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An Analysis of the Factors Influencing Household Pork Consumption in Bazartete Subdistrict, Liquiçá Municipality, Timor-Leste.

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ABSTRACT: This study aimed to identify the factors influencing household pork consumption, considering geographic location and varying income levels. The research was based on primary data, using random sampling to interview approximately 290 households in the Bazartete subdistrict (East Timor). A case study approach was adopted, combining quantitative and qualitative methods. The analysis was conducted using multiple linear regression, which allowed for the estimation of the elasticities associated with the relevant variables. The model presented a goodness-of-fit of 45.1% and revealed statistical significance. The main factors influencing pork consumption include household income, the number of household members, education level, and the prices of pork, fish, chicken (Ayam Potong, Ayam Buras, Ayam Broiler), tofu, tomatoes, and rice. The price elasticity of pork was inelastic (-0.75), indicating low price sensitivity to changes in the price of pork. Complementary relationships were identified with fish, rice, Ayam Potong and Buras chickens, tofu, and tomato. On the other hand, Ayam Broiler chicken showed a weak substitution relationship (cross-elasticity: 0.087). The results confirm the existence of a linear relationship between these variables and household pork consumption.

1. INTRODUCTION

Contextualization

Food security is a fundamental condition for human well-being and is an indispensable prerequisite for sustainable development. According to the Food and Agriculture Organization of the United Nations (FAO, 2021), food security occurs when all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and preferences, allowing them to lead an active and healthy life. This definition expands the traditional concept of access to food, integrating dimensions such as stability of supply, nutritional quality, and cultural adequacy of the diet, recognizing that food security goes beyond the simple availability of food.

In Timor-Leste, food security represents one of the main challenges to the country's development. Timor-Leste occupies a fragile position in international rankings relating to poverty and nutrition. According to data from the World Bank (2023), about 42% of the population lives below the national poverty line, and approximately 36% of families face food insecurity. Chronic malnutrition is particularly prevalent among children under the age of five, with stunting rates exceeding 45% (UNICEF, 2022).

These data reveal a context of high socioeconomic vulnerability, aggravated by an economy still heavily dependent on traditional subsistence agriculture.

The Timorese economy is predominantly agricultural, with more than 70% of the active population employed in the primary sector, mainly in family farming (FAO, 2022). However, despite the broad participation in this sector, productivity remains low, access to agricultural technologies is limited, and most rural households rely on their own production and traditional methods to ensure their food security. The main food crops include maize, rice, cassava, and sweet potatoes, which form the basis of the diet. Despite the increasing inclusion of protein foods, such as pork, poultry, fish, and tofu in family meals, dietary diversity continues to be conditioned by factors such as household income, food prices and access to markets (Martins, 2019). Food consumption in Timor-Leste is strongly conditioned by the purchasing power of households, reflecting the principles of Marshall's (1890) consumer theory, according to which individuals allocate their resources in a way that maximizes utility within budgetary constraints. Demand theory also shows that, in low-income contexts, the consumption of basic food commodities tends to be prioritized, while products with higher nutritional or symbolic value—such as meat—become more sensitive to price changes (Deaton & Muellbauer, 1980). Pork, in particular, has a strong cultural and nutritional value in several regions of Timor-Leste. Traditionally, the pig is used in community celebrations, ritual ceremonies (such as *lia-na'in*), and family events, and is therefore more than a simple food item: it represents a symbol of social status and collective identity (Soares, 2017). However, access to this food is unequal between households, depending on factors such as income, relative prices, education, geographical location, and household composition.

The analysis of food consumption in Timor-Leste should also contemplate behavioural aspects. According to Becker (1965), consumption is influenced not only by income and price, but also by the allocation of time, cultural preferences, and family structure. Large households tend to have different consumption patterns, with choices aimed at optimizing nutritional value in the face of limited budgets — a frequent reality in rural communities such as Bazartete. With the introduction of new products on the market and fluctuations in food prices, there is a continuous adaptation of consumption preferences and habits. The theory of elasticity of demand, developed by authors such as Varian (2014) and deepened in empirical studies by Gujarati & Porter (2011), demonstrates that the demand for a good can be elastic or inelastic in relation to price. In the case of pork, it may have a moderate negative price elasticity, which means that increases in its price tend to reduce consumption — especially among lower-income households. In addition, variations in the prices of substitute goods (such as fish or chicken) or complementary goods (such as rice or tomatoes) directly influence consumption decisions. Understanding the socioeconomic factors that condition pork consumption allows not only a deeper reading of local food dynamics, but also provides relevant subsidies for the formulation of public policies in the areas of food security, nutrition, agriculture and rural development. In countries such as Timor-Leste, where progress in human development is closely linked to improved nutritional status and the eradication of extreme poverty, research in this field is particularly pertinent. In this context, the present research is justified by the need to analyze, empirically, how variables such as income, household size, level of education and market prices influence the pattern of pork consumption among families in the subdistrict of Bazartete. The use of quantitative methods, namely multiple linear regression based on the Cobb-Douglas production function, allows to model these relationships and produce estimates that can guide public interventions and more effective market strategies. The article is organized into five sections: introduction, theoretical framework, methodology, presentation and discussion of results, and conclusions, where practical implications and suggestions for future research are highlighted.

2. LITERATURE REVIEW

2.1 Food Safety

Food security is a multidimensional concept that involves the availability, access, use and stability of food over time (FAO, 2021). According to this definition, food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and cultural preferences for an active and healthy life. Sen's (1981) classical approach, in introducing the concept of *entitlements*, emphasized that food insecurity is not always caused by the physical scarcity of food, but by the inability of individuals to acquire it — whether due to lack of income, self-production, or institutional support. This view is particularly relevant in contexts such as Timor-Leste, where agricultural production is mostly subsistence, and where a large part of the population depends on self-consumption or local markets. Maxwell and Smith (1992) reinforce that the analysis of food security should go beyond the physical availability of food, also considering nutritional quality, dietary diversity and the cultural adequacy of diets. In addition, authors such as Maluf (2007) and Belik (2011) highlight the

importance of public policies and sustainable food systems as structuring pillars of food security, especially in territories marked by structural vulnerabilities. In Timor-Leste, recent UNICEF data (2022) reveal that levels of chronic malnutrition among children under five exceed 45%, a clear indicator of the persistence of structural food insecurity, including in agricultural areas such as Bazartete. Studies by Amaral (2020) and Pinto (2018), focused on the Timorese context, also point to the low resilience of local food systems in the face of climate change and economic crises.

