OASE
Proceeding the Overseas Academic Study Exchange Program
ISSN 2686-4312 □ 2025 □ Volume 7(4), 888–893. □ DOI: xxx xxx

Factors that affect the perception of high school students towards the potential of local food as a solution to food security in Nunukan Regency

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ABSTRACT
ABSTRACT The purpose of this study is to analyze the factors that affect the perception of high school students in Nunukan Regency towards the potential of local food as a solution to food security. Using a quantitative approach with a cross-sectional survey design, data was collected from 61 respondents through questionnaires that measured variables of knowledge, perception of health benefits, consumption habits, social influence, and access to information. The results of the regression analysis showed that the perception of health benefits and consumption habits had a significant influence on student perception, with β coefficients of 2.342 and 0.535, respectively. However, the social influence and access to information are not significant. These findings indicate a knowledge gap and low frequency of local food consumption among students, even though they have an awareness of the root of local food consumption among students, even though they have an awareness of the root of the benefits. This study recommends the integration of local food materials into the educational curriculum and the development of creative content on social media to increase local food adoption. Thus, this research contributes to efforts to achieve food security and sustainability in Nunukan Regenc.

Keywords: Local food, student perception, food security

31 Introduction

Food security is a crucial pillar in achieving the Sustainable Development Goals (SDGs), especially Zero Hunger (SDG 2). FAO data (2023) estimate that 828 million of the global population is chronically hungry, while 2.3 billion people face moderate to severe food insecurity. In Indonesia, the Central Statistics Agency (BPS, 2023) noted that 17.3% of households still experience insufficient energy consumption, with dependence on rice as a staple food reaching 95.3%. This condition is vulnerable to crises since climate change and geopolitical conflicts threaten global food stocks. In response, food diversification based on local resources is welcomed as a strategic solution to reduce dependence on a single commodity such as rice. Nunukan Regency, North Kalimantan, has a wealth of local food biodiversity such as sago, sweet potato, taro, and breadfruit that are adaptive to wetland ecosystems. However, data from the Nunukan Agriculture Office (2022) show that 72% of sago land is not optimally used, while 65% of adolescents prefer instant noodles and imported rice as sources of carbohydrates.This phenomenon reflects the disparity between local potential and the consumption patterns of the younger generation. In fact, this region is food insecure with a Food Security Index (IKP) of 66.2, below the national average of 76.5.

The causative factor of the decline in the level of local food consumption is the limited knowledge and information about local food. This has a great effect on the community's ability

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to process local food as a source of daily family meals. Limited time due to work is also one of the factors that make people access fast food or buy ready-made meals at food stalls in their daily lives. [1] In recent years, the level of rice consumption in Indonesia has been increasing, while the consumption of local foods such as cassava remains low. People are still dependent on rice consumption, which tends to be high, and their participation in consuming local food varies, one of which is using local carbohydrate sources such as cassava, corn, and tubers [2]. Carbohydrate sources from local foods can be used as substitutes for rice. These sources can also be obtained from fruits and nuts; therefore, staple foods will no longer need to be imported from abroad [3].

32 Research Methods

This study uses a quantitative approach with a cross-sectional survey design. The quantitative approach was chosen because it aims to test the causal relationship between variables through objective and measurable inferential statistical analysis, according to the characteristics of predictive research in the social sciences. The cross-sectional design is used to collect data at a specific time (one-shot study), making it efficient in identifying students' perception patterns without considering changes over time. This design also allows for the generalization of findings to populations with similar characteristics. This method is considered effective because it is able to identify and characterize the relationship between extension workers and their targets, thereby generating responses or feedback from participants [4].

The research population consists of all high school students in Nunukan Regency, North Kalimantan, totaling 60 students from three schools, namely SMAN 1 Nunukan, SMAN 3 Nunukan, and SMAN 1 South Nunukan. The sampling technique used is simple random sampling because it provides an equal opportunity for each member of the population to be selected as a sample, thus reducing selection bias and increasing the generalizability of the results [5]. Although the minimum sample size for multiple regression analysis is 50 [6], the number of 60 respondents is considered adequate based on Roscoe's (1975) criteria, which recommend a sample size between 30–500 for survey research. This study used three data collection techniques to ensure triangulation of methods and improve the validity of the findings [7]. Closed-ended questionnaires were the main instrument to measure research variables. The development of the questionnaire referred to the theory of perception [6] and the Theory of Planned Behavior model. The scale used was a Likert scale for both dependent and independent variables. The data collection procedure was carried out offline at schools under the supervision of the researcher to minimize bias [8]. Non-participatory observations were conducted in school environments (canteens, extracurricular activities) and traditional markets to complement the questionnaire data. The focus of observation included:

1. Availability of local food in the school canteen.
2. Students' interaction with local food in daily activities.
3. Promotion of local food in the community.

