International Journal of Technology and Education Research

https://e-journal.citakonsultindo.or.id/index.php/IJETER

E-ISSN: 2986-0733

Analysis of the Relationship between Food Consumption Patterns and Food Security among Maize Farmers in Abeli District

Ericha Masitta Dewi R[1], Sitti Aida Adha Taridala[2],Samsul Alam Fyka[3]

[1] Student of Department of Agribusiness, Faculty of Agriculture, Halu Oleo University, Kendari, Indonesia

[2,3] Lecturer and Instructor at Faculty of Agriculture, Halu Oleo University, Kendari, Indonesia

Corresponding Author: erichamasitta05032002@gmail.com

Abstract

This research aims to determine: food consumption patterns and food security of corn farmers in Abeli District, Kendari City. This research was conducted in Abeli District, Kendari City with a total sample of 27 respondents. The data analysis used was descriptive statistical analysis using the Likert scale method, USDA analysis, and Rank-Spearman correlation analysis. The research results show that 1) the majority of respondents consume quite high amounts of food, in the categories 4-6 times a week and 1 time a week. Most respondents felt that the food they consumed was neither too much nor too little, indicating adequacy and good adjustment to the number of portions of food they took. On the other hand, the majority of respondents had access or the habit of consuming various types of food other than corn in their diet, 2) the majority of respondents stated that the food choices available were quite varied (59.25%), and had good access to various types of food in the local market (74.07%). All respondents consumed various types of food other than corn every day. all respondents process their own harvests to make daily food, reflecting strong practices in using local food resources to meet family consumption needs, and 3) there is a moderate positive relationship between the frequency of food consumption and the level of food security of respondents, but the relationship between the amount of food portions and food security is not statistically significant. Meanwhile, there is a significant relationship between the variety of food consumed by respondents and the level of food security. In other words, the higher the level of food variety consumed, the higher the level of food security that can be expected from respondents.

Keywords: ***Corn; food security; rank-spearman correlation***

Copyright to the author of some rights reserved This work is licensed under aCreative Commons Attribution-ShareAlike 4.0 International License.

International Journal of Technology and Education Research

https://e-journal.citakonsultindo.or.id/index.php/IJETER

E-ISSN: 2986-0733

INTRODUCTION

Indonesia is an agrarian country where most of the population relies on the agricultural sector as their main livelihood. The agricultural sector is a very important sector because it is the main provider of food (Djajadi, 2018). Food is one of the strategic issues in a country's development. Therefore, it is rational and reasonable for Indonesia to make the national food security strengthening program its top development priority (Suryana, 2008). The achievement of food security is reflected in the availability of sufficient food, evenly distributed at affordable prices and safe for consumption for every citizen to carry out their daily activities (Riyanto, 2013).

Maize (*Zea mays* L.) is a major crop commodity in Indonesia that has an important role in the food and feed sectors, with extensive use of its products as raw materials for the food and beverage industry such as corn flour, corn porridge, popcorn, and corn milk (Ratulangi, 2019). The national demand for maize continues to increase along with population growth, with the national production target in 2022 reaching 33.9 million tons, of which around 32% is used for the feed industry and 14% for food consumption (DG Food Crops, 2023).

Southeast Sulawesi is one of the potential corn producing areas with a harvest area of 49,632.70 hectares and a total production of 165,146.37 tons (BPS Southeast Sulawesi, 2022). One area that is actively developing the potential of corn crops is Abeli Sub-district in Kendari City. This sub-district has an area of 13.90 km² which is divided into seven villages: Benua Nirae, Pudai, Lapulu, Abeli, Anggalomelai, Poasia, and Talia (BPS Kendari City, 2023). The availability of maize as one of the staple foods for some people in this region is an important indicator in assessing the success of the region's food security (Sarasautha, 2012). The harvest area and production of maize in Abeli Sub-district in 2024 can be seen in Table 1.

Table 1 Maize Harvested Area and Production in Abeli District 2023

No.	Village	Land Area (Km²)	Production (Ton)
1	Abeli	2,11	3,00
2	Anggomelai	1,83	1,00
3	Nirae Continent	7,25	4,00

Source: BPS Southeast Sulawesi, 2023

The welfare of farmers can be measured by the availability of staple foods in their households, which is influenced by farm production. The consumption pattern of the community is an important indicator because it illustrates how the community allocates and

Copyright to the author of some rights reserved This work is licensed under aCreative Commons Attribution-ShareAlike 4.0 International License.

consumes food in general. Each household has a different consumption pattern depending on various factors, such as the number of family members and the type of food consumed. The level of consumption describes the average amount of food consumed per person in the household, making the household an important unit of analysis in looking at community food consumption (Halyani, 2008).