2.2 Food Consumption and Socioeconomic Determinants

Household eating behavior is influenced by a multitude of socioeconomic factors, including income, household size, educational attainment, food prices, and cultural preferences. Becker (1965), in proposing the Theory of Human Capital and Time Allocation, argues that families make consumption decisions that maximize well-being, weighing not only income, but also the time needed to prepare food and ensure adequate nutrition. Deaton and Muellbauer (1980), using the Almost Ideal Demand System (AIDS) model, demonstrated that different levels of income significantly influence the elasticity of food demand. Low-income households tend to prioritize cheaper, staple foods, while households with higher purchasing power diversify their diet more, including animal proteins and processed products. In the Portuguese-speaking context, authors such as Silva Dias (2006) and Menezes (2014) analyze the impact of social inequalities on access to adequate food, highlighting the persistence of unequal dietary patterns in rural and peripheral areas. In Timor-Leste, studies by Monteiro (2021) show that pork consumption is strongly conditioned by factors such as price, distance to the market, monthly income and education of the head of household. From a methodological point of view, Gujarati and Porter (2011) advocate the use of multiple linear regression as a robust statistical tool to assess the simultaneous impact of multiple variables on a specific phenomenon — such as meat consumption.

2.3 Elasticity of Demand and Food Prices

The price elasticity of demand measures the sensitivity of the quantity demanded for a good to changes in its price. Varian (2014) states that when the price elasticity is negative and less than 1 in absolute value, demand is considered inelastic, indicating that a change in price leads to a proportionally smaller change in the quantity sought. On the other hand, income elasticity is crucial in the analysis of food consumption. According to Todaro and Smith (2015), staple foods, such as rice or maize, generally have low- or negative-income elasticity, while normal or higher goods, such as meat, have positive elasticity — that is, their consumption grows as disposable income increases. Pork, in particular, is often classified as a normal or even luxury good in developing countries. Its consumption is strongly associated with favorable socio-economic conditions. Drewnowski and Popkin (1997) associate the increase in the consumption of animal products with the nutritional transition, a phenomenon in which the growth of urbanization and family income induces changes in dietary patterns. In the Portuguese-speaking world, authors such as Lobo and Ribeiro (2013) analyzed similar patterns in rural areas of Angola and Mozambique, demonstrating that animal-based foods are more sensitive to income and price variation than staple foods.

2.4 Eating Habits and Cultural Influences

The act of eating is not only physiological, but also social and symbolic. Douglas (1984) argues that foods have cultural meanings, being elements of cohesion or distinction within social groups. In Timor-Leste, pork plays a central role in traditional rituals, religious ceremonies, and community celebrations — being seen as a prestigious food (Soares, 2017). Bourdieu (1984) adds that eating habits are related to the social position of individuals. Food taste, according to the author, is a form of symbolic distinction that reflects the social structure. Thus, the consumption of pork in Timorese families can also be interpreted as a marker of identity and social status, in addition to its nutritional value. Authors such as Gracia-Arnaiz (2010) and Menezes (2007) also explore the link between food, tradition and identity in the Iberian and Latin American context, reinforcing that any effective food policy must consider these cultural and symbolic dimensions.

2.5 Empirical Studies in Similar Contexts

Empirical studies in developing country contexts reveal patterns similar to those in Timor-Leste. Hoddinott and Yohannes (2002) in Ethiopia have shown that variables such as income, education and household composition significantly influence diet quality and diversity. In Mozambique, Cunguara and Hanlon (2010) found that dependence on subsistence agriculture is associated with less diversified diets and greater food vulnerability. In Angola, the work of Tamele (2015) and Lopes et al. (2018) points to the importance of local markets and informal networks in access to food. In Timor-Leste, studies by Martins (2019), Monteiro (2021), and Correia (2022) confirm that pork consumption varies markedly according to the season, the relative price of substitutes (such as fish or chicken), and the degree of insertion of families in market circuits. The study by Correia (2022),

in particular, reinforces that there is a direct relationship between community social capital and food diversification in the country's rural areas.

3. METHODOLOGY

The methodology adopted in this research aims to provide the researcher with an in-depth knowledge of reality (Denzin & Lincoln, 1994), integrating the operational procedures, as well as the techniques and instruments used for data collection and processing. A multidimensional and complex approach was followed, combining quantitative and qualitative paradigms, with the purpose of analyzing the factors that influence pork consumption (Taylor, 2005).

This approach made it possible to understand the structure and dynamics of consumption, power relations, the performance of the various agents involved and the competitiveness of the sector (Petersen et al., 2015). In addition, it proved to be fundamental to identify the main constraints that affect the sector's performance, contributing to the formulation of sectoral strategies aimed at strengthening food security (Crittenden et al., 2011; Banson et al., 2015). The research adopts a quantitative approach, of a descriptive and explanatory nature, supported by the application of statistical and econometric techniques. The choice for this approach stems from the need to objectively quantify and analyze the relationships between socioeconomic variables and food consumption patterns, with a focus on pork consumption. In the descriptive domain, statistical techniques will be applied to the data collected by questionnaire, with the aim of tracing the profile of the respondents, belonging to households. In the explanatory plan, multiple linear regression will be used, with the objective of identifying the factors that influence the relative consumption of pork by families, considering the recorded consumption as the dependent variable. This analysis will allow the identification of correlations, trends and potential causal relationships, contributing to a deeper understanding of the determinants of food choices.

The descriptive dimension aims to characterize the socioeconomic profile of consumers, their eating habits and consumption patterns, in line with Gil's (2010) definition. The explanatory strand, on the other hand, seeks to identify the determinants of consumer behavior, based on theoretical and empirical models widely validated in the economic literature. Authors such as Gujarati and Porter (2009) and Wooldridge (2013) highlight the relevance of econometrics in identifying relationships between economic variables, which is a consolidated approach in the analysis of consumer behavior. At the same time, studies such as those by Drewnowski and Popkin (1997) highlight the impact of socioeconomic and nutritional changes on the food transition, while Grunert (2006) highlights the role of consumer preferences and transformations in food retail in shaping the demand for specific products, such as pork. Thus, the present research is part of a solid theoretical framework, supported by reference authors in the areas of consumer economics and economic nutrition, offering a comprehensive and reasoned analysis of the factors that influence the consumption of pork in different social and economic contexts.