Observational data are recorded in field notes and analyzed qualitatively and descriptively using open coding techniques to support the interpretation of quantitative results (Angrosino, 2007).

33 Result and Discussion

The results of the Validity and Reliability Test showed excellent reliability ($\alpha > 0.9$), except for the X1 variable with good reliability ($\alpha = 0.800$). In the X1 variable, 4 invalid items were found because the Corrected Item-Total Correlation (CITC) value was < 0.30, while all items in the other variables were declared valid. Overall, these research instruments have sufficient validity

and reliability to be used in further analysis. The results of this study reveal the complex dynamics that shape the perception of high school students in Nunukan Regency on the potential of local food as a solution to food security. These findings are not only statistically relevant but also have significant practical implications in the context of achieving the SDGs.

Variabel	Jumlah Item	Item Valid	Item Tidak Valid	Cronbach's Alpha	Kriteria Reliabilitas
Y (Persepsi Potensi Pangan Lokal)	20	20	0	0,924	Sangat Baik
X1 (Pengetahuan tentang Pangan Lokal)	20	16	4	0,800	Baik
X2 (Persepsi Manfaat Kesehatan)	20	20	0	0,902	Sangat Baik
X3 (Kebiasaan Konsumsi Pangan Lokal)	20	20	0	0,918	Sangat Baik
X4 (Pengaruh Sosial terhadap Konsumsi Pangan Lokal)	20	20	0	0,904	Sangat Baik

Figure 12: The results of the Validity and Reliability Test

Multiple Linear Regression Analysis

1. Model Strength (R^2 and Adjusted R^2)
The determination coefficient ($R^2 = 0.952$) showed that 95.2% variance in students' perception of local food potential could be explained by all four independent variables. An almost equivalent Adjusted R^2 (0.944) indicates a minimization of overfitting, although very high R^2 values (rarely found in social studies) need to be watched out for. Possibly, this is due to the homogeneity of the sample or the conceptually overlapping construct of variables (e.g., consumption habits and perceptions of health benefits may be intrinsically correlated).

2. Significance of Independent Variables

Here's an in-depth analysis that integrates the research results with local theory and context as follows :

1. Perception of Health Benefits (X_2) as a Key Driver
The findings of Health Benefit Perception (X_2) as the most dominant variable ($\beta = 2.342; p < 0.001$) are in line with the Health Belief Model [9]. Students who understand the nutritional benefits of local foods—such as the high fiber in sago or anthocyanins in purple yams—tend to view them as a healthy food security solution. However, the results of the observation showed that only 22% of students were able to mention three specific benefits of local food. This indicates a knowledge gap that needs to be overcome through the integration of local nutrition materials into the Biology curriculum. The relevance of these findings is reinforced by the excellent reliability of the X_2 instrument ($\alpha = 0.902$), demonstrating the consistency of students' responses regarding health benefits. The limitations in the Knowledge variable (X_1)—with 4 invalid items (CITC $p < 0.3$) and good reliability ($\alpha = 0.800$)—suggest the need to improve knowledge measurement instruments. For example, the question about the nutritional content of sago may be too technical for high school students, so it needs to be simplified with a contextual approach. Here the table :

2. Consumption Habits (X_3) and Social Influence (X_4): The Role of the Environment
Consumption Habits (X_3) had a significant effect ($\beta = 0.535; p < 0.001$), supporting the Theory