Household food security is determined by various factors such as assets, education, income, access to credit, land size, and gender of the household head (Some and Jones, 2018). In the context of maize farming households, land ownership and agricultural production play a major role in fulfilling daily food needs. The fact that food consumption dominates the expenditure of poor households shows the importance of consumption patterns in realizing food security. Therefore, this study was conducted to analyze the relationship between food consumption patterns and food security among maize farmers in Abeli Sub-district.

METHOD

This research was conducted in Abeli Sub-district, Kendari City in May - June 2024. The population as well as the sample in this research are all people who make a living as corn farmers in Abeli Subdistrict, Kendari City, which according to data obtained at the Abeli Subdistrict Office amounted to 27 corn farmers. Data collection techniques were carried out by interviewing and recording.

The first objective on household food consumption patterns was analyzed descriptively using the elaboration method. The second research objective on food security of maize farmers was measured using the Household Food Security Survey Module developed by the *United States Department of Agriculture (USDA).* This module contains 5 questions intended for respondent households. The third research objective on the relationship between food consumption patterns and food security was analyzed using *Spearman Rank* correlation, which is a statistical method to measure the relationship between two or more variables in the data. The variables used are food consumption patterns and the level of food security with indicators including frequency of consumption, number of meal portions, food variety, food availability, food characteristics and food utilization. Mathematically, the *Rank Spearman* correlation analysis equation is written as follows:

$$p = 1 - \frac{\partial \sum d^2}{n(n^2 - 1)}$$

Description:

p = *Spearman* rank correlation coefficient

Copyright to the author of some rights reserved This work is licensed under aCreative Commons Attribution-ShareAlike 4.0 International License.

d = Rank difference between data pairs

n = Number of data pairs

To provide an interpretation of the correlation coefficient, the authors use guidelines that refer to Sugiyono (2010) as follows:

Table 2 Interpretation of Correlation Coefficient value r_s

r_s	Interpretation
0,00 - 0,199	Very Low
0,20 - 0,399	Low
0,40 - 0,599	Medium
0,60 - 0,799	Strong
0,80 - 1,00	Very Strong

Source: Sugiyono (2010)

After going through the calculation of the *Rank Spearman* correlation analysis equation, then testing is carried out using the criteria set, namely by comparing the calculated ρ value with the ρ table which is formulated as follows:

- If *p-value* < 0, then H_0 is accepted and H_1 is rejected.
- If *p-value* > 0, then H_0 is rejected and H_1 is accepted.
- If *p-value* = 0, then H_0 is accepted and H_1 is rejected.

RESULTS AND DISCUSSION

Food Consumption Patterns

Food consumption patterns in this study were measured based on several indicators. First, the frequency of food consumption refers to how often respondents consume certain types of food in a weekly period. Furthermore, food variety measures the variety of food types consumed by respondents. Good dietary variety includes consumption of different types of food groups, such as fruits, vegetables, vegetable protein and animal protein. Finally, the number of meal portions reflects the size or volume of food consumed by respondents in one meal or one day. This indicator can provide information about the respondents' daily diet, as well as its potential impact on their overall health, energy needs and nutritional adequacy.

Copyright to the author of some rights reserved This work is licensed under aCreative Commons Attribution-ShareAlike 4.0 International License.

International Journal of Technology and Education Research

https://e-journal.citakonsultindo.or.id/index.php/IJETER

E-ISSN: 2986-0733

Table 3 Maize Food Consumption Patterns of Maize Farmer Respondents in Abeli Sub-district, Kendari City in 2024

Variables		Number (person)	Percentage (%)
Consumption Frequency	1 time per day	4	14,8
	2 times a day	10	37,0
	3 times a day	12	44,4
	> 4 times a day	1	3,8
Number of Meal Portions	Generous portions	2	7,4
	Enough portions	15	55,6
	Not too much/little	5	18,5
	Small portions	5	18,5
Meal Variety	Consume only corn in 1 day	0	0,0
	Other menus are available but only consume	2	7,4
	Consume corn and other menu items	25	92,6

Based on the data in table 3 above, the researcher can explain as follows;