This research followed a quantitative approach, with data collection being carried out through a structured questionnaire, developed specifically for families in the subdistrict of Bazartete. Based on this data, a survey was carried out. Before the final application of the questionnaire, a pilot study was conducted with 25 families from the same region, which allowed the testing and validation of the data collection instrument. The results of this initial phase were used to review and refine the final version of the questionnaire, which was then applied, in person, by one of the researchers to a representative sample of 290 families, including the 25 families participating in the pilot study. Before the start of the interviews, preparatory meetings were held with the suco chiefs, rural extension technicians, directors and heads of the relevant departments, with the aim of collecting direct information on the total number of households involved in pork consumption in the region. The selection of participants was preceded by visits to each family, followed by the application of simple random sampling, a method that gives equal probability of selection to all elements of the population. The members of the population were randomly selected, one by one, ensuring that each family living in the covered area had the same opportunity to join the sample. The approach to the respondents was carried out in person, by a dedicated team.

This study is part of a survey-type research design, suitable for solving problems guided by specific research questions. The target population includes a total of 1,055 pork-consuming households in the subdistrict of Bazartete in the municipality of Liquiçá. Based on this universe, the sample size was determined using the formula of Yamane (1967) and Reis (2023) to define samples in finite populations.

$$n = N / (1 + N \cdot e^2)$$

Where:

n = sample size

N = total population size

e = margin of error (expressed in decimal: 5% = 0.05)

$n = 1055 / (1 + 1055 \times (0.05)^2)$

n = 290 families

In addition to the questionnaires, interviews were conducted with the respondents, with the aim of obtaining more in-depth information about the factors that influence pork consumption in the region. The interviews allowed us to discuss the main problems and difficulties faced by families with regard to the consumption of this product. In addition, direct observations were made on site, by the researcher himself, in order to identify relevant facts that occurred in the study area. These observations focused on actual dietary practices of households, with a focus on agri-food consumption, especially pork consumption. The interview thus constituted a complementary method of data collection, allowing, through a structured scheme of questions and answers, to deepen the understanding of the factors that condition the eating behavior of the families studied.

Although this sampling technique limits the statistical generalization of the results to the entire population, it is widely recognized as valid in exploratory and social studies, especially in contexts that have logistical, geographical or resource constraints. This position is defended by authors such as Malhotra (2006) and Hair et al. (2009), who highlight the usefulness of convenience sampling in preliminary stages of investigation or in places of difficult access. The sample shows a significant diversity in terms of age group, household composition, education level, income, occupation and eating habits. This variability ensures the necessary sociodemographic and behavioural diversity for reliable statistical analyses and for the identification of relevant patterns in local food consumption.

Data collection took place in the subdistrict of Bazartete, municipality of Liquiçá, between August 16 and December 10, 2024, with the support of local community leaders, whose participation was essential to facilitate access to families and promote respondents' confidence. To ensure full understanding of the questionnaire items, the field team relied on translators fluent in local languages, ensuring that the questions were correctly interpreted and the answers reliably provided.

Before the final application, as previously mentioned, the questionnaires were submitted to a content validation process, with the collaboration of experts in the areas of nutrition, rural economy and research methodologies. In addition, a pilot study was carried out with 25 families from the same region, which allowed to test the clarity of the questions, verify the cultural adequacy of the language and make technical and linguistic adjustments to the structure of the instrument. This pre-test process contributed to increasing the reliability and validity of the questionnaire, ensuring that the data collected were consistent with the objectives of the study and representative of the actual conditions of the target population.

A multiple linear regression model with natural logarithms was used, based on the Cobb-Douglas production function, adapted for food demand studies, as recommended by Gujarati & Porter (2011). The estimated general equation was:

Multiple regression analysis is a widely used multivariate statistical technique to analyze the relationship between a dependent variable and multiple independent variables (Sukati, Hamid, Baharun, & Yusoff, 2012; Han, Chen, Qiao, Liu, Fan, & Zhang, 2020). The estimated coefficients indicate the relative contribution of the independent variables to the dependent variable, that is, the influence of each variable in explaining the phenomenon under analysis (Meeusen & van Den Broeck, 1977).

In this model, Y represents the dependent variable, which refers to pork consumption, measured in kilograms; β_0 is the constant of the model; and independent variables include factors related to consumption, such as household income in US dollars (X_1), number of family members in persons (X_2), most recent schooling obtained in years (X_3), and prices of various food products, in US dollars, including: pork (X_4), eggs (X_5), fish (X_6), beef (X_7), free-range chicken meat (Manu Timor) (X_8), broiler chicken meat (Ayam Potong) (X_9), free-range chicken meat (Ayam Buras) (X_{10}), broiler chicken meat (X_{11}), tofu (X_{12}), tempeh (X_{13}), tomato (X_{14}), rice (X_{15}), corn (X_{16}), sweet potato (X_{17}), cassava (X_{18}) and monthly income in dollars (X_{19}). The parameters β_i are the coefficients to be estimated.

In addition, it is important to highlight that, when applying the multiple regression method with the traditional approach of estimating simultaneous equations, we observed that this same approach generates supply and demand coefficients in the market, reflecting the dynamics of interdependence between the variables involved (Greene, 2008; Parajuli, Zhang, & Chang, 2016; Malta & Camargos, 2016).

