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## **STATE OF FOOD AND NUTRITION SECURITY OF RURAL COMMUNITIES IN MASSINGIR DISTRICT, MOZAMBIQUE**

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### **ABSTRACT**

Agriculture plays a very important role in the Mozambican economy as a source of food and income, about 70% of the population practices it, due to the seasonality that agriculture suffers, it puts a large part of the population in a situation of food insecurity, so it is estimated that more than half of Mozambican households are affected by food insecurity. and this seasonality and low production end up putting about 30% of families in poverty or on the limit of food diversification and 80% of families are unable to have adequate food. The present study aimed to analyze the current situation of food and nutritional (in)security in rural communities in the district of Massingir, province of Gaza. Data collection was carried out through dietary and demographic surveys in the rural communities of Chitar, Década da Victoria, Timondzuene, Matxinguetxingue and Banga, where home visits were carried out to 490 households. For the assessment of food (in)security; the Brazilian Food Insecurity Scale (EBIA) was used and the work data were analyzed using the statistical package SPSS v2. The research showed that a large part of the population (84.5%) of the rural communities of Massingir is in a situation of severe food insecurity, due to lack of access and availability of food, which is not physically or economically accessible, 4.3 % are in a state of moderate food insecurity, 8.4% in mild food insecurity and only 3.3% in a state of food and nutritional security, 81.7% of households spend less than 5 thousand meticaís on food.

### **KEY WORDS**

Access to food, food availability, rural community, household, food consumption, food insecurity.

Food and nutrition security (FNS) is the realization of everyone's right to regular and permanent access to quality food, in sufficient quantity, without compromising access to other essential needs, based on health-promoting food practices that respect diversity, and are environmentally, economically and socially sustainable". This means that every human being must have access to safe and nutritious food, regardless of race, religion, sex or region (Torres, 2001).

As refers Abreu (2001), food security exists when people have permanent physical and economic access to safe, nutritious and sufficient food to satisfy their dietary needs and food preferences in order to lead an active and healthy life. Menezes (2011) mentioned that food and nutrition security is based on several pillars, and it is very important to understand what these pillars mean, as they must all be attended to simultaneously in order to achieve a situation of "security" on the part of families with regard to food and nutrition. These dimensions are as follows: Availability and production; Access; Consumption and use and Stability.

Availability refers to the existence of a sufficient quantity of food, of adequate quality, to meet the consumption needs of the population and that are provided through domestic production or import (including food aid), to estimate availability, it is necessary to take into account consideration of post-harvest losses and food exports (LEÃO, 2011).

Access, according to FAO (2004), refers to the ability of individuals to acquire food in quantity and quality and a nutritious diet through adequate resources.

The impossibility of access to food can be economic, when families have sufficient economic resources to meet their basic food needs, without prejudice to the satisfaction of



other primary needs, such as housing, health, education and information and of a physical nature (GODFRAY, 2011).

Consumption and Utilization refers to the intake and use of food in quantity and quality, in order to meet the needs in micronutrients (vitamins and minerals) and macronutrients (carbohydrates, proteins and lipids) to achieve a state of nutritional well-being based on in the correct absorption of the nutrients necessary for a healthy diet (KNOWLES, 2005).

It refers to the use of food through adequate nutrition, clean water, sanitation and health care to achieve a state of nutritional well-being in which all physiological needs are met (KLAUS, 2005).

Stability is ensured when adequate amounts of food are produced and available to people. Stability is directly related to climate variability, price fluctuations, political and economic factors (HANSON, 2013).

In order for the condition of the State of food and nutrition security (FNS) to be maintained continuously (permanently), it is necessary to safeguard the stability dimension. This dimension concerns, according to JOÃO, (2008), at least three fundamental aspects: intra-family food security, as defined by the National Food Security Council, a productive and healthy life to be a proper diet, and cultural habits of each one of them. PINTO (2008) indicate that the first is achieved when all its members have access, through socially acceptable means, to the consumption of food in sufficient quantity and adequate quality, thus being able to lead, each of them, the second must meet the individual's energy needs, be nutritionally diverse, respect age, according to physiological conditions, physical activity.