1. Table 3 shows that the majority of maize farmers in Abeli Sub-district of Kendari City consume three meals a day (44.4%), reflecting a stable consumption pattern supported by the availability of maize as the main food ingredient. This consumption habit shows the important role of maize in meeting farmers' daily nutritional needs, as it contains carbohydrates, fiber, vitamins, and minerals that are essential for health (Mercy, 2019). However, it is important to encourage diversification of consumption so that nutritional needs are met as a whole. Understanding these consumption patterns is important for designing programs to improve food security, nutrition education, and food diversification for farmers, in order to improve their welfare and reduce their vulnerability to hunger (Tedjo, 2017).
2. Table 3 shows that the majority of maize farmers in Abeli Sub-district consume a sufficient portion of food (55.6%), reflecting balanced eating habits. Others consume small portions (18.5%) or modest portions (18.5%), and only 7.4% eat large portions. This consumption pattern indicates the need to improve nutrition awareness and access to quality food. Efforts to increase meal portions need to be supported by nutrition education, adequate food access, and economic policies that support farmers' welfare (Adetiya and Ningsih, 2020).

Copyright to the author of some rights reserved This work is licensed under aCreative Commons Attribution-ShareAlike 4.0 International License.

3. Table 3 shows that all maize farmers in Abeli Sub-district of Kendari City in 2024 consume more than one type of food a day, with the majority (92.6%) combining maize with other menu items, and only 7.4% choosing to eat only maize despite alternatives. This varied consumption pattern is important to meet daily nutritional needs and reflects an understanding of the importance of a balanced diet. Food diversification not only improves household food security but also opens up economic opportunities through the development of more diverse agricultural products (Suharni, 2019).

Food Security

Food security conditions in this study are measured based on indicators of 1) food availability, which refers to the physical and economic availability of sufficient food to meet nutritional needs and ensure stable food availability over time, 2) food characteristics, which describes the nutritional quality and sources of food consumed, including the variety and diversity of foods available to meet balanced nutritional needs, and 3) food utilization, covering the way food is consumed and processed as well as the use of nutrients from food consumed to support health and productivity. Thus, the overall affirmative answers and respondents' assessments of food security aspects are presented in Table 4.

Table 4 Average Respondents' Assessment of Food Security in Abeli Sub-district, Kendari City in 2024

No.	Aspects	Average	Percentage (%)
1	Food availability	15,6	57,8
2	Food characteristics	12,0	44,4
3	Food utilization	17,6	65,2

Source: Primary data processed, 2024

Table 4 presents the average respondents' assessment of food security in Abeli Sub-district. There are three main aspects assessed, namely food availability, food characteristics and food utilization. The first aspect is food availability, with an average affirmative answer of 15.6 representing 57.8% of respondents. This indicates that most respondents feel that food availability in Abeli Sub-district is quite good, with more than half of the respondents describing adequate food availability. The second aspect is food characteristics, which had an average affirmative answer of 12.0 and a percentage of 44.4%. This indicates that less than half of the respondents felt that food characteristics in their area were adequate, suggesting some concern

Copyright to the author of some rights reserved This work is licensed under aCreative Commons Attribution-ShareAlike 4.0 International License.

or dissatisfaction with the quality or diversity of food available. The third aspect is food utilization, with the highest mean value of 17.6 representing 65.2% of respondents. This indicates that the majority of respondents feel that food utilization is quite good, and feel that the available food is well utilized to meet nutrition and food needs.

To improve food utilization among maize farmers, it is necessary to take an approach that educates and encourages sustainable and efficient practices. Training programs on good food storage techniques, the use of simple food processing technologies, and the implementation of sustainable agricultural practices can help improve their food security. In addition, policies that support good agricultural infrastructure and stable market access can also help create an enabling environment for optimizing food resource utilization and improving the overall welfare of maize farmers (Ningsih *et al.,* 2019).

Table 5 Level of household food security based on affirmative answers

Number of Affirmative Answers	Level Food Security	Total (Person)	Percentage (%)
0	High	0	0,0
1-2	Marginal	21	77,8
3-5	Low	6	22,2
6-10	Very Low	0	0,0

Based on the data in Table 5 above, the food security level of maize farmers in Abeli Sub-district of Kendari City is mostly in the marginal category (77.8%), while 22.2% are in the low category, and none are classified as high or very low food security. This shows that most farming households still face food access instability, which can turn into vulnerability in the event of a small disturbance. This weak food security is closely related to poverty and unequal food distribution, as explained by Coleman-Jensen (2015), United Nations Human Rights and WHO (2008), and FAO (2013), that food insecurity is not only a matter of production, but access and distribution are not optimal.