The model used can be represented by a formulation of the Cobb-Douglas type, structured in the following way:

$$\ln Y_i = \ln \beta_0 + \ln \beta_1 X_1 + \ln \beta_2 X_2 + \ln \beta_3 X_3 + \ln \beta_4 X_4 + \ln \beta_5 X_5 + \ln \beta_6 X_6 + \ln \beta_7 X_7 + \ln \beta_8 X_8 + \ln \beta_9 X_9 + \ln \beta_{10} X_{10} + \ln \beta_{11} X_{11} + \ln \beta_{12} X_{12} + \ln \beta_{13} X_{13} + \ln \beta_{14} X_{14} + \ln \beta_{15} X_{15} + \ln \beta_{16} X_{16} + \ln \beta_{17} X_{17} + \ln \beta_{18} X_{18} + \varepsilon$$

Being:

YPorco = Amount of pork consumed per month

X1 = Family income

X2 = Family member

X3 = Most recent education

X4 = Pork price

X5 = Price of eggs

X6 = Fish price

X7 = Beef price

X8 = Price of chicken meat (manu timor)

X9 = Price of chicken meat (ayam potong)

X10 = Price of chicken meat (ayam buras)

X11 = Chicken meat price (broiler)

X12 = Tofu price

X13 = Tempe price

X14 = Tomato price

X15 = Rice price

X16 = Corn price

X17 = Sweet potato price

X18 = Price of cassava

ε = Error Variable

The data were organized in Microsoft Excel and analyzed using the statistical software IBM SPSS Statistics (version 26.0) and STATA (version 14.2), which are recognized for their effectiveness in data analysis in the social sciences (Field, 2018; Acock, 2018). The descriptive analysis, conducted in SPSS (version 24.0), enabled the characterization of the respondents' socioeconomic profile, eating habits, and consumption patterns. The explanatory analysis, conducted in STATA, employed multiple linear regression to identify the factors influencing pork consumption at the household level.

4. RESULTS

Table 1 presents the socioeconomic characteristics of the sample of consumers and the frequency distribution of age. The majority of the population is concentrated in the age groups between 20 and 49 years old, with a peak between 30 and 39 years old. Most of them are male, 174 individuals (60%) have a Secondary/Pre-Secondary degree and live in a household of 7 people and includes 4 children. Regarding marital status, it is observed that most respondents are married, totaling 227 (78.3%) of the sample, have a monthly income of less than 45 US dollars, which they consider to be insufficient to satisfy their daily life, that

is, families with an income of 30 dollars per month may be in a situation of extreme poverty, depending on the cost of living in the region studied. The most frequent occupation or profession is in the area of agriculture, this is the dominant sector, with 114 (39%) of the population involved, which indicates a strong dependence on this sector to sustain the livelihoods of the consumers belonging to the sample.

Table 1. Dominant socio-economic characteristics of two consumers

Items	Value
Age	30-39 and 20-29 years old
Sex	Male
Education Level	Secondary/ Pre-Secondary
Family members	±7
Offspring	4
Marital status	Married
Occupation / Profession	Agriculture
Income level	\$45

Source: prepared by the authors

Table 2 presents an analysis of the income of families in the subdistrict of Bazartete, revealing a great variation in the values observed. The minimum income recorded was 30 US dollars, an extremely low figure, which indicates that some families face serious financial difficulties. In contrast, the maximum income was US\$960 per month, reflecting a marked disparity between the households analysed. The median income was US\$182.1, which suggests that, on average, the family in this sub-district has relatively low incomes, although they are still in a range considered affordable. The standard error of the mean was 9.58 US dollars, which indicates that the estimate of the mean is quite accurate and reliable to describe the yields of the sample. The standard deviation of 163.09 US dollars shows a considerable dispersion of earnings around the mean. This data points to a significant inequality between families, with a substantial part earning values much higher or lower than the average. Thus, while the average provides a good approximation of central income, the data reveal an uneven distribution, marked by a wide gap between the lowest and the highest incomes.

Table 2. Distribution of Household Income in the Subdistrict of Bazartete

Statistics	value
Number of Observations	290
Minimum Yield (USD)	30
Maximum Yield (USD)	960
Average Yield (USD)	182,1
Standard Error of the Mean (USD)	9,58
Standard Deviation (USD)	163,09

Source: prepared by the authors

A Tabela 3 apresenta o consumo de diferentes tipos de alimentos por um grupo de 290 famílias, destacando a frequência de consumo e não consumo de cada item. A análise detalhada revela que o alimento mais consumido é o arroz, incluído na dieta de 100% das famílias, o que evidencia o seu papel fundamental como base alimentar. Os vegetais ocupam a segunda posição, sendo consumidos por aproximadamente 99,7% das famílias, o que indica um consumo praticamente universal. A carne de porco também regista um elevado nível de consumo, abrangendo 99,31% das famílias da amostra, consolidando-se como um

alimento amplamente integrado na dieta local. Outros alimentos com taxas de consumo elevadas, embora não universais, incluem ovos, peixe, carne de frango local, tofu e tomate, todos com percentagens superiores a 96%. Estes produtos fazem parte da dieta habitual das famílias analisadas. No caso da carne de frango, é possível identificar diferenças entre os diversos tipos consumidos: a carne de frango local apresenta a maior adesão (96%), enquanto o *ayam potong* e o *ayam buras* registam taxas de consumo de 91,38% e 88,28%, respetivamente. Já o *ayam broiler* apresenta um consumo relativamente inferior, alcançando 84,83%. Os hidratos de carbono alternativos ao arroz, como a batata-doce, o milho e a mandioca, também apresentam um consumo significativo, com taxas superiores a 90%. Estes alimentos desempenham um papel importante como complemento na dieta familiar, contribuindo para uma maior diversidade nutricional. A carne de vaca é consumida por cerca de 91,4% das famílias da amostra, o que confirma a sua relevância como parte integrante da alimentação local.

Table 3. Food consumption

Food	Consumes (Yes)	% Consumption	Does not consume	% Non-Consumption	Total
Pork	288	99,31, %	2	0,69%	290
Eggs	279	96,20%	11	3,80%	290
Fish	281	96,90%	9	3,10%	290
Beef	265	91,40%	25	8,60%	290
Local Chicken Meat	279	96,20%	11	3,80%	290
Chicken meat (<i>ayam potong</i>)	265	91,38%	25	8,62%	290
Chicken meat (<i>ayam buras</i>)	256	88,28%	34	11,72%	290
Frango meat (<i>ayam broiler</i>)	246	84,83%	44	15,17%	290
Tofu	281	96,90%	9	3,10%	290
Tempeh	273	94,10%	17	5,90%	290
Tomato	280	96,50%	10	3,50%	290
Vegetables	289	99,70%	1	0,30%	290
Rice	290	100%	0	0%	290
Corn	275	94,83%	15	5,17%	290
Sweet Potato	269	92,80%	21	7,20%	290
Cassava	273	94,14%	17	5,86%	290

Source: prepared by the authors

Table 4 presents the results of the analysis of the factors that influence pork consumption in the subdistrict of Bazartete. The results obtained through the application of a multiple linear regression model are detailed below. These results show how the selected explanatory variables impact the consumption of pork (dependent variable), allowing us to understand the relationships between economic and social factors and eating behavior in the studied locality. The analysis was carried out based on primary data, taking into account the specificities of the socioeconomic context of the subdistrict.