According to José (2013), the percentage of the population suffering from chronic malnutrition is higher in communities residing in rural areas (46%) than in those residing in urban areas (35%). The provinces of the Northern Region of Mozambique registered the highest prevalence rates of stunting, with the provinces of Nampula and Cabo Delgado being the ones with 55% and 52%, respectively. On the other hand, the provinces of the Southern Region, with the exception of Inhambane Province, have, GODFRAY (2011), the lowest proportions, where Maputo Province and Maputo City stand out, both with 23%.

The provinces of Zambézia and Sofala with 9% and 7% respectively, Manica and Nampula with 7% and Cabo Delgado and Tete all with 6% are the ones with the highest level of malnutrition, while the lowest rates are recorded in the provinces of Gaza (1%), Maputo Province and Maputo City both with 2% (MICOA, 2012).

Chronic food insecurity is most prevalent in Tete and Niassa provinces (33 and 30% of households, respectively) and least prevalent in Maputo city (11%).

FAO (2003) clears that nutritional food insecurity (ISAN) is a situation in which a person or population does not have access and safe availability to a sufficient amount of food to have normal growth and to lead an active and healthy life. It is, as said by HEIFER (2008), related to social vulnerability, as it results from a combination of factors that can lead to deterioration in the level of well-being of individuals, families or communities, depending on their exposure to certain types of risks.

According to Lima (2015), in general, food insecurity is greater in rural areas (27 of the households) than in urban areas (18), due to some factors that occur in cities such as 1) obtaining higher monetary income; 2) prices of essential goods are subsidized; 3) greater availability of food due to imports; 4) more diversified food diets, among others. Concerning to this, PACHECO (2021) says that the lack of income, the high unemployment rate, the concentration of land, the commercialization of water and the precariousness of education limit access to food and nutrition and prevent a dignified life for the entire population.

In Mozambique, many causes of food insecurity are pointed out, the most prominent being the lack of access and availability of food products where the population does not have the means to acquire or produce food, often there is no food physically available to meet the needs of the population. The lack of these two pillars, on which food security is based, is visible when we analyze the Mozambican diet (CARRILHO, 2016).

The main causes of food insecurity and malnutrition in Mozambique, the latest studies on poverty indicate the increase in the number of poor in the country and greater social and territorial inequalities. Other qualitatively similar trends where it says that more than half



(55%) lives below the national poverty line. This factor leads a large part of the Mozambican population to live in a state of food and nutrition insecurity in the country, being seen as the main cause of insecurity (INE, 2011 and FRANCISCO, 2011).

To Selemene (2011), a significant part of work in rural areas is seasonal and precarious, and the minimum wage is lower than in other sectors, often not being enough to cover the monthly expenses of households, thereby causing food insecurity, and malnutrition to a large part of the Mozambican population. GRANHEIM (2013) notes that seasonality and lack of a steady job are seen as one of the indicators of food insecurity due to the lack of an income capable of satisfying their needs.

Knowledge of the state of food and nutrition security in recent times has helped many families to get out of the state of extreme poverty, food insecurity through food aid and stock exchanges, creating many programs and strategies for the survival of the population or improvement of the state of food security.

## METHODS OF RESEARCH

The study was carried out in the communities of Chitar, Década da Victória, Timondzuene, Matxinguetxingue and Banga, district of Massingir, province of Gaza. Mozambique. According to INE (2020), this district is surrounded in the south with the district of Magude, Maputo Province, to the east is the district of Mabalane and Chókwè and to the west with the Republic of South Africa and has a population density of 37,664.