Relationship between Food Consumption Patterns and Food Security

The relationship between food consumption patterns and the level of food security among maize farmers in Abeli Sub-district, Kendari City was analyzed using the Rank Spearman correlation method, which can determine the direction and strength of the relationship between two ordinal or scaled variables. In this study, the observed variables include food consumption

Copyright to the author of some rights reserved This work is licensed under aCreative Commons Attribution-ShareAlike 4.0 International License.

patterns (such as frequency, number of meal portions, and food variety) and food security level (including food availability, characteristics, and utilization). This analysis aims to see whether there is a statistically significant relationship between diverse food consumption patterns and high or low levels of food security. More diverse food consumption patterns, such as consuming nutritious foods and utilizing various local food sources, can contribute to improved food security. The positive correlation between these two variables suggests that the better the food consumption pattern, the higher the level of food security that can be achieved by maize farmers in the area. The results of the Rank Spearman correlation analysis are shown in the following table.

Table 6 Summary of Relationship between Consumption Patterns and Food Security of Maize Farmers

Variables	Correlation Coefficient (ρ)	Significance (p-value)	Description
Consumption Frequency	0,359	0,066	Weak correlation, not significant
Number of Meal Portions	0,173	0,388	Very weak correlation, not significant
Food Variety	0,476**	0,008	Moderate correlation, significant at 0.01

Notes:
ρ = Spearman Correlation Coefficient
p < 0.01 indicates a statistically significant relationship.
Methods: Spearman correlation, N=27

Relationship between Food Consumption Frequency and Food Security

Table 6 shows that the Spearman's rho correlation between food consumption frequency and food security is 0.359 with a significance value (p-value) of 0.066 (p < 0.1), which indicates a moderate positive relationship between the two. This means that respondents who consume food more frequently and diversely tend to have a better level of food security. Although the significance value has not reached a very strong level (<0.05), this result suggests that the frequency of food consumption can be an important factor in local food policy. Maize farmers

Copyright to the author of some rights reserved This work is licensed under aCreative Commons Attribution-ShareAlike 4.0 International License.

who frequently consume diversified food usually have better access to various types of food, both from their own farms and local markets, which is important for providing more complete and balanced nutrition. In addition, the adoption of frequent and diverse food consumption patterns often has a positive impact on public health, by preventing malnutrition and nutrition-related diseases. Maize farmers who implement sustainable and efficient agricultural practices tend to have better access to food, increasing food availability in their households.

Relationship between meal size and food security

Table 6 shows a Spearman's rho correlation between meal size and food security of 0.173 with a significance value (Sig.) of 0.388 (2-tailed), indicating that the relationship between these two variables is not statistically significant. Although there is a tendency for a positive relationship, this weak correlation suggests that a larger number of meal portions is not necessarily associated with higher levels of food security among maize farmers. Other factors, such as access to varied food, affordable food prices, or efficient food management strategies, may have more influence on their food security. This weak correlation can be explained by Abidin's (1997) food access theory, which states that food security is more influenced by accessibility to varied and nutritious food, not just the number of meals. In addition, economic factors such as high food prices or low income may limit access to adequate and varied food. In this regard, the food economics theory proposed by Douglass (1998) emphasizes that to improve food security, efforts need to be made to increase economic accessibility to varied and nutritious food.

Relationship between Food Variety and Food Security

Table 6 shows the correlation between dietary variation and food security among maize farmers in Abeli Sub-district, Kendari City, with a Spearman correlation coefficient of 0.476 and a significance level (Sig.) of 0.008, indicating a significant relationship between the two. This means that the higher the level of food variety consumed by respondents, the higher the level of food security that can be expected. This relationship can be explained by several factors, firstly, higher dietary variety reflects access to a variety of different foods, which is important for meeting diverse nutritional needs and ensuring respondents do not rely on one type of food as the main source of nutrition. The availability of varied food options allows access to more complete and balanced nutrition, which supports long-term health and food security. Secondly, economic factors and accessibility play an important role; respondents with better economic access are able to purchase or access different types of food more consistently. In contrast,

Copyright to the author of some rights reserved This work is licensed under aCreative Commons Attribution-ShareAlike 4.0 International License.

respondents with economic limitations tend to have limited food choices, which can negatively affect food security. Therefore, policies or programs that support access to varied food at affordable prices can improve food security among maize farmers.

