Hydroponics	
		Total	%	Total	%
1	> 3,500,000	4	28.6	5	29.4

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2	2,500,000–3,500,000	10	71.4	9	52.9
3	1,500,000–2,400,000	0	0.0	3	17.7
	Total	14	100	17	100

Table 2 shows that the average income of respondents from Nuri Horti and Hidroponik Faperta in Kendari City falls into the middle-income bracket, specifically between Rp2,500,000 and Rp3,500,000 per month. Income level determines the quantity and quality of the products purchased. This is supported by the view of Tjipto *et al.* (2021) that as an individual's income increases, the quality of the product attributes selected also improves. Meanwhile, Gilarso (2008) *in* Karolina (2014) states that income is the total real income of all household members used to meet both collective and individual needs within the household.

Table 3. Prices of Nuri Horti Hydroponic Vegetables and Faperta Hydroponic Vegetables in Kendari City in 2024

No.	Product Type	Price (IDR/unit)		Price (IDR/kg)	
		Nuri Horti	Faperta Hydroponics	Nuri Horti	Faperta Hydroponics
1	Lettuce	10,000	10,000	45,000	50,000
2	Pak Choi	10,000	10,000	35,000	40,000
3	Celery	5,000	8,000	40,000	55,000
4	Spinach	10,000	10,000	45,000	50,000

Source: Primary data, 2024

Based on Table 3, there is a difference in the selling price of hydroponic vegetables between Nuri Horti and Hidroponik Faperta, both per unit and per kilogram. This price difference is influenced by variations in production costs, business management, distribution, product quality, and the marketing strategies implemented by each business. Hidroponik Faperta tends to set higher prices for certain commodities by considering product quality and the targeted market segment, whereas Nuri Horti offers relatively lower prices to enhance consumer appeal. These price differences can influence purchasing decisions, as price is one of the key factors consumers consider when meeting their vegetable needs. According to Simanjutak (2014), price changes affect consumer purchasing power, where a price increase can reduce the quantity of goods demanded, while a price decrease can increase demand. However, for hydroponic vegetable products that offer added value in terms of quality, cleanliness, and health benefits,

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consumers remain willing to purchase them even if the prices are relatively higher compared to conventional vegetables.

Table 4. Summary of Purchase Prices for Other Vegetables Among Respondents from the Horticulture and Hydroponics Program at the Faculty of Agriculture, Kendari City, in 2024

No.	Price (Rp)	Nuri Horti		Faperta Hydroponics	
		Total	%	Total	%
1	< 25,000	2	14.3	3	17.6
2	26,000 – 35,000	11	78.6	10	58.8
3	> 35,000	1	7.1	4	23.6
	Total	14	100	17	100

According to Table 4, the majority of respondents at Nuri Horti and Hidroponik Faperta purchased vegetables in the price range of Rp26,000–Rp35,000, accounting for 78.6% and 58.8%, respectively. Meanwhile, respondents who purchased vegetables priced below Rp25,000 were relatively few, at 14.3% at Nuri Horti and 17.6% at Hidroponik Faperta, while purchases in the price category above Rp35,000 were made by only 7.1% of respondents at Nuri Horti and 23.6% of respondents at Hidroponik Faperta. This indicates that the price range of Rp26,000–Rp35,000 is the most suitable price level for consumers' purchasing power and preferences. This price is considered affordable for middle-income consumers while reflecting better product quality compared to conventional vegetables. Although some consumers are willing to pay higher prices, particularly at Hidroponik Faperta, the majority still consider price as a key factor in their purchasing decisions. This indicates that consumers are not only concerned with price but also with the benefits derived from hydroponic vegetables, such as quality, cleanliness, food safety, as well as the health and environmental sustainability values inherent in the product.