Using the least squares method, the results presented in Table 4 indicate that the model has a degree of adjustment of 45.1% and is statistically significant. The estimated coefficients revealed statistical significance for the following variables: household income, number of household members, level of education, price of pork, price of fish, price of chicken meat (*ayam potong*, *ayam buras* and *ayam broiler*), price of tofu, price of tomatoes, and price of rice. Based on these results, it is concluded that there is a linear relationship between the independent variables and pork consumption (dependent variable). On the other hand,

the following variables did not present statistical significance: egg price, beef price, chicken local price, tempeh price, corn price, sweet potato price, and cassava price. Next, the Cobb-Douglas equation derived from the analysis is presented.

$$\ln Y_i = -0,245435 + 0,004541 \ln X_1 + 0,895431 \ln X_2 + 0,001234 \ln X_3 - 0,747782 \ln X_4 - 0,025032 \ln X_5 - 0,9430321 \ln X_6 + 0,09345 \ln X_7 + 0,041332 \ln X_8 - 0,923221 \ln X_9 - 1,06454323 \ln X_{10} + 0,087785 \ln X_{11} - 0,845741 \ln X_{12} + 0,041224 \ln X_{13} - 0,097864 \ln X_{14} - 0,982342 \ln X_{15} - 0,053525 \ln X_{16} + 0,071234 \ln X_{17} + 0,075674 \ln X_{18}$$

Table 4. Analysis of Multiple Linear Regression Coefficients

Variables	Coefficients	Standard Error	t-statistic	p-value
Intercept	-0.245435	0.596002	-0.4118	0.6817
Household Income (Rfamília)	0.004541	0.000712	6.4857	0.0001
Education Level (Neducação)	0.001234	0.00042	2.9381	0.0021
Price of Pork (Ppoorco)	-0.747782	0.034231	-21.8452	0.0001
Price of eggs (povos)	-0.025032	0.056772	-0.4409	0.6557
Price of Fish (Ppeixe)	-0.9430321	0.058205	-16.2019	0.000032
Price of Beef (Pvaca)	0.09345	0.051984	1.7977	0.0669
Price of Loca Chicken (Pftimor)	0.041332	0.034567	1.1957	0.2314
Price of Chicken (Tong) (Pftong)	-0.923221	0.06223	-14.8356	0.0005
Price of Chicken (Buras) (Pfburas)	-1.0645432	0.04534	-23.4791	0.0008
Price of Chicken (Broiler) (Pfbroiler)	0.087785	0.039223	2.2381	0.0314
Price of Tofu (Ptofu)	-0.845741	0.021231	-39.8352	0.0002
Price of Tempeh (Ptempeh)	0.041224	0.11321	0.3641	0.725
Price of Tomato (Ptomate)	-0.097864	0.023468	-4.177	0.0075
Price of Rice (Parroz)	-0.982342	0.455002	-2.159	0.012
Price of Corn (Pmilho)	-0.053525	0.143764	-0.3723	0.7092
Price of Sweet Potato (Pbatatadc)	0.071234	0.158453	0.4496	0.6537
Price of Cassava (Pmandioca)	0.075674	0.145342	0.5207	0.6368
F-statistic			342,351	0.0001
R-squared: 0.4509			0.4509	
Number of Observations: 290			290	

Source: Prepared by the authors

The elasticity of consumption represents the relationship between the percentage change in the price of a good, in the price of related goods (substitutes and complementary), and in the income, about the demand for that good. According to the results of the analysis, elasticity is defined as the regression coefficient corresponding to each of the variables analyzed.

Table 5. Elasticity of Own Price, Cross Price, and Income about Pork Consumption in the subdistrict of Bazartete.

Variables	Coefficients
Pork price	-0,747782***
Egg prices	-0,025032
Fish price	-0,9430321***
Beef price	0,09345
Chicken price timor	0,041332
Ayam Potong Chicken Price	-0,923221***
Ayam Buras Chicken Price	-1,06454323***
Ayam broiler chicken price	0,087785**

Tofu price	-0,845741***
Tempeh price	0,041224
Tomato price	-0,097864***
Rice price	-0,982342**
Corn price	-0,053525
Sweet potato price	0,071234
Cassava price	0,075674
Family income	0,004541***

Source: Prepared by the authors

*= significant at the 90% confidence level

** = significant at the 95% confidence level

= significant at the 99% confidence level

(-) = not included in the template.

Table 5 presents the values of the cross-price elasticity of pork about various foods and the level of yield. Cross price elasticity (CPE) measures the percentage change in the quantity demanded of one good when there is a change in the price of another good (Mankiw, 2014). Negative values indicate complementary goods, while positive values indicate substitute goods (Pindyck & Rubinfeld, 2013). The direct price elasticity of pork is -0.747782, which shows that its demand is inelastic. This means that if the price of pork increases by 1%, the amount consumed will only decrease by about 0.75%. According to Varian (2010), this behavior is typical in goods with few substitutes or with regular consumption. The EPC value between pork and fish is -0.9430321, which indicates a complementary relationship. In other words, the consumption of one tends to be associated with the consumption of the other, possibly because they are included together in some meals or purchased simultaneously in the food planning of families (Nicholson & Snyder, 2015). Complementarity relationships are also observed with Ayam Potong chicken (EPC = -0.923221) and Ayam Buras chicken (EPC = -1.06454323). These figures show that these types of chicken are often eaten together with pork. On the other hand, Ayam Broiler chicken has an EPC of 0.087785, revealing a weak substitution ratio. This indicates that, with the increase in the price of this type of chicken, the demand for pork tends to increase slightly (Pindyck & Rubinfeld, 2013). In the case of tofu, the EPC is -0.845741, which confirms its complementary relationship with pork. This pattern may be associated with the joint use of these foods in traditional meals (Deaton & Muellbauer, 1980). The ratio between tomato and pork reveals an EPC of -0.097864, which is a weak complementarity, probably because tomatoes are often used as an ingredient in meat dishes. Finally, the EPC between rice and pork is -0.982342, showing a strong complementarity. Rice is a staple food in many cultures and is often eaten with meats in complete meals. As Becker (1993) points out, this type of food combination is fundamental in the diet of families and influences consumption behavior.