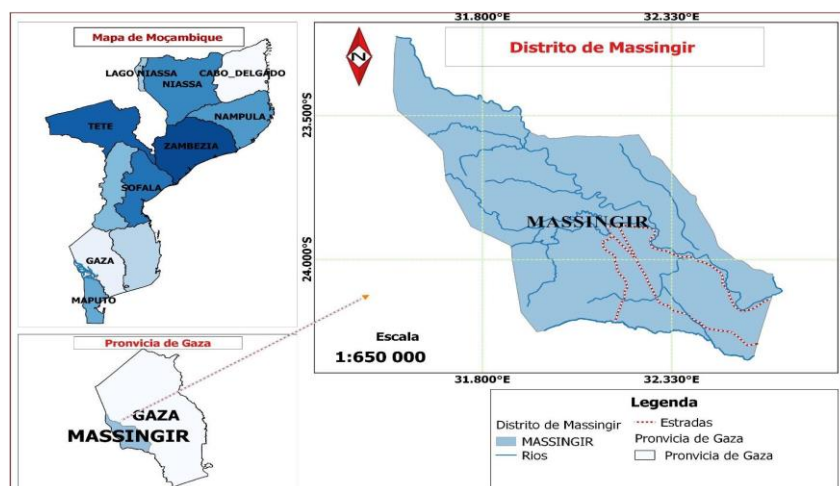


Figure 1 – Geographical location of Massingir

The district's climate is dry semi-arid, with average annual temperatures of around 30°C and rainfall well below the evapotranspiration rate, which, together with the great irregularity of rainfall, strongly hinders agricultural practice in a markedly rural region. To limit the effects of an unfavorable climate for agriculture, a large dam was built on one of the permanent-flowing rivers that cross the district. This dam, which inherited the name of the district, was built on the Rio dos Elefantes, one of the main tributaries of the Limpopo, and forms a reservoir whose retained water occupies about 150 km<sup>2</sup> (INE, 2020).

In addition to the aforementioned Rio dos Elefantes, other important rivers in the district are the Rio Mazimulhpe (which, like the Rio dos Elefantes, has a permanent flow), the Chingedzi, the Machapane, the Benhuca, the Zambalala, the Chivambalane, Nhamvotso, the Nhapombe and the Inhatcozoane (all of which have a temporary flow). There are also 10 lagoons, namely the Chileusse, Vele, Dzendenfu, Inhaphessane, Malopane, Furene, Pumbe, Nhalungo, Nhatindzau and Namagungo lagoons (INE, 2020).

In terms of flora, the district has huge forests where the chanatsi and micaia species clearly predominate, and there are also some patches of mondzo, sandalo, vumaila and mecrusse.



As for the fauna, the variety is extremely high, including elephants, buffaloes, lions, leopards, zebras, horse oxen, giraffes, kudus, chicks, impalas, hippos, wolves, jackals, ostriches, chippians, wild goats, wild hens, boa constrictors, mambas, crocodiles, tortoises, among many others INE (2020).

The district's economy is essentially based on agricultural and livestock activities, fishing, tourism and the exploitation of forest resources, namely medicinal plants, firewood and wood, reeds, stakes, and firewood for charcoal. In the case of agricultural activity, the production of corn, beans, sweet potato, pumpkin, vegetables and peanuts stands out. Reference is also made to the existence of an agricultural company producing sugarcane whose available exploration area is around 30,000 hectares INE (2020).

Home visits were made to 490 households to apply a structured questionnaire to key members as described by the Simple Random Sampling with Repetition (AASCR). The number of households was found by using the equation 1, and teachers, researchers and students previously trained in interview techniques, conducted the interviews.

$$n = \left( \frac{Z_{\alpha/2} \cdot \sigma}{E} \right)^2 \quad (1)$$

Where:  $Z_{\alpha/2}$  = Critical value that corresponds to the desired degree of confidence;  $\sigma$  = Population standard deviation of the studied variable e; E = Margin of error or maximum estimating error.

The economic and/or socio-demographic profile of the communities was obtained by applying a questionnaire to the key members of the participating household, using the method described by Segall-Corrêa (2004) for this purpose. It was characterized the levels of expenses of the families, health plan, household composition and level of education.

Food consumption was verified through the application of the Qualitative Food Frequency Questionnaire (QQFA) proposed by Regina Mara (2009). For the purposes of analysis, 14 foods were grouped into energy foods (maize, rice, tubers, bread, sugar and oil), protector foods (vegetables, fruits and beans) and builder foods (milk powder, fresh milk, egg, meat and/or derivatives and fish). The QQFA offered then, 5 consumption frequency options: more than 5 times per a week; 3 times, 2 times, 1 time and rarely and respective amounts.

For the evaluation of food security used Brazilian Food Insecurity Scale (EBIA) recommended by IBGE (2010). This scale was used to evaluate the perception of individuals in relation to access to food and its availability at home, estimating the prevalence of (in %) food security in households and classify it into four categories with three levels of intensity: food security, mild, moderate or severe food insecurity.

Data were tabulated in duplicate using the Microsoft Excel in order to identify typing errors, as suggested by the general linear model (GLM); if the level of significance of 5%, being the averages of the results compared through the test of Tukey. All statistics data were performed with the SPSS program version 21.0.

