AGROMIX, Volume 15 Number 2 (2024), Pages 207-214

AGROMIX
pISSN (Print): 2085-241X; eISSN (Online): 2599-3003
Website: https://jurnal.yudharta.ac.id/v2/index.php/agromix

Food consumption pattern and food security status of maize farmer households in Galis District, Bangkalan

Setiani Setiani [1*], Dian Eswin Wijayanti [1], Moh. Wahyudi Priyanto [1]
[1] Department of Agribusiness, Faculty of Agriculture, University of Trunojoyo Madura, East Java, Indonesia
*Email correspondence: setiani@trunojoyo.ac.id

Original article

Article history
Received : December 18, 2023
Accepted : September 15, 2024
Published : September 30, 2024

Keyword
Household food security;
Dietary diversity;
Maize farmers;
Determinants of food security;

ABSTRACT

Introduction: This study examines the food consumption patterns and food security status of corn farming households in Paterongan Village, Galis Subdistrict, Bangkalan Regency, Madura Island, Indonesia. The research is conducted within the context of the low food security levels in Indonesia, despite the implementation of the Sustainable Development Goals (SDGs) since 2015. Paterongan Village serves as an interesting case study due to its high corn production but also a high poverty rate, which raises concerns regarding household-level food security. This study aims to identify the factors influencing food security among corn farmers in the area. **Methods:** This research uses a descriptive quantitative approach, collecting data through interviews and questionnaires with 76 female corn farmers. The 24-hour food recall technique was applied to assess food consumption patterns and calculate the Household Dietary Diversity Score (HDDS). Binary logistic regression analysis was conducted to identify the factors influencing food security. **Results:** The findings indicate that the food consumption patterns are relatively limited in diversity, with most households primarily consuming cereals, vegetables, oils, legumes, and fish. The average HDDS score is 7.1, with 67% of households classified as food insecure. **Conclusion:** The logistic regression analysis identified education level, household income, and the utilization of home gardens as significant factors that improve food security.

Cite this article:
Setiani, S., Wijayanti, D. E., & Priyanto, M. W. (2024). Food consumption pattern and food security status of maize farmer households in Galis District, Bangkalan. *Agromix, 15*(2), 207-214. https://doi.org/10.35891/agx.v15i2.4669

INTRODUCTION

The United Nations has established the Sustainable Development Goals (SDGs) as objectives for underdeveloped nations until 2030 (Muslim *et al.*, 2021). SDG goal number two is "Zero Hunger," which aims to eliminate hunger and ensure that different nations do not face issues of food scarcity, ultimately achieving food resilience (Taryani *et al.*, 2022). However, the 2018 event in Maluku, where four Indonesian individuals lost their lives due to poverty and hunger, illustrates that hunger and poverty persist in Indonesia (Hadi *et al.*, 2019). This demonstrates that even with the SDGs in place, not all Indonesians enjoy food justice.

Food insecurity persists as a problem despite the implementation of the SDGs since 2015. It remains a priority, particularly in areas where the majority of the population works as farmers. Madura Island has a total of 768,513 people engaged in farming, providing abundant food products (Badan Pusat Statistik, 2018). One of these products is maize, which contributes 9.5% to maize production in East Java. Prior research by Cele & Mudhara (2021) has demonstrated that despite producing a large amount of food, African farmers are still considered the poorest and most food-insecure people. Due to their similar hot climates and somewhat dry soils, this condition may be comparable to that of Madura Island. Poverty poses one of the most significant challenges for farmers because of their cyclical economy (Zaini *et al.*, 2021). This implies that they are unable to fulfill various nutrient-dense dietary needs, such as those for milk and meat, and suggests difficulty in meeting their household's food requirements.

According to the Food Security Agency of the Ministry of Agriculture of the Republic of Indonesia, food security is a condition where good food can be fulfilled, starting from quantity and quality, ensuring even distribution, food safety, and providing affordable access to food at the household level (Saputro & Fidayani, 2020). Indonesia has established a law regarding food security in Law No. 7 of 1996 concerning food, which consists of four aspects or subsystems. These subsystems include food availability, food consumption, food access or distribution, and health or absorption.

Food security is not only an issue at the national and regional levels but also at the smallest level, such as households, including farmers. Food security in households is closely related to their family members; the more family

members there are, the greater the food needs of the farmer's household (Yanti & Murtala, 2019). Therefore, it is necessary to make efforts to increase income so that it can still meet the growing needs of households. Land utilization can be an option to improve the food security of farmer households. By utilizing the land, farmers can generate more income from selling plants grown in the yard or for their consumption to meet household food needs.