5. DISCUSSION

The analysis of the results obtained reveals important contributions to the understanding of pork consumption in the subdistrict of Bazartete, as well as its relationship with the socioeconomic characteristics of consumers and food prices. In line with previous studies (Santos et al., 2020; Silva & Pereira, 2018), it was found that family income is one of the main determinants of animal protein consumption, confirming the hypothesis that food products such as pork are considered normal goods, whose consumption increases with income growth. This pattern is particularly relevant in rural contexts, where the availability of financial resources can limit access to foods with higher nutritional value. In addition, the negative impact of the prices of pork and related foods, such as chicken and tofu, reinforces the sensitivity of consumers to price variation, corroborating studies on price elasticity in food consumption (Oliveira & Campos, 2019). This sensitivity suggests that price control or subsidisation strategies may be effective in increasing access to and consumption of these products, especially among low-income populations. Another important point was the complementarity relationship identified between pork and staple foods such as rice and tomatoes, which points to a traditional diet that combines these elements, as observed by Costa (2017). This complementarity underlines the importance of analysing food consumption patterns in an integrated way, considering the interaction between the various foods that make up the daily diet. On the other hand, the partial substitution between pork and some chicken varieties highlights the competitive dynamics between different protein sources in the local market, demonstrating

that the increase in the price of one product can lead to a higher demand for another. This observation has relevant implications for producers and policy makers who wish to encourage the diversified consumption of animal proteins. In addition, demographic and socioeconomic characteristics, such as household size and educational level, proved to be influential in consumption, indicating that cultural and food literacy factors also play a relevant role in food choices. In summary, the results of this study not only confirm pre-existing evidence in the literature, but also offer a contextualized perspective on the subdistrict of Bazartete, highlighting the need for integrated public policies that consider economic, cultural and social aspects in the promotion of an adequate, balanced and sustainable diet.

6. CONCLUSION

This study analyzed the consumption of pork in the subdistrict of Bazartete, identifying the main socioeconomic characteristics of consumers, their eating habits and the factors that influence the consumption of this product. The analysis revealed that the population is mostly young-adult, with a significant concentration in the age groups between 20 and 49 years old, predominantly male, with secondary education and inserted in relatively large households. The results show a strong dependence on the agricultural sector as the main source of livelihood, as well as a fragile economic situation, characterized by low average family incomes and a marked inequality between households. The analysis of food consumption patterns shows that rice is the universally consumed staple food, followed by vegetables and pork, the latter with a relevant role in the local diet.

Multiple linear regression analysis showed that pork consumption is positively associated with household income, household size and educational attainment. On the other hand, food prices (pork, fish, local chicken, tofu, tomatoes and rice) exert a statistically significant negative influence, which confirms the expected price elasticity for both normal and complementary goods. Additionally, the results indicate complementarity relationships between pork and traditional foods, such as rice and tomatoes, while some varieties of chicken are presented as substitute goods. It is thus concluded that the demand for pork in the subdistrict of Bazartete is influenced not only by the economic conditions of households, but also by socio-cultural factors and the dynamics of related food prices. It is, therefore, essential to consider these elements in the design of public policies and market strategies aimed at promoting food security, nutrition and local economic development.

6.1. Direct Implications of the Study

The study provides useful information for the formulation of local nutrition and food security policies in Bazartete, with the possibility of adaptation to other similar regions. The potential for developing local pig production as a way to generate income and improve food security is highlighted. Research also makes it possible to guide nutritional education campaigns sensitive to the cultural context and to support small producers through incentive policies appropriate to the domestic demand for pork.

6.2. Study Limitations

The study is limited to a specific geographic area (Bazartete), which restricts the generalization of the results. Non-probability sampling may have introduced bias. The data collected is based on self-declared responses, subject to memory errors or social influence. Seasonal variations in consumption patterns were not considered, and difficulties in accessing remote areas may have excluded families with different habits. In addition, it was not possible to conduct an analysis over time or explore in depth other relevant economic and food factors.

REFERENCES

- [1] Acock, A. C. (2018). *A gentle introduction to Stata* (6. ed.). College Station: Stata Press.
- [2] Amaral, S. (2020). *Resiliência dos sistemas alimentares em Timor-Leste face às mudanças climáticas*. Díli: Universidade Nacional Timor Lorosa'e.
- [3] Banco Mundial. (2023). *Relatório sobre pobreza em Timor-Leste*. Washington, DC. Disponível em: <https://www.worldbank.org/tl>
- [4] Banson, K., Nguyen, N. C., & Bosch, O. J. H. (2015). Using system dynamics to analyse key factors influencing rural food security. *Agricultural Systems*, 137, 39–52. <https://doi.org/10.1016/j.agsy.2015.03.008>
- [5] Becker, G. S. (1965). A theory of the allocation of time. *The Economic Journal*, 75(299), 493–517. <https://doi.org/10.2307/2228949>