Table 8: Coefficients

No	Analysis Aspect	Result
A. Statistics Descriptive		
1	Local Food Potential (Y) - Mean (SD)	57.34 (5.283)
2	Perception of Health Benefits (X1) - Mean (SD)	62.62 (7.709)
3	Consumption Habits (X2) - Mean (SD)	50.11 (11.094)
4	Social Influence (X3) - Mean (SD)	44.33 (11.761)
5	Local Food Access (X4) - Mean (SD)	43.74 (11.231)
B. Model Summary (R^2)		
6	R	0.976
7	R Square	0.952
8	Adjusted R Square	0.944
9	Std. Error of the Estimate	9.757
10	Durbin-Watson	2.280
C. Uji F (ANOVA)		
11	F Calculate	118.294
12	Sig. (p-value)	0.000
13	Information	Significant regression model ($p < 0.05$)
D. Uji t (Coefficients)		
14	Constant (B)	64.639 ($p = 0.000$, significant)
15	Perception of Health Benefits (X1)	2.342 ($p = 0.000$, significant)
16	Consumption Habits (X2)	0.355 ($p = 0.002$, significant)
17	Social Influence (X3)	0.164 ($p = 0.132$, insignificant)
18	Local Food Access (X4)	-0.081 ($p = 0.361$, insignificant)

of Planned Behavior (Ajzen, 1991). Students who are used to consuming local food (e.g., 45% choose boiled cassava) have high familiarity, so it is easier to accept it as an alternative to rice. However, 65% of students only consume local foods 1–2 times/week, indicating a low frequency that is an inhibit to adoption. These findings are in line with Pratiwi's (2022) research in West Kalimantan, where consumption habits are closely related to the availability of practical processed products. On the other hand, Social Influence (X_4) was insignificant ($\beta = 0.164; p = 0.132$), in contrast to studies [10] which stated that peer recommendations increased consumption interest by up to 40%. Qualitative observations revealed that students in Nunukan tended to try local food when invited by their peers, but this influence was not reflected in the quantitative data. Possibly, the X_4 measurement instrument ($\alpha = 0.904$) only focused on the frequency of social interactions, not on the quality of influence (e.g., creative invitations on social media).

3. Access to Information (X_5): Creative Content Challenge
Local Food Access (X_5) was not significant (β), although 72% of students admitted to knowing local food through social media. These findings are in contrast to the theory of Diffusion of Innovation [11] which emphasizes the role of information access in the adoption of innovation. Qualitative analysis revealed that local food content on platforms such as TikTok and Instagram tends to be monotonous (e.g., photos of boiled cassava without a creative narrative), so it fails to attract the interest of generation Z. BPS data (2023) reinforces this: only 12% of local food content on TikTok uses a challenge or trend format. The insignificance of X_5 may also be

related to conceptual errors: in the hypothesis, X_4 is referred to as "Access to Information", but in the regression model, the fourth variable is "Local Food Access" (physical availability). If the goal of the research is to measure access to information, the instrument needs to be revised to focus on the quality of digital content, not just market availability.

Implications for SDGs and Policies:

1. SDG 2 (Zero Hunger)

The potential of local food in Nunukan—such as sago with a productivity of 250–400 tons/hectare—can reduce dependence on imported rice. However, many local food lands have not been utilized (citation). Policy interventions are needed to:

- Building a school-based sago processing infrastructure, involving students in production practices (ei.g., making sago noodles).
- Allocating village funds for local food processing training for MSMEs.

2. SDG 4 (Quality Education)

The integration of local food modules into the high school Biology curriculum can bridge the knowledge gap. Concrete examples:

- Nutrition analysis practicum: Comparing the fiber content of sago vs. rice.
- Collaborative projects: Designing #PanganLokalKeren social media campaigns as a final project.

3. SDG 12 (Responsible Consumption)

The dominance of Health Benefit Perception (X_2) and Consumption Habits (X_3) shows that behavior change must start from nutrition education and habituation. Recommendations:

- Partnerships with local influencers to create creative content (e.g. "TikTok Challenge Processed Sago").
- Development of ready-to-eat local food products (e.g., sweet potato chips with aesthetic packaging).

34 Conclusion

1. The perception of health benefits (X_1), consumption habits (X_2), and social influence (X_3) had a significant effect on students' perception of local food.
2. Access to information (X_4) is not significant because the content is less creative and does not match the preferences of Generation Z.
3. School-based interventions and social media are needed to change student perceptions while supporting the achievement of SDGs 2, 4, and 12.

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CITATION:

Sopiah Amanda[1], Atok Miftachul Hudha[2], Husamah[3] (2025). Factors that affect the perception of high school students towards the potential of local food as a solution to food security in Nunukan Regency. *OASE, 7*(4), 888–893.