Bangkalan is a district on Madura Island where the poverty rate has risen over the past three years. The proportion of individuals in poverty in Bangkalan Regency increased by 8.6% between 2019 and 2021 (Badan Pusat Statistik, 2022). Despite being the second-largest producer of maize on Madura Island, with 105,577.55 tons produced in 2022, poverty in Bangkalan remains high. Paterongan Village, located in the Galis Subdistrict, is the largest maize-producing area, with 12,851.41 tons of maize produced (Dinas Pertanian Tanaman Pangan Hortikultura dan Perkebunan Kabupaten Bangkalan (2022). However, this significant maize production has not led to a reduction in poverty, which may hinder the achievement of household-level food security among maize farmers in this area.

This study focuses on maize farmer households in Paterongan Village, Galis District, Bangkalan Regency because this village represents a critical case where high agricultural production contrasts with persistent poverty, offering valuable insights into the factors influencing food security in similar contexts. Previous studies have identified various factors affecting food security in Indonesia. For example, Muttaqin's (2022) reported that the poverty rate in Gresik Regency in 2018 was 12.89%, highlighting a potential link between poverty and declining food security. Utami and Suprapti (2020), highlighted that the impoverished conditions among farmers in Guluk-guluk District, Sumenep Regency, impede the attainment of household-level food security, especially for maize farmers. These findings suggest that poverty, insufficient income, and high living costs are significant barriers to food security.

Given the unique conditions in Paterongan Village, this study aims to: (1) determine the pattern of food consumption; (2) assess the status of food security; and (3) identify the factors affecting food security in maize farmer households in Paterongan Village, Galis district, Bangkalan Regency. By investigating these aspects, this research intends to enhance the overall understanding of food security issues in agricultural communities and offer insights that could guide strategies to strengthen food security in comparable settings.

METHODS

Research location

This study is part of a broader research project focusing on maize farmer food consumption and stunting on Madura Island. The funding for this project is provided by the Research and Community Service Institute (LPPM), University of Trunojoyo Madura (UTM). The research site is located in Paterongan Village, Galis District, Bangkalan Regency. The decision was based on information from the Department of Agriculture, Horticultural Food Crops and Plantations, Bangkalan, and Galis District Agricultural Extension Center (BPP), which confirmed that this village is the largest maize producer in Bangkalan Regency, Madura Island.

Data collection

This study is identified as a descriptive quantitative study, providing an overview of the phenomenon or facts related to the circumstances of the maize farmers who are participants. It also outlines the values of the variables involved (Hadi *et al.*, 2019). The determination of the sample size relies on previous research that used binary logistic analysis, specifically Hu *et al.* (2021), where the minimum number of samples is set at ten times the number of independent variables. This study incorporates seven independent factors: education, age, farm size, household income, home garden utilization, number of household members, and government assistance. Consequently, a minimum sample size of 70 was selected. Nevertheless, this study surpassed these constraints by employing 76 samples. Each respondent, all of whom were female farmers cultivating maize for several years, was selected based on the assumption that they play a pivotal role in determining household dietary choices and possess relevant knowledge.

The primary data were gathered through interviews employing questionnaires that addressed household socio-economic factors and food consumption patterns. Following the 24-hour food recall technique by Sly *et al.* (2023), individuals self-reported their food consumption, which was then categorized into twelve distinct food groups. The data obtained from this food recall process was utilized to calculate the Household Dietary Diversity Score (HDDS). Additionally, supplementary data were sourced from pertinent organizations, the BPS, and relevant journals. Data collection took place from August 2023 to October 2023.

Data analysis

$$HDDS = (A+B+C+D+E+F+G+H+I+J+K+L) \quad (1)$$

Where A = cereal or grains (such as rice and maize), B = tubers, C = vegetables, D = fruits, E = meat or poultry, F = eggs, G = types of seafood, H = nuts, I = milk and dairy products, J = oils, K = sweeteners, and L = others (such as spices,

seasonings, and beverages). After determining the number of HDDS for maize farming households, calculating the average HDDS per sample group as a whole is necessary to determine their food security status. Maize farming households above the average are considered food-secure households, and vice versa, using the following formula:

$$\text{Average HDDS} = \frac{HDDS}{Nnumber of Household} \quad \text{..... (2)}$$