## RESULTS AND DISCUSSION

The socio-demographic and economic characterization of the rural communities of Massingir, is shown in the table 1. It is possible to notice that 81.7% live with less than 5 thousand meticaís for food expenses and 16.9% with 5 to 10 thousand. This find can be justified by the fact that the income of families proves the surplus of agricultural practices. Similar results were found by PMA (2009) on his study about household budget survey, in which found that more than 60% of families in rural communities live with less than 5,000 meticaís. Also aligned with these results, PANIGASSI et al (2008) in their study related to food expenses, found 99.0% of the households spending less than 5 thousand meticaís on health and 1.0% spend from 5 to 10. Regarding education, FENITA E ABBA (2017) notice that 99, 0% spend less than 5 thousand meticaís and 1% over 5 thousand, and they explain



that this may be a consequence of the low income of the households, since more than 70% of them obtain their income from agricultural production surplus, corroborating with.

Concerning to health and education, similar results were found by INE (2010) in his study on family income, reporting that 56% of Mozambican families spend less than 5,000 meticaís on health and education. There is also corroboration of the results of this research with those of SOUSA (2013) on the assessment of eating habits in rural communities, who obtained (79.4%) of households living on less than 5,000 meticaís for health and education in Mozambique. SETSAN (2014), in their study on food security and agricultural potential of rural communities, found that 89.36% of that population lives with less than 5,000 meticaís for their expenses.

Related to monthly expenditure on food, education as well as health, 80.0% of households live with less than 10.000,00Mt, 19.8 % spending between 10 to 20 thousand meticaís for the same expenses and 0.9% spends 20 to 30 thousand. The justification may be that part of these latter groups has their income from paid work practiced in the neighboring Republic of South Africa to meet the needs of their families. The results of the present research are similar to those taken by SOUSA (2011) in the work on poverty assessment, where he found that 65% had a monthly family income of 808.20 mt. Also similar to the results of this study, PINTO (2011), in the study on Food and Nutrition Security of the Republic of Mozambique, points out that more than 74.7% of the population lives with less than 60.5 meticaís per day. Correlating the results of the present study with those of HOF and STIGLIZ (2006) in their study on the assessment of family income and food security, the similarity with these is evident, showing that 83% live with less than 10,000 mt. Regarding the age group, it was noticeable that 79.6% are between 21 and 60 years old, this fact was possibly verified because it is characteristic of rural communities, where the largest workforce is characterized by the youth, dedicated to agricultural production, hunting and fishing.

Concerned to the education, it was noted that the population of the Massingir community did not attend any educational, and only 1.1% has a higher education. This can be related to the culture and behavior of rural communities that prioritizes agriculture as a basic activity, according to the MEC (2012).

Table 1 – Economic and socio-demographic characterization of the Massingir communities' households

	Variable	Categories	Relative Frequency (%)
Socio-demographic	Genre	Feminine	27.5
		Male	72.5
	Education	Did not study	46.6
		Primary school	45.1
		High school	6.9
University education		1.1	
Age group	Age 0-14	0.4	
	Age 21-60	76.9	
	Age > 60	22.7	
Economic	Food expense	<5 thousand meticaís	81.7
		5 -10 thousand meticaís	17.0
		10 -15 thousand meticaís	1.1
		25 -30 thousand meticaís	0.2
	Housing expense	<5 thousand meticaís	98.2
		5 -10 thousand meticaís	1.4
		25 -30 thousand meticaís	0.4
	Health expenditure	<5 thousand meticaís	99.0
		5 -10 thousand meticaís	1.0
	Monthly expense	<10 thousand meticaís	80.0
10 -20 thousand meticaís		19.1	
20 -30 thousand meticaís		0.9	

The Figure 2 represents the frequency of consumption of the main energy foods among the households in Massingir rural communities.