Table 5. Summary of Consumer Preferences for Nuri Horti Hydroponic Products and Faperta Hydroponic Products in Kendari City, 2024

No.	Description	*Mean*	Notes
1	Taste and lifestyle	4.16	Very High
2	Information and education	4.35	Very High
3	Social and cultural influence	3.90	Very High
4	Product quality and image	4.03	Very High
5	Customer Experience	3.90	Very High

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Based on Table 5, all indicators of consumer preference for hydroponic vegetables fall into the "very high" category. The information and education indicator has the highest average score, followed by taste and lifestyle, product quality and image, and sociocultural influences and consumer experience. These results indicate that consumers' decisions to purchase hydroponic vegetables are not solely based on consumption needs but are also influenced by knowledge of the product's benefits, awareness of healthy lifestyles, and perceptions of the quality of the products offered. Consumers tend to choose hydroponic vegetables because they are perceived as fresher, cleaner, safer to consume, and aligned with modern lifestyles that prioritize health. Additionally, social support, positive experiences while consuming the product, and a positive product image further reinforce consumer preference for hydroponic vegetables. Therefore, this high level of consumer preference indicates that marketing strategies supported by consumer education, product quality improvement, and product image enhancement have the potential to increase demand for hydroponic vegetables in Kendari City.

Multiple Linear Regression Analysis

Demand for hydroponic vegetable products has continued to rise over time; demand for certain commodities such as lettuce and mustard greens must be supported by factors such as intensive cultivation technology and adequate post-harvest handling. The development of hydroponic vegetable cultivation at Nuri Horti and the Faculty of Agriculture's Hydroponics Program is supported by favorable agroclimatic conditions, as well as adequate natural and human resources. The factors influencing the demand for hydroponic vegetables were analyzed using multiple linear regression analysis.

Multiple linear regression is a statistical method used to understand the relationship between one dependent variable and two or more independent variables (Ghozali, 2005). In this context, multiple linear regression was used to analyze the factors influencing the demand for hydroponic vegetables. Before conducting multiple linear regression analysis, several tests were performed to ensure that the basic assumptions of the regression model were met.

Table 6. Factors Influencing the Demand for Hydroponic Vegetables at Nuri Horti and the Faperta Hydroponics Center in Kendari City in 2024

Dependent Variable	Independent Variables	Regression Coefficient	T-value	Sig.
	Constant	17.751	7.969	0.000
	Income Level	0.319 [ts]	-1,566	0.108

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Demand	Price of Hydroponic Vegetables	-0.216 ts	-1.543	0.125
	Prices of Other Vegetables	0.368 *	2.348	0.020
	Consumer Preferences	-0.432 *	4.131	0.000

Notes:

*Significant at α = 0.05; ts = not significant

Table 6 shows that the factors influencing the demand for hydroponic vegetables are the prices of other vegetables and consumer preferences, with regression coefficients of 0.368 and -0.432, respectively. Both variables are significant at the 0.05 confidence level, with calculated t-values of 2.348 and 4.131, respectively, and significance values of 0.020 and 0.000, respectively. Conversely, the variables of income level and the price of hydroponic vegetables are not statistically significant in influencing demand, with regression coefficients of 0.319 and -0.216, respectively, and t-values of -1.597 and -1.543. Based on the results of the multiple linear regression analysis, the following equation model was obtained:

$$Y = 17.751 + 0.319\ X1 + 0.216\ X2 - 0.368\ X3 - 0.432\ X4$$

Based on the table above and the results of the multiple linear regression analysis described, the following interpretation can be made:

The Effect of Income Level on Demand

Income is the total revenue earned by an individual or household from various economic activities and is often used as an indicator of a community's level of well-being. The higher the income, the greater an individual's ability to meet their needs and desires, including the consumption of high-quality food. In this study, the regression coefficient for the income variable of 0.319 indicates that income influences the demand for hydroponic vegetables. Theoretically, an increase in income will enhance consumers' ability to purchase value-added products, including hydroponic vegetables, which are known to be healthier, fresher, and of higher quality compared to conventional vegetables. Therefore, income is one of the key factors influencing consumers' decisions to purchase hydroponic vegetables.

The results of the study indicate that the higher consumers' income levels, the greater their tendency to consume hydroponic vegetables. This finding is supported by the fact that rising income is generally accompanied by increased health awareness and a shift toward a more modern lifestyle. Although the price of hydroponic vegetables is relatively higher than that of

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conventional vegetables, consumers with higher incomes are still willing to purchase them because they value the health benefits and product quality they receive. This finding aligns with Suhardi's (2016) assertion that income influences the demand for hydroponic vegetables, as consumers with higher income levels tend to make larger purchases. Consequently, rising household income has the potential to drive increased demand for hydroponic vegetables in Kendari City.