Specifically, if the HDDS value is smaller than the average, the status is deemed food insecure with code 0; if the HDDS value is greater than the average, the status is considered food secure with code 1 (Niles *et al.*, 2020; Li, 2022). Further analysis is conducted to identify the factors influencing the food security of these households, utilizing the logistic regression method. Muliani *et al.* (2021) highlight the utilization of binary logistic regression as a data analysis approach to determine the relationship between binary dependent variables and independent variables acting as predictors. The binary logistic regression function is expressed by the following equation:

$$(Y)=ln\left(\frac{P}{1-P}\right) = \alpha + \beta_1 EDU + \beta_2 AGE + \beta_3 FS + \beta_4 IC + \beta_5 HGU + \beta_6 HM + \beta_7 GA + e_i \quad \text{..... (3)}$$

Where P is the desired probability, α is the intercept model indicator and β_1- β_7 are the regression coefficients. EDU (education), AGE (age of respondents), FS (farm size), IC (household income), HGU (home garden utilization), HM (number of household members), and GA (government assistance) are independent variables, while e_i represents disturbance. The hypotheses used in this study are as follows: H_o states that there is no significant influence between the independent variables on maize farmer food security, whereas H_1 suggests a significant influence on food security.

RESULTS AND DISCUSSION

Characteristic respondents

Most people in the study area are farmers, growing crops like maize and peanuts. While they are open to growing rice, the land's uneven and rocky terrain makes rice cultivation difficult, so they focus on maize farming. This has made the area a key maize producer in Bangkalan Regency. However, because of the rainfed farming system, they can only plant twice a year. The land is left fallow during the dry season, with maize typically grown from November to January and peanuts from February to April.

Table 1. Respondent characteristics

Variable		Total (N)	Percentages (%)
Education	Not in school	9	12
	Elementary school	48	63
	Junior high school	11	14
	High school	8	11
Age	Young (<45 tahun)	48	60
	Medium (45-55 tahun)	22	27
	Old (>55 tahun)	10	13
Farm Size	Narrow (<0.5)	70	92
	Medium (0.5-1 ha)	4	5
	Wide (>1 ha)	2	3
Household Income (IDR/month)	< 2,000,000	7	11
	2,000,000- 3,999,999	13	20
	4,000,000- 5,999,999	15	23
	6,000,000- 7,999,999	9	14
	8,000,000- 9,999,999	10	15
	> 10,000,000	11	17
Home garden utilization	No (0)	40	53
	Yes (1)	36	47
Government assistance	No (0)	39	51
	Yes (1)	37	49
		Minimum	Maximum	Average
Number of household members		3	10	6.5

Source: Primary data processed, 2023

The characteristics of maize farmers are presented in Table 1. Female maize farmers have various levels of education, ranging from no school, elementary school, junior high school, and high school, but the majority (63%) are elementary school-educated, and only 8% have the highest education. Based on the age classification according to

Asfiati and Sugiarti (2021), the majority of respondents, as much as 60%, belong to the young category, which is less than 45 years old. Accordingly, landholding is dominated by narrow land, which is less than 0.5 ha, or as much as 92%.

The household income varies and is classified into six categories, with the majority having incomes ranging from IDR 4 million to IDR 6 million (23%). Almost half of maize farmers utilize their home gardens (47%) and also receive assistance from the government (49%). Their ages range from the youngest at 23 years to the oldest at 80 years, with an average age of 51.5 years. The average number of household members is around 6.5, ranging from three to ten people.

Food consumption patterns

All maize farmer households eat three meals a day, including breakfast, lunch, and dinner. Housewives typically prepare meals in the morning and reheat them for dinner. According to Figure 1, cereals and oil are the most consumed food items, at 100% and 97%, respectively. The grains ingested consist of both pure rice and a blend of rice and maize, with the maize mixture being sourced from our yield. This discovery aligns with Setiani's (2016) assertion that the dietary intake of farming households may originate from their cultivation or through purchases. Cultural aspects play a role in the high consumption of cereals. Indonesians perceive rice as an essential part of a meal, believing that a meal is incomplete without it. Additionally, oil is commonly used to fry various foods, such as eggs, fish, tofu, tempeh, and others. According to Murtiningsih *et al.* (2021), both urban and rural residents frequently consume fast food and fried snacks (*gorengan*).

The percentage of consumption for both fish and nuts was 62%. Due to their inexpensive cost and delectable flavor, skipjack tuna (cakalan) and mackerel (tongkol) are two popular fish varieties. They also eat nuts in the form of tempeh and tofu. As another alternate side meal, 96% of farmers' consumption consists of vegetables. Moringa oleifera, known locally as maronggih, is the most frequently consumed due to its abundant availability in their home gardens. Almost half of households (46%) consume fruit; in contrast, only 3% of households drink milk. Typically, they harvest and consume fruit obtained from their home gardens, such as bananas, mangoes, and papayas. These findings conform to many previous studies that reveal the importance of home gardens to household food consumption (Castañeda-Navarrete, 2021; Diekmann *et al.*, 2020; Setiani *et al.*, 2022)