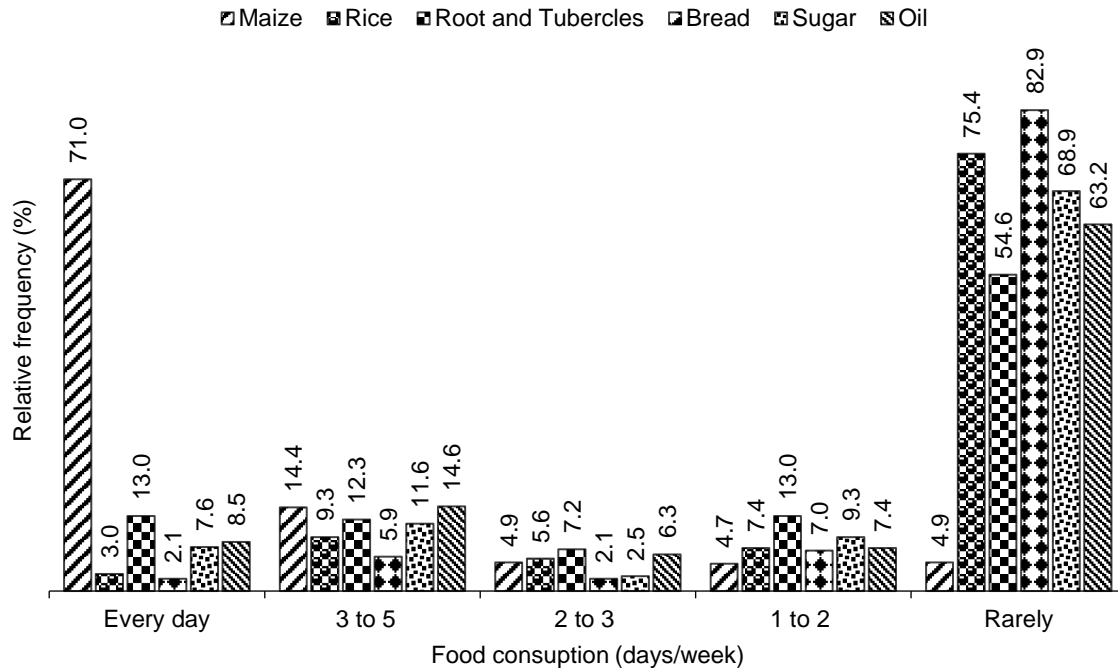


Figure 2 – Frequency of energy food consumption

The maize consumption was seen around 71.0% for the category “every day” and 4.9% for rarely, thus having a higher frequency of cereal consumption. This can be the direct consequence, assuming that maize is the basic and traditional food in those communities. With regard to rice consumption, the data showed a variation of around 3% for daily consumption, and 75.4% for rarely, thus meaning lower consumption of this food when compared to maize. This find is possibly related to the fact that the rice, a part of the maize, is not a traditional crop; don’t meet the values and/or local habits, and communities experiment high production costs with the consequent replacement of this by maize. ZIDORA (2015) in his study on the variation of food consumption in Zambezia, also found that the cereals most consumed by rural communities in Nicuadala, inhasungi is maize, followed by rice, culturally established in African populations, for being cheap and high-calorie foods.

The results found in this survey agree with PESAN (2002) when he refers that, in addition to rice, maize is the dominant cereal crop in the upland areas of Massingir, with more than 80% of farmers growing maize, and that most of rural communities in upland areas depends on maize as a staple cereal crop. Wang (2012), in his study of main cereal crops produced at national level, found that most rice is from small areas and rainfed. This means that rice production is very low in rural communities, thus showing the low production and consequent low consumption.

13% of AGF was found consuming tubers every day and 54.6% rarely. the results revealed a balanced consumption of this food per week. This accessibility possibly may be linked to availability in almost any time of the year and, or its production locally, assuming that the tuber crops can be grown under drought and other difficult condition of production. These results corroborate the findings of BIASSONI et al (2002), in their study evaluating the eating habits of rural communities in Mozambique, where they say that the majority of Mozambicans consumes vegetable leaves, especially those of cassava, and tubers, WB (2011) reported, on the Agricultural Census and frequency of food consumption in rural communities, that roots and tubers are produced by about 70% of families in rural communities as well as their consumption is centered in these communities.

82.9% of households were found consuming bread rarely, 2.1% every day and 6.9% from 1 to 2 days. This low level of consumption may be related to the low availability of the product and, or access, considering the financial difficulties of families. These results are different from those found by PORTO (2000) in his research on the level of bread



consumption, where 87.6% of respondents assumed the consumption of this food between 1 and 3 times a day. PAIN (2001), evaluating the frequency of bread consumption in the communities, reports that 76.3% was consuming bread every day or at least in one of the meals a day, 20% consume it twice a week and 3.7% do not consume.