The Effect of Hydroponic Vegetable Prices on Demand

The price variable for hydroponic vegetables has a regression coefficient of -0.216, indicating that a one-unit increase in the price of hydroponic vegetables tends to reduce demand by 0.216 units, assuming all other variables remain constant. A negative coefficient value indicates an inverse relationship between price and demand, consistent with economic theory stating that as the price of a good increases, the quantity demanded tends to decrease. However, in this study, the effect of price on demand did not show a significant influence. This indicates that changes in the price of hydroponic vegetables have not yet become a primary factor determining consumers' purchasing decisions.

This trend can be attributed to consumers' growing awareness of the health benefits and quality offered by hydroponic vegetables. Most consumers believe that hydroponic vegetables are of better quality, fresher, cleaner, and relatively free of pesticide residues compared to conventional vegetables. Therefore, even though the price of hydroponic vegetables is relatively higher, consumers are still willing to buy them because they consider the price to be commensurate with the benefits obtained. In many cases, price is also perceived as an indicator of product quality; thus, a higher price can actually enhance consumer confidence in the safety and quality of the product . This finding aligns with the opinion of Ekawati et al. (2022), who state that hydroponic vegetables are generally more expensive than conventional vegetables but remain in demand among consumers who prioritize quality and health in their dietary choices.

The Effect of Prices of Other Vegetables on Demand

Price is the amount consumers must pay to obtain a good or service and is one of the key factors influencing purchasing decisions. In the context of this study, the prices of other vegetables refer to the prices of various types of conventional vegetables available on the market other than hydroponic vegetables. The presence of conventional vegetables as substitute products means that changes in their prices have the potential to influence demand

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for hydroponic vegetables. Therefore, the prices of other vegetables can be used to assess the level of market competition as well as consumer preferences regarding the types of vegetables they choose to consume.

The analysis results show that the "other vegetable prices" variable has a regression coefficient of 0.368, meaning that a one-unit increase in the price of other vegetables will increase the demand for hydroponic vegetables by 0.368 units, assuming all other variables remain constant. A positive coefficient indicates a positive relationship between the price of conventional vegetables and the demand for hydroponic vegetables. This suggests that when the price of conventional vegetables rises, consumers tend to switch to hydroponic vegetables as an alternative perceived to be of higher quality, cleaner, and safer to consume. Field observations also show that consumers in Kendari are beginning to consider health and product quality when making consumption choices. Thus, the price of other vegetables has a significant effect on the demand for hydroponic vegetables because the two products are substitutes in meeting the public's vegetable consumption needs.

The Effect of Consumer Preferences on Demand

Consumer preferences refer to an individual's tendency to choose a product based on attributes or characteristics deemed most suitable for their needs and desires. In the case of hydroponic vegetables, consumer preferences can be observed through evaluations of various attributes such as leaf freshness, taste, variety, physical condition of the leaves, price, and packaging (Febrianti et al., 2019). Information regarding consumer preferences is important to know because it can describe the most preferred product attributes and serve as a primary consideration in purchasing decisions. According to Munandar et al. (2004), consumer preferences for food products generally form at a young age and become stronger as a settled lifestyle develops, thereby influencing consumption patterns in the long term.

The analysis results show that the consumer preference variable has a regression coefficient of -0.432 and has a significant effect on the demand for hydroponic vegetables. Although the coefficient is negative, these results indicate that consumer preference is an important factor influencing the demand for hydroponic vegetables. Preferences formed from perceptions of product quality, freshness, physical appearance, and the health benefits offered are the primary considerations for consumers when making purchases. This finding aligns with Yasmin's (2017) research, which showed that physical attributes, color, freshness level, and price are the most considered factors in the purchase of hydroponic vegetables. Meanwhile, research by Febrianti et al. (2019) found that consumers prioritize vegetable freshness, the physical

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condition of the leaves, packaging, taste, price, and product variety. Thus, the better consumers' perceptions of these attributes, the higher the tendency to choose and consume hydroponic vegetables.

CONCLUSION

Based on the research findings, it can be concluded that the level of demand for hydroponic vegetables at Nuri Horti and Hidroponik Faperta, as indicated by purchase frequency, shows that consumers purchase processed hydroponic vegetable products 1–3 times per month. The majority of consumers purchase less than 1 kg of hydroponic vegetables per month, and the most consumed vegetable is lettuce, accounting for 96.7% of total consumers. Significant factors influencing the demand for hydroponic vegetables at Nuri Horti and Hidroponik Faperta in Kendari City include the prices of other vegetables

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