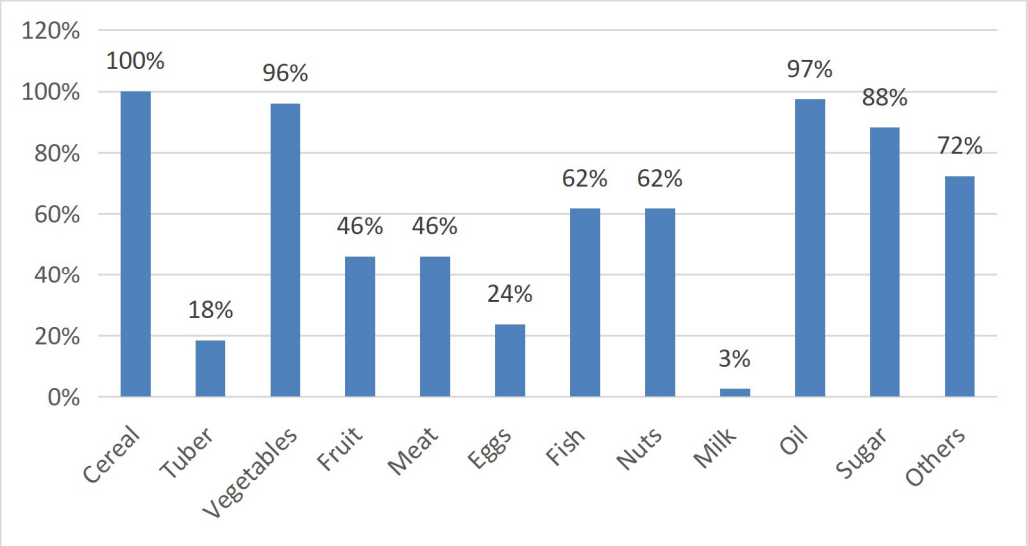

Figure 1. Percentage of food types consumed

Source: Primary data processed, 2023

Based on the findings from observations and interviews, during Islamic celebrations like *Idul Adha, Maulid, and Halal Bihalal*, individuals sometimes partake in a diverse array of foods. The objective is for farmers and community leaders to unite, fostering camaraderie. Typically, they savor meals like meat, poultry, and fruits—whether self-prepared or received as blessings during these communal events.

Food security status

The HDDS computation reveals an average of 7.1, with a maximum of nine and a minimum of four. Additionally, according to their food security status, 67% of maize farmers experience food insecurity, with the remaining 33% experiencing food security (Table 2). These data indicate that the majority of corn farmers face serious challenges in meeting their daily food needs. The relatively high average HDDS indicates that there is variation in food consumption, but there are still a large number who are unable to achieve adequate levels of food security.

Table 2. Food security status of maize farmer households

Household Status	Score	Total	Percentage (%)
Food Secure (> average 7,1%)	8-9	25	33
Food Insecurity (< average 7,1%)	4-7	51	67
Total		76	100

Source: Primary data processed, 2023

The higher proportion of people experiencing food insecurity also indicates that their food consumption is becoming less diverse or insufficient. A prior study that found 80% of maize farmer households in Guluk-guluk Village to be food insecure supports the idea that Madura Island has higher levels of food insecurity (Utami & Suprapti, 2020). The large number of farmer households classified as food insecure is also consistent with the food consumption patterns, which are less diverse and only include staple foods such as cereals, vegetables, nuts (tofu and tempeh), and fish every day. They will consume other types of food, such as fruit, chicken, and meat if it coincides with a big day or there is a special activity. In addition to these reasons, they mention that consuming food as usual is enough. Thus, their consumption patterns are less diverse, and eventually, the majority of them belong to the food insecure category.

Factors affecting food security

The binary logistic regression equation was then tested to determine the effect of the odds ratio on food security. In logistic regression analysis, there is no need for a normality test or a classical assumption test for the independent variables. However, it is necessary to test the feasibility of the model, assess the overall model, determine the coefficient of determination, and also conduct simultaneous testing (Ainiyah *et al.*, 2016). The output of binary logistic regression is presented in Table 3. Hosmer and Lameshow value, which has a sig value of 0.350> 0.005, so H_0 is accepted and the binary logistic regression model in this study is feasible to use. The Omnibus Tests of Model Coefficients show a sig value of 0.000<0.005, so reject H0 and accept H1. These results indicate that there are independent variables that have a joint or simultaneous effect on food security. To find out the ability of the independent variables to affect food security can be seen from the Nagelkerke R square value of 0.401. This explains that the independent variable in explaining the dependent value is 40.1%, and the rest is explained by other factors not included in this study.