For sugar, it was found that 7.6% consume it every day and 68.9% rarely. This fact can be associated with little demand for this food by the families of the communities, as well as the low purchasing power on their part. Only 8.5% of the households consume oil every day against 63.2% who consumed it rarely. This percentage may possibly be associated with the lack of purchasing power of families and, or by the partial replacement by other sources, such as peanuts and coconuts, assuming that most families earn their income from agriculture, as mentioned by FAO (2010). Similar results were found by SOUSA (2010) in the study on the food frequency of fried foods and the use of oil in rural communities in Brazil, where 7.3% of consumption of foods prepared with oil was less frequent, and FILHO (2001) who, in order to assess the eating habits of rural communities in Mozambique, also found a lower frequency (4.9%) of consumption of this good and assumed that the access to oil in the communities was restricted.

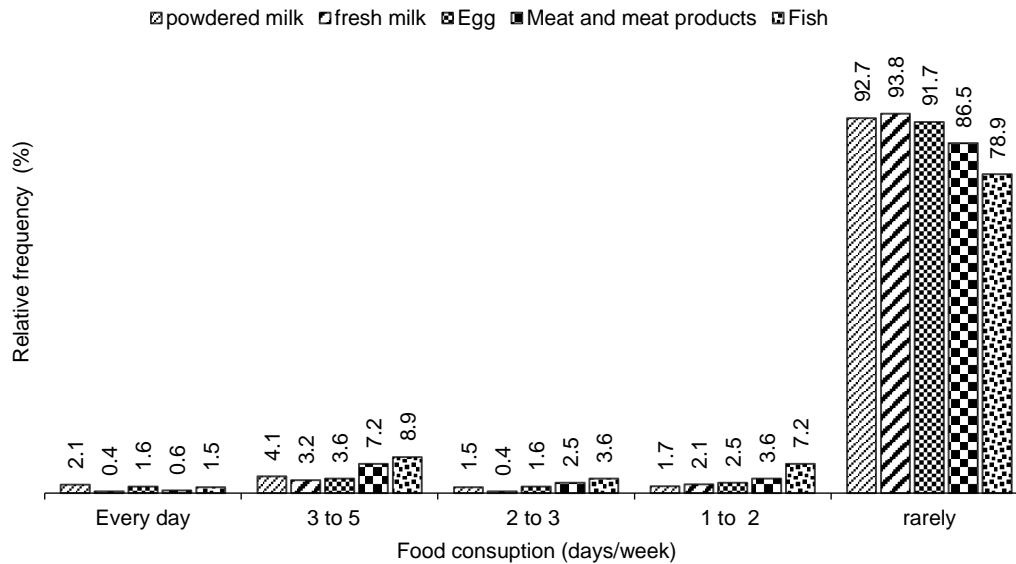


Figure 3 – Frequency of consumption of building foods

The result regarding to frequency of consumption of building foods is shown in figure 3, where it is clear that the majority (92,7%) is characterized by rare consumption of this group of foods, Similarly, and although the fact that the cattle production was evident in those communities, 93.8% of AF was found consuming rarely milk fresh. Therefore, the low level of consumption of this food is possibly associated with eating habits and customs. In the same line, less then 1% was found consuming meat and its derivatives every day. MACUÁCUA (2016), in his study carried out in Manjakaze, Gaza province, aiming to evaluate the food consumption of adolescents from rural public schools, reported a low level of 7.1% of consumption of building foods (egg, milk, meat and fish). Mozambique (2008) argues that in rural regions the consumption of these foods has been more frequent only on special dates such as festive days.

and for the frequency of egg consumption, it was noted that 1.6% consumed it every day, 3.6% from 3 to 5 days and 91.74% rarely, which can somehow be linked to poor access to this food. PHILIPPI (2008), evaluating the nutritional status and the frequency of consumption of protein source products, found that 52% added only one daily portion of the recommended, and the others did not reach this daily amount. Regarding to fish, it was noted that only 1.5% of AF consumes it every day, although the district is one of the potential



sources of fish, according to INE (2011). This low consumption of fish can be linked to the fact that most AF practice fishing as a source of income to satisfy other needs and not for their own consumption. HEANEY (2000) and CASÉ et al (2005) in their surveys of socioeconomic assessment and food consumption of rural families obtained similar results with the present study, mentioning 3% of consumption of milk, fish and eggs.