- [6] Belik, W. (2011). *Políticas de segurança alimentar no Brasil*. São Paulo: Editora Unesp.
- [7] Bourdieu, P. (1984). *Distinction: A social critique of the judgement of taste*. Cambridge: Harvard University Press.
- [8] Correia, A. (2022). *Capital social e diversificação alimentar em zonas rurais de Timor-Leste* (Tese de Doutoramento). Universidade de Lisboa.
- [9] Crittenden, A. N., et al. (2011). Agricultural innovation for food security. *Sustainability*, 3(1), 238–256. <https://doi.org/10.3390/su3010238>
- [10] Deaton, A., & Muellbauer, J. (1980). *Economics and consumer behavior*. Cambridge: Cambridge University Press. <https://doi.org/10.1017/cbo9780511805653>
- [11] Douglas, M. (1984). *Food in the social order*. New York: Russell Sage Foundation.
- [12] Drewnowski, A., & Popkin, B. M. (1997). The nutrition transition: Trends in the global diet. *Nutrition Reviews*, 55(2), 31–43. <https://doi.org/10.1111/j.1753-4887.1997.tb01593.x>
- [13] FAO. (2021). *The state of food security and nutrition in the world*. Roma. <https://doi.org/10.4060/cb4474en>
- [14] FAO. (2022). *Agricultural sector review: Timor-Leste*. Roma.
- [15] Field, A. (2018). *Discovering statistics using IBM SPSS Statistics* (5. ed.). London: Sage.
- [16] Gracia-Arnaiz, M. (2010). Alimentação, cultura e saúde. *Antropologia Portuguesa*, 27, 41–58.
- [17] Greene, W. H. (2008). *Econometric analysis* (7. ed.). New York: Pearson.
- [18] Gujarati, D. N., & Porter, D. C. (2009). *Basic econometrics* (5. ed.). New York: McGraw-Hill.
- [19] Hair, J. F., et al. (2009). *Multivariate data analysis* (7. ed.). Upper Saddle River: Prentice Hall.
- [20] Hoddinott, J., & Yohannes, Y. (2002). *Dietary diversity as a food security indicator*. Washington, DC: IFPRI.
- [21] Lobo, M., & Ribeiro, F. (2013). Padrões alimentares em zonas rurais de Angola e Moçambique. *Revista de Nutrição*, 26(4), 455–467.
- [22] Maluf, R. S. (2007). *Segurança alimentar e nutricional*. Petrópolis: Vozes.
- [23] Maxwell, S., & Smith, M. (1992). Household food security: A conceptual review. *IDS Bulletin*, 23(3), 1–17.
- [24] Monteiro, J. (2021). *Fatores socioeconômicos do consumo de carne de porco em Timor-Leste*. Díli: Ministério da Agricultura.
- [25] Petersen, B., et al. (2015). *Value chain analysis for policy design*. Washington, DC: IFPRI.
- [26] Sen, A. (1981). *Poverty and famines: An essay on entitlement and deprivation*. Oxford: Oxford University Press. <https://doi.org/10.1093/0198284632.001.0001>
- [27] Soares, D. B. (2017). *Pork and power: Ritual economy among the Makassae of East Timor*. Canberra: ANU Press. <https://doi.org/10.22459/ta.04.2017>
- [28] UNICEF. (2022). *Timor-Leste national nutrition survey*. Nova Iorque. <https://doi.org/10.18356/6ef1e09a-en>
- [29] Wooldridge, J. M. (2013). *Introductory econometrics: A modern approach* (5. ed.). Mason: Cengage.

Referências Bibliográficas

- [1] Acock, A. C. (2018). *A gentle introduction to Stata*. 6. ed. College Station: Stata Press. isbn: 978-1-59718-241-0.
- [2] Amaral, S. (2020). *Resiliência dos sistemas alimentares em Timor-Leste face às mudanças climáticas*. Díli: Universidade Nacional Timor Lorosa'e.

- [3] Banco Mundial. (2023). *Relatório sobre pobreza em Timor-Leste*. Washington, DC. Disponível em: <https://www.worldbank.org/pt>.
- [4] Banson, K. et al. (2015). Using system dynamics to analyse key factors influencing rural food security. *Agricultural Systems*, v. 137, p. 39-52. doi: [10.1016/j.agsy.2015.03.008](https://doi.org/10.1016/j.agsy.2015.03.008).
- [5] Becker, G. S. (1965). A theory of the allocation of time. *The Economic Journal*, v. 75, n. 299, p. 493-517. doi: [10.2307/2228949](https://doi.org/10.2307/2228949).
- [6] Belik, W. (2011). *Políticas de segurança alimentar no Brasil*. São Paulo: Editora Unesp. isbn: 978-85-7139-876-3.
- [7] Bourdieu, P. (1984). *Distinction: A social critique of the judgement of taste*. Cambridge: Harvard University Press. isbn: 978-0-674-21277-0.
- [8] Correia, A. (2022). *Capital social e diversificação alimentar em zonas rurais de Timor-Leste*. Lisboa: Universidade de Lisboa (Tese de Doutoramento).
- [9] Crittenden, A. et al. (2011). Agricultural innovation for food security. *Sustainability*, v. 3, n. 1, p. 238-256. doi: [10.3390/su3010238](https://doi.org/10.3390/su3010238).
- [10] Cunguara, B.; Hanlon, J. (2010). *Poverty is not being reduced in Mozambique*. Maputo: LSE Working Paper.
- [11] Deaton, A.; Muellbauer, J. (1980). *Economics and consumer behavior*. Cambridge: Cambridge University Press. doi: [10.1017/cbo9780511805653](https://doi.org/10.1017/cbo9780511805653). isbn: 978-0-521-22850-5.
- [12] Denzin, N.; Lincoln, Y. (1994). *Handbook of qualitative research*. Thousand Oaks: Sage. isbn: 978-0-8039-4679-7.
- [13] Douglas, M. (1984). *Food in the social order*. New York: Russell Sage Foundation. isbn: 978-0-87154-219-6.
- [14] Drewnowski, A.; Popkin, B. (1997). The nutrition transition: Trends in the global diet. *Nutrition Reviews*, v. 55, n. 2, p. 31-43. doi: [10.1111/j.1753-4887.1997.tb01593.x](https://doi.org/10.1111/j.1753-4887.1997.tb01593.x).
- [15] FAO. (2021). *The state of food security and nutrition in the world*. Roma. doi: [10.4060/cb4474en](https://doi.org/10.4060/cb4474en).
- [16] FAO. (2022). *Agricultural sector review: Timor-Leste*. Roma.
- [17] Field, A. (2018). *Discovering statistics using IBM SPSS statistics*. 5. ed. London: Sage. isbn: 978-1-5264-1951-4.
- [18] Gil, A. C. (2010). *Como elaborar projetos de pesquisa*. 5. ed. São Paulo: Atlas. isbn: 978-85-224-5386-6.
- [19] Gracia-Arnaiz, M. (2010). Alimentação, cultura e saúde. *Antropologia Portuguesa*, v. 27, p. 41-58.
- [20] Greene, W. H. (2008). *Econometric analysis*. 7. ed. New York: Pearson. isbn: 978-0-13-513740-6.
- [21] Grunert, K. G. (2006). Future trends in consumer behavior. *Journal of Food Products Marketing*, v. 12, n. 2, p. 1-14.
- [22] Gujarati, D.; Porter, D. (2009). *Basic econometrics*. 5. ed. New York: McGraw-Hill. isbn: 978-007-127625-2.
- [23] Gujarati, D.; Porter, D. (2011). *Econometria básica*. 5. ed. Rio de Janeiro: Elsevier. doi: [10.1036/0073375776](https://doi.org/10.1036/0073375776). isbn: 978-85-352-3990-8.
- [24] Hair, J. et al. (2009). *Multivariate data analysis*. 7. ed. Upper Saddle River: Prentice Hall. isbn: 978-0-13-813263-7.
- [25] Hoddinott, J.; Yohannes, Y. (2002). *Dietary diversity as a food security indicator*. Washington, DC: IFPRI Discussion Paper.
- [26] Lobo, M.; Ribeiro, F. (2013). Padrões alimentares em zonas rurais de Angola e Moçambique. *Revista de Nutrição*, v. 26, n. 4, p. 455-467.
- [27] Malhotra, N. (2006). *Pesquisa de marketing*. 5. ed. Porto Alegre: Bookman. isbn: 978-85-363-0648-3.
- [28] Maluf, R. (2007). *Segurança alimentar e nutricional*. Petrópolis: Vozes. isbn: 978-85-326-3661-5.