Table 3. Binary logistic regression results

Variable	Coefficients Sign	Coefficients Regression	p-value	Odds Ratio
Education (EDU)	+	0.190	0.082***	1.209
Age (AGE)	+	0.008	0.787	1.008
Farm Size (LA)	+	2.282	0.113	9.792
Household Income (IC)	+	0.000	0.001*	1.000
Home Garden Utility (HGU)	+	1.047	0.083***	2.849
Number of Household Members (HM)	+	0.141	0.465	1.152
Government Assistance (GA)	+	0.989	0.110	2.688
Constant	-	-7.033	0.000	0.001
-2 Log likelihood		74.496[a]		
Omnibus Tests of Model Coefficients		0.000		
Nagelkerke R Square		0.401		
Hosmer and Lemeshow Test		0.350		

notes: *significant effect on α=1%; **significant effect on α=5%; ***significant effect on α=10%

Source: Primary data processed, 2023

Among seven variables, three independent variables have a significant impact on the food security of maize farmer households: education, household income, and home garden utilization. The age variable does not have a significant effect, which aligns with Etea *et al.* (2019) but is contrary to a study among 48 countries by Park *et al.* (2019), and other previous studies in Gunung Kidul (Wahyuni & Sukarniati, 2018) and Karawang (Sugiarto *et al.*, 2018).

The land area variable has a significant and real effect on the resilience of farmer households (Ariesa & Khairani, 2019; Pusvita *et al.*, 2019). In contrast, Ayele (2020) that the land area variable has a significant and real effect on the resilience of farmer households (Ariesa & Khairani, 2019; Pusvita *et al.*, 2019). In contrast, Ayele (2020), suggests that larger land areas owned by farmers are associated with greater food resilience of farmer households in Northern Ethiopia. Considering the farm size variable, the study justifies its findings based on the relatively narrow average land area.

The impact of the number of household members on food security was found to be negligible, contradicting previous research on household food vulnerability in Mexico, which suggested that a higher number of members increased the likelihood of food insecurity (Lemus, 2016). Other studies emphasize that the number of household members significantly influences the resilience of farmer households (Aliciafahlia *et al.*, 2019; Melisa *et al.*, 2023; Sugiarto *et al.*, 2018). The lack of influence observed in this study can be attributed to the majority of household members being employed and actively contributing to household income.

The GA variable has a significant and real effect on household resilience (Ahda, 2021). GA does not enhance the chances of households becoming food-resilient. This contradicts research on the impact of direct cash transfers (BLT) that can increase household calorie and protein intake (Hidayah, 2020). The government's assistance does not improve households' chances of becoming food secure. This is contrary to research on the impact of direct cash transfers (one form of government assistance), which can enhance households' calorie and protein intake (Amrullah *et al.*, 2020). The findings in this study are presumed to be because the BLT is not utilized to improve food consumption but rather for non-food needs.

The p-value for the education variable is 0.082, indicating significance at the 10% level (α = 10%) and a positive correlation with food security. This supports the hypothesis (H1 accepted, Ho rejected), suggesting that an increase in education influences the food security of maize farmer households in the study area. The odds ratio for the education variable is 1.209, indicating that maize farmers with higher education have a 1.209 times greater likelihood of being food secure compared to those with lower education. This implies that higher education equips maize farmers to optimize cultivation processes, potentially increasing yields to meet household food needs. This finding is consistent with previous research, which reveals a higher likelihood of food security with increased education levels (Aliciafahlia *et al.*, 2019; Ngema *et al.*, 2018; Omotayo & Aremu, 2020). This is in line with the situation in Paterongan Village, where farmers with higher education tend to have a monthly income exceeding 12.5 million IDR.

In this study, IC has a p-value of 0.001 and is significant at the α = 1% level, indicating a positive correlation with food security. This result supports the acceptance of the alternative hypothesis (H1) and the rejection of the null hypothesis (Ho), suggesting that an upswing in household income will impact the food security status of maize farmers' households in Paterongan Village. The odds ratio quantified at 1.000, implies that maize farmers with higher incomes are one time more likely to achieve food security compared to their counterparts with lower incomes. Consistent with the findings of Nengovhela *et al.* (2022), this study underscores that an elevated household income augments the probability of a household attaining food security. The research indicates that maize farmers with higher incomes may experience less concern about meeting their dietary requirements. A substantial household income not only facilitates the management of food-related needs but also enables better handling of both food and non-food expenditures. The study site conditions affirm that affluent farmers exhibit diverse consumption patterns, ensuring the food security of their households. In contrast, low-income maize farmers tend to have less varied food consumption habits, contributing to food insecurity in their households. The investigation confirms that the income variable significantly and tangibly influences the resilience of farmer households, aligning with the research of Wahyuni & Sukarniati (2018), Pusvita *et al.* (2019), Saputro & Fidayani (2020), and Melisa *et al.* (2023).