The frequency response of consumption of regulatory foods in 5 rural communities in the district of Massingir is reported in figure 4, which reflects the satisfactory consumption (41.5% of the AF) of vegetables every day. The relative consumption may be associated with the great availability of those foods in those communities and easy accessibility. CAP (2010) supports the findings of this that survey by saying that when foods are locally and sufficient produced, be cheaper to acquire in that region. The figure also highlights the low consumption of fruits and beans, foods mentioned by several authors as getting many benefits. This may be associated with poor fruit production in those communities and, or lack of access, as well as the low power purchase by households. Similar results were found by CASÉ (2011), who identified a decline in fruit consumption from 76.5 to 45.9% in 2011 and 2019, respectively. This decline can be justified by substitution in industrialized foods and, or lack of access to the same foods.

MATTOS and MARTINS (2000) found similar results in their study on the frequency of eating in the Municipality of Nampula, mentioning 73.8% of rice and beans consumption. Agreeing with the findings of the research carried out in Mopeia, by ASSIS et al (2002), 95.6% of the interviewed revealed that they consume beans rarely, 65.7% do it 4 to 7 times a week. FAO (2008), in the evaluation of the availability of basic products on the table of the communities of Estaquinha, noticed that 75% of AF was consuming those items.

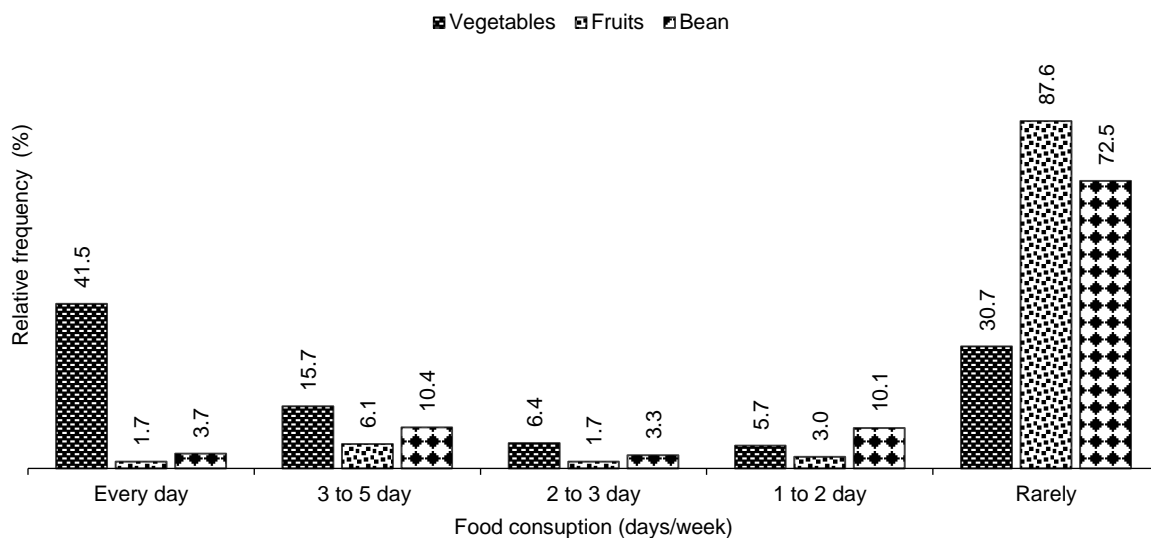


Figure 4 – Frequency of consumption of regulatory foods

According to the results presented in Figure 5, very low percentage (3,3%) of the surveyed households is in a state of food security, evidencing the significant level of access and permanent availability of food to satisfy their needs. Similar results (4.7%) were found by SETSAN (2015) in a study assessing the availability of domestic production, net trade (import – export) and food stock levels. Also according to the same graph, 8.4% of households are in a state of mild food insecurity. SETSAN (2019), in his food and nutrition security report, maintains that the state of mild food insecurity comes from the non-availability of products in the markets and non-accessibility in economic terms, thus corroborating with the finds in this work. Silva *et al* (2011), in their study, also assessing the state of food and nutrition security in Quilombola Communities, reported, like on this work, food insecurity of 52.1%, with 30.9% mild, 15.7% moderate and 5.4% severe.