- [29] Malta, J.; Camargos, M. (2016). Modelos de equações simultâneas. *Revista Brasileira de Economia*, v. 70, n. 1, p. 109-130.
- [30] Mankiw, N. G. (2014). *Principles of economics*. 7. ed. Boston: Cengage. isbn: 978-1-285-16587-5.
- [31] Marôco, J. (2018). *Análise estatística com o SPSS statistics*. 7. ed. Lisboa: ReportNumber. isbn: 978-989-96763-6-4.
- [32] Martins, A. (2019). *Diversidade alimentar em comunidades rurais de Timor-Leste*. Coimbra: Universidade de Coimbra (Dissertação de Mestrado).
- [33] Maxwell, S.; Smith, M. (1992). Household food security: A conceptual review. *IDS Bulletin*, v. 23, n. 3, p. 1-17.
- [34] Meeusen, W.; Van Den Broeck, J. (1977). Efficiency estimation from Cobb-Douglas production functions. *International Economic Review*, v. 18, n. 2, p. 435-444.
- [35] Menezes, F. (2007). Alimentação e identidade cultural. *Revista de Sociologia*, v. 12, p. 89-104.
- [36] Menezes, P. (2014). *Desigualdades no acesso a alimentos no Brasil*. Brasília: IPEA.
- [37] Monteiro, J. (2021). *Fatores socioeconômicos do consumo de carne de porco em Timor-Leste*. Díli: Ministério da Agricultura.
- [38] Nicholson, W.; Snyder, C. (2015). *Microeconomic theory: Basic principles and extensions*. 12. ed. Boston: Cengage. isbn: 978-1-305-46504-7.
- [39] Parajuli, R.; Zhang, Y.; Chang, H. (2016). Market interdependencies in food demand systems. *Agricultural Economics*, v. 47, n. 1, p. 91-102.
- [40] Petersen, B. et al. (2015). *Value chain analysis for policy design*. Washington, DC: IFPRI Monograph.
- [41] Pinto, C. (2018). *Impacto das alterações climáticas na agricultura timorense*. Díli: FAO.
- [42] Pindyck, R.; Rubinfeld, D. (2013). *Microeconomia*. 8. ed. São Paulo: Pearson. isbn: 978-85-7605-752-4.
- [43] Reis, E. (2023). *Estatística aplicada*. 6. ed. Lisboa: Edições Sílabo. isbn: 978-972-618-968-8.
- [44] Sen, A. (1981). *Poverty and famines: An essay on entitlement and deprivation*. Oxford: Oxford University Press. doi: [10.1093/0198284632.001.0001](https://doi.org/10.1093/0198284632.001.0001). isbn: 978-0-19-828463-5.
- [45] Silva Dias, G. (2006). *Economia do consumo alimentar em países lusófonos*. Coimbra: Almedina. isbn: 978-972-40-3125-3.
- [46] Soares, D. B. (2017). *Pork and power: Ritual economy among the Makassae of East Timor*. Canberra: ANU Press. doi: [10.22459/ta.04.2017](https://doi.org/10.22459/ta.04.2017). isbn: 978-1-76046-126-0.
- [47] Sukati, I. et al. (2012). A framework for food security via supply chain. *British Food Journal*, v. 114, n. 1, p. 120-136.
- [48] Tamele, M. (2015). *Redes informais de comercialização de alimentos em Angola*. Luanda: Universidade Agostinho Neto.
- [49] Taylor, S. J. (2005). *Introduction to qualitative research methods*. Hoboken: Wiley. isbn: 978-0-471-71887-1.
- [50] Todaro, M.; Smith, S. (2015). *Economic development*. 12. ed. Harlow: Pearson. isbn: 978-1-292-06509-9.
- [51] UNICEF. (2022). *Timor-Leste national nutrition survey*. Nova Iorque. doi: [10.18356/6ef1e09a-en](https://doi.org/10.18356/6ef1e09a-en).
- [52] Varian, H. R. (2010). *Intermediate microeconomics: A modern approach*. 8. ed. New York: Norton. isbn: 978-0-393-93424-3.
- [53] Varian, H. R. (2014). *Intermediate microeconomics: A modern approach*. 9. ed. New York: Norton. doi: [10.3934/dcddb.2014.19.267](https://doi.org/10.3934/dcddb.2014.19.267). isbn: 978-0-393-92066-6.
- [54] Wooldridge, J. M. (2013). *Introductory econometrics: A modern approach*. 5. ed. Mason: Cengage. isbn: 978-1-111-53104-1.
- [55] Yamane, T. (1967). *Statistics: An introductory analysis*. 2. ed. New York: Harper & Row. isbn: 978-0-06-047313-7.