The variable HGU exhibits a p-value of 0.083, signifying significance at the 10% level (α = 10%) and indicating a positive correlation with food security. This supports the hypothesis (accepting H1 and rejecting H0), suggesting that farmers who utilize their home gardens increase their likelihood of achieving food security. The odds ratio (2.849) implies that maize farmers employing home gardens are 2.849 times more likely to be food secure compared to those who do not utilize home gardens. The positive impact of home gardens has been reported on improving nutrition, dietary diversity, and food security (Rammohan *et al.*, 2019; Fathi Royyani *et al.*, 2020). Additionally, HGU in this study demonstrates a notable impact, allowing farmers to cultivate crops for household consumption. Maize farmers can diversify their food consumption patterns, avoiding additional expenses on market-bought vegetables since they already have produce in their home gardens. Consequently, this enhances the probability of categorizing them as having food security status.

CONCLUSION

This study has revealed the food consumption patterns and food security status of maize farming households in Galis District, Bangkalan Regency. Cereals, vegetables, and oils dominate the food consumption patterns, with a consumption rate exceeding 90%. However, household milk consumption is very low (3%), indicating a need for increased awareness of the importance of milk consumption. Additionally, 67% of households have a Household Dietary Diversity Score (HDDS) below the average (7.1), classifying them as food insecure. To address the high level of food insecurity, it is crucial to consider factors that significantly influence household food security, including education, income, and the utilization of home gardens. Given the findings that emphasize the role of home gardens, future research should focus on exploring their contribution to enhancing food security.

REFERENCES

Ahda, N. (2021). Keterkaitan antara rumah tangga penerima manfaat BLT dan tingkat konsumsi pangan: Temuan dari Indonesia. *Jurnal Budget, 6*(2), 1–21.

Ainiyah, N., Deliar, A., & Virtriana, R. (2016). The classical assumption test to driving factors of land cover change in the development region of northern part of West Java. *International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences - ISPRS Archives, 41*(July), 205–210. https://doi.org/10.5194/isprsarchives-XLI-B6-205-2016

Aliciafahlia, C., Maleha, & A. D., Y. (2019). Faktor-faktor yang mempengaruhi perilaku. *J-SEA (Journal of Socio Economics Agricultural), 14*(2), 40–47.

Amrullah, E. R., Pullaila, A., Hidayah, I., & Rusyiana, A. (2020). Dampak bantuan langsung tunai terhadap ketahanan pangan rumah tangga di Indonesia. *Jurnal Agro Ekonomi, 38*(2), 77–90.

Ariesa, Y., & Khairani, R. (2019). Faktor-faktor yang mempengaruhi ketahanan pangan dengan menggunakan analisis faktor konfirmatori. *Jurnal Ilmiah Abdi Ilmu, 2*(1), 8–18.

Asfiati, R. F., & Sugiarti, T. (2021). Motivasi petani dalam usahatani pembibitan padi: Studi kasus di Desa Ngumpakdalem Kecamatan Dander Kabupaten Bojonegoro. *Jurnal Ekonomi Pertanian Dan Agribisnis, 5*(3), 735–747. https://doi.org/10.21776/ub.jepa.2021.005.03.12

Ayele, A. W. (2020). Determinant factors of food security among households in northern Ethiopia: An application of binary logistic regression model. *Journal of Global Economics, 8*(4), 4–10. https://doi.org/10.37421/economics.2020.8.352

Badan Pusat Statistik. (2018). Jumlah petani menurut kabupaten/kota dan jenis kelamin, 2018. *Badan Pusat Statistik*.

Badan Pusat Statistik. (2022). Kabupaten Bangkalan dalam angka 2022. In *Badan Pusat Statistik*.

Castañeda-Navarrete, J. (2021). Homegarden diversity and food security in southern Mexico. *Food Security, 13*(3), 669–683. https://doi.org/10.1007/s12571-021-01148-w

Cele, T., & Mudhara, M. (2021). Impact of market participation on household food security among smallholder irrigators in KwaZulu-Natal, South Africa. *Agriculture, 12*(261), 1–13. https://doi.org/10.3390/agriculture12020261

Diekmann, L. O., Gray, L. C., & Baker, G. A. (2020). Growing "good food": Urban gardens, culturally acceptable produce, and food security. *Renewable Agriculture and Food Systems, 35*(2), 169–181. https://doi.org/10.1017/S1742170518000388

Dinas Pertanian Tanaman Pangan Hortikultura dan Perkebunan Kabupaten Bangkalan. (2022). Luas tanam, luas panen, produktivitas dan produksi jagung menurut kecamatan di Kabupaten Bangkalan 2021-2022. In *Bangunan Bangkalan, Sejahtera Petani*.