Overall, this correlation underscores the importance of dietary variety in influencing food security. Policy measures that support food consumption diversification, economic strengthening of farming households, and increased accessibility to quality food are important to improve the overall food and nutrition conditions of maize farming communities.

CONCLUSION

Based on the results of the research conducted, it can be concluded that most respondents of corn farmers in Abeli Sub-district, Kendari City consume food 3 times a day (44.4%), followed by the frequency of 2 times a day (37.0%). The majority of respondents (92.6%) consumed maize along with other menus.

Most respondents stated that food choices were quite varied (59.3%) and had good access to different types of food in local markets (74.0%). All respondents consume a variety of foods other than maize on a daily basis and process their own harvest for daily consumption, indicating strong practices in the use of local food resources.

There is a positive relationship between the frequency of food consumption and the level of food security of respondents, but the relationship between the number of meal portions and food security is not statistically significant. Meanwhile, the variety of food consumed was significantly associated with the level of food security, indicating that the higher the variety of food, the higher the level of food security of the respondents.

REFERENCE

BPS Sulawesi Tenggara. 2022. *Luas Panen, Produktivitas, dan Produksi Jagung Menurut Kabupaten di Sulawesi Tenggara Tahun 2021.* Kendari: Badan Pusat Statistik.

BPS Kota Kendari. 2023. *Luas Panen, Produktivitas, dan Produksi Jagung Menurut Kecamatan/Kelurahan di Kota Kendari Tahun 2022.* Kendari: Badan Pusat Statistik.

Djajadi, S. 2018. *Pertanian Indonesia: Sejarah, Kebijakan, dan Penerapannya*. Bogor: IPB Press.

Ditjen Tanaman Pangan. 2023. *Statistik Tanaman Pangan Menurut Propinsi di Indonesia Tahun 2015-2020.* Jakarta: Direktorat Jenderal Tanaman Pangan.

FAO. 2011. *The Definition and Classification of Commodities*. Rome: Food and Agriculture Organization of the United Nations.

FAO. 2006. *World Food Summit*. Rome: Food and Agriculture Organization of the United Nations.

Copyright to the author of some rights reserved This work is licensed under aCreative Commons Attribution-ShareAlike 4.0 International License.

Halyani. 2008. Analisis Ekonomi Rumah tangga responden Wortel di Desa Sukanti Kecamatan Pacet Kabupaten Cianjur Provinsi Jawa Barat. *Skripsi.* Bogor: Program Studi Ekonomi Pertanian dan Sumberdaya Institut Pertanian Bogor.

Ratulangi, A. 2019. Analisis Ketahanan Pangan Rumah tangga responden Jagung di Desa Tamma Kecamatan Pahunga Lodu Kabupaten Sumba Timur. *Tesis*. Bogor: Program Pascasarjana Institut Pertanian Bogor.

Riyanto, A. 2013. Permintaan Beras di Provinsi Jambi (Penerapan Partial Adjustment Model). *Jurnal Perspektif Pembiayaan dan Pembangunan Daerah*, 1(1): 222-231.

Sarasutha, A. 2002. Kinerja Usahatani dan Pemasaran Jagung di Sentra Produksi. *Jurnal Litbang Pertanian*, 21(2): 39-47.

Some, JW., dan Jones, AD. 2018. Pengaruh Produksi Tanaman dan Faktor Sosial Ekonomi terhadap Keragaman Makanan Rumah Tangga Musiman di Burkina Faso. *Jurnal PLoS SATU*, 13(5): 1-16.

Sugiyono. 2010. *Metode Penelitian Pendidikan Pendekatan Kuantitatif, kualitatif, dan R&D*. Bandung: Alfabeta.

Suryana, A. 2009. *Ketahanan Pangan Rumah Tangga*. Bogor: IPB Press.

USDA. 2012. *Unites States Household Food Security Survey Module: Three- Stage Design, With Screeners*. Economic Research Service of United States.

WHO. 2006. *Global Reference List of 100 Core Health Indicators*. Luxembourg: World Health Organization

Copyright to the author of some rights reserved This work is licensed under aCreative Commons Attribution-ShareAlike 4.0 International License.