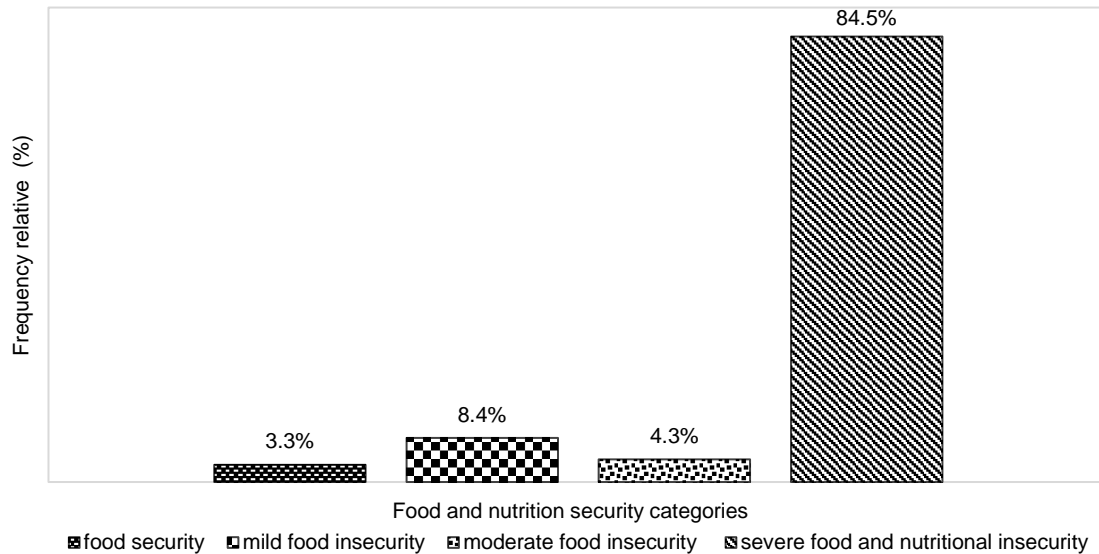


Figure 5 – Status of food and nutrition security in rural communities in Massingir district

Pereira et al (2006), when studying the food situation in a region of high social vulnerability in Mozambique, found 7.89% in a state of mild food insecurity, results that are in agreement with the present research. The moderate food insecurity (4.27%) demonstrate that this part of the population can meet their food needs, but living in a concern to reduce the amount of food to reach the next production season. Non-suppression of needs may stem from the lack of foodstuffs availability as well as the lack of funds to purchase them once they run out. In line with research, E.S (2014) found on, his study about the availability of food products in the market and its level of accessibility, 17% of AF with no regular access to food and in moderate food insecurity. The severe food and nutritional insecurity (84.5%) of the households in Massingir communities was evidenced by their lack of food needs, poor availability and lack of access to food. SETSAN (2015) and CONSEA (2004), in his study reported that in rural areas the main source of income is agriculture, access to food by households is also influenced by the seasonality of agricultural production. These authors also characterize the fact that most (94%) of the households have difficulties in accessing food, with particular focus on the province of Gaza (99%), data that corroborate with those of this research, Hoffman (2008), in his study on nutritional food security in rural communities in Somalia, found that 94% of the AF had difficulty in accessing food, putting them in a condition of severe food insecurity. SETSAN (2015), analyzing the determinants of food insecurity in Mozambique, found 78% of the population living in severe food insecurity. Luciana (2015), describing the food security experienced by families living in the rural community found 10.7% in severe nutritional food security. Also in line with this research, Maluf and Zimmermann (2005), working with rural families in Paraíba, found 14.0% of AF in severe food insecurity.

## CONCLUSION

The present research showed that a large part of the population of the rural communities of Massingir is in a situation of severe food insecurity, due to lack of access and availability of food goods. Regarding to energy foods, maize consumption (71.0%) was noted unless bread (2.1%). In group of building foods, the fish is rarely (92.7%) on the table. The most consumed regulators foods are vegetables (41.5%) and fruits are less (2.0%). 81.7% of households spend less than 5,000,00 meticaís for food, education and health, more than 46.6% of household heads have not attended any educational institution, the dominant gender is male and 76.9% are in the age group of 21-60 years old. The status of food security in the rural community of Massingir is characterized as sever food insecurity.



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