Etea, B. G., Zhou, D., Abebe, K. A., & Sedebo, D. A. (2019). Household income diversification and food security: Evidence from rural and semi-urban areas in Ethiopia. *Sustainability (Switzerland), 11*(12), 3232. https://doi.org/10.3390/SU11123232

Fathi Royyani, M., Efendy, O., Farida Hasanah, I., Rambu Ana, R., & Bintoro, R. (2020). Tanaman pekarangan dan ketahanan pangan pada masyarakat Sumba Timur. *Jurnal Biologi Indonesia, 16*(2), 205–215. https://doi.org/10.47349/jbi/16022020/205

Hadi, A., Rusli, B., & Alexandri, M. B. (2019). Dampak Undang-Undang Nomor 12 tentang pangan terhadap ketahanan pangan Indonesia. *Responsive, 2*(2), 173–181. https://doi.org/10.24198/responsive.v2i3.26085

Hu, P., Xu, Y., Liu, Y., Li, Y., Ye, L., Zhang, S., Zhu, X., Qi, Y., Zhang, H., Sun, Q., Wang, Y., Deng, G., & Chen, Q. (2021). An externally validated dynamic nomogram for predicting unfavorable prognosis in patients with aneurysmal subarachnoid hemorrhage. *Frontiers in Neurology, 12*(August), 1–10. https://doi.org/10.3389/fneur.2021.683051

Li, X. (2022). Can collecting water fees really promote agricultural water-saving? Evidence from seasonal water shortage areas in South China. *Sustainability (Switzerland), 14*(19), 12881. https://doi.org/10.3390/su141912881

Melisa, S., Jakfar, F., & Kasimin, S. (2023). Faktor-faktor yang mempengaruhi ketahanan pangan rumah tangga petani padi semasa pandemi Covid-19 di Kecamatan Indrapuri Kabupaten Aceh Besar. *Jurnal Ilmiah Mahasiswa Pertanian, 8*(1), 156–163. https://doi.org/10.17969/jimfp.v8i1.23358

Muliani, F., Amelia, Nabilla, U., & Azizah. (2021). Analisis regresi logistik biner untuk menentukan faktor stillbirth di Kabupaten Aceh Timur. *Barekeng: Jurnal Ilmu Matematika Dan Terapan, 15*(1), 1–8.

Murtiningsih, M. K., Pandelaki, K., & Sedli, B. P. (2021). Gaya hidup sebagai faktor risiko diabetes melitus tipe 2. *E-CliniC, 9*(2), 328. https://doi.org/10.35790/ecl.v9i2.32852

Muslim, A. Q., Suci, I. G. S., & Pratama, M. R. (2021). Analisis kebijakan pendidikan di Jepang, Finlandia, China, dan Indonesia dalam mendukung Sustainable Development Goals. *Adi Widya: Jurnal Pendidikan Dasar, 6*(2), 170–186. https://doi.org/10.25078/aw.v6i2.2827

Muttaqin, R., Usman, F., & Subagiyo, A. (2022). Faktor-faktor yang mempengaruhi ketahanan pangan di Kecamatan Bungah Kabupaten Gresik. *Planning for Urban Region and Environment Journal (PURE), 11*(2), 149–160.

Nengovhela, R., Belete, A., Hlongwane, J., & Oluwatayo, I. B. (2022). Measuring rural households' food consumption pattern using HDDS: A case of Mopani District Municipality, Limpopo province, South Africa. *Journal of Agribusiness and Rural Development, 63*(1), 1–13. https://doi.org/10.17306/j.jard.2022.01513

Ngema, P. Z., Sibanda, M., & Musemwa, L. (2018). Household food security status and its determinants in Maphumulo local municipality, South Africa. *Sustainability (Switzerland), 10*(9), 1–23. https://doi.org/10.3390/su10093307

Niles, M. T., Bertmann, F., Belarmino, E. H., Wentworth, T., Biehl, E., & Neff, R. (2020). The early food insecurity impacts of Covid-19. *Nutrients, 12*(7), 1–23. https://doi.org/10.3390/nu12072096

Omotayo, A. O., & Aremu, A. O. (2020). Evaluation of factors influencing the inclusion of indigenous plants for food security among rural households in the North West Province of South Africa. *Sustainability (Switzerland), 12*(22), 1–19. https://doi.org/10.3390/su12229562

Park, J. Y., Ville, A. Saint, Schwinghamer, T., & Melgar-Quiñonez, H. (2019). Heterogeneous factors predict food insecurity among the elderly in developed countries: Insights from a multi-national analysis of 48 countries. *Food Security, 11*(3), 541–552. https://doi.org/10.1007/s12571-019-00934-x

Pusvita, E., Sriati, S., & Adriani, D. (2019). Analisis strategi penguatan ketahanan pangan beras di Kabupaten Ogan Komering Ulu. *SEPA: Jurnal Sosial Ekonomi Pertanian dan Agribisnis*, 15(2), 97–105. https://doi.org/10.20961/sepa.v15i2.27862

Rammohan, A., Pritchard, B., & Dibley, M. (2019). Home gardens as a predictor of enhanced dietary diversity and food security in rural Myanmar. *BMC Public Health*, 19(1), 1–13. https://doi.org/10.1186/s12889-019-7440-7

Saputro, W. A., & Fidayani, Y. (2020). Faktor-faktor yang mempengaruhi ketahanan pangan rumah tangga petani di Kabupaten Klaten. *Agrica: Jurnal Agribisnis Sumatera Utara*, 13(2), 115–123.

Setiani. (2016). Faktor-faktor yang mempengaruhi konsumsi berbagai bahan pangan dari pembelian oleh rumah tangga petani di desa tahan dan rawan pangan. *Agromix*, 7(1), 1–20. https://doi.org/10.35891/agx.v7i1.701

Setiani, S., Setiawan, E., & Huang, W. C. (2022). Taneyan Lanjang shared home gardens and sustainable rural livelihoods of ethnic Madurese in Madura Island, Indonesia. *Sustainability (Switzerland)*, 14(5960), 1–24.

Simopoulos, A. P., Bourne, P. G., & Faergeman, O. (2013). Bellagio report on healthy agriculture, healthy nutrition, healthy people. *Nutrients*, 5(2), 411–423. https://doi.org/10.3390/nu5020411

Sly, B. C., Weir, T. L., Cunningham-Sabo, L., Leisz, S. J., Stull, V. J., & Melby, C. L. (2023). Increasing household diet diversity and food security in rural Rwanda using small-scale nutrition-sensitive agriculture: A community-engaged proof-of-concept study. *Nutrients*, 15(14), 1–16. https://doi.org/10.3390/nu15143137

Sugiarto, U., Karyani, T., & Rochdiani, D. (2018). Faktor-faktor yang mempengaruhi pangsa pengeluaran pangan rumah tangga petani padi-sapi di Kecamatan Pangkalan Kabupaten Karawang. *Agricore: Jurnal Agribisnis dan Sosial Ekonomi Pertanian Unpad*, 3(2), 446–458. https://doi.org/10.24198/agricore.v3i2.20660

Taryani, A., Nur Rahma, N., Alam, N. S., Putri, R. Y. E., Belindasari, R. R. A. D., & Suparjito. (2022). Mewujudkan desa tanpa kemiskinan dan kelaparan dengan dana desa (2019-2020) di Jawa Tengah. *Jurnal Pembangunan Ekonomi dan Keuangan Daerah*, 23(1), 112–125.

Utami, Q., & Suprapti, I. (2020). Faktor modal sosial terhadap ketahanan pangan rumah tangga petani jagung lokal desa Guluk Guluk Kabupaten Sumenep. *Agriscience*, 1(1), 138–150. https://doi.org/10.21107/agriscience.v1i1.7972

Wahyuni, & Sukarniati, L. (2018). Food security analysis of poor households. *Jurnal Analisis Bisnis Ekonomi*, 16(1), 53–62.

Yanti, Z., & Murtala. (2019). Pengaruh pendapatan, jumlah anggota keluarga dan tingkat pendidikan terhadap konsumsi rumah tangga di Kecamatan Muara Dua Kota Lhokseumawe. *Jurnal Ekonomika Indonesia*, 8(2), 72–81. https://doi.org/10.29103/ekonomika.v8i2.972

Zaini, I. F., Muhammad, R., Latief, M. I., Haris, A., & Arifin, S. (2021). Kebijakan sustainable development goals (SDGs) dalam penanggulangan kemiskinan masyarakat desa (studi kasus: Desa Wargajaya, Kecamatan Cigudeg, Kabupaten Bogor, Jawa Barat). *Hasanuddin Journal of Sociology (HJS)*, 3(2), 126–140.