

# Food consumption and determinants of food insecurity in the department of Man (Western Côte d'Ivoire)

## ABSTRACT

Despite the progress made in the framework of the Sustainable Development Goals (SDG) to ensure food security, pockets of food insecurity still remain in the Ivorian landscape. The objective of this study was to assess the food consumption of rural households in the department of Man in western Côte d'Ivoire and to identify the determinants of food insecurity. The assessment of food consumption was based on the calculation of the food consumption score. A survey of 1065 households was conducted to characterise the socio-economic profile and food consumption within these households. A survey of 1065 households was conducted to characterise the socio-economic profile and food consumption within these households. During the favourable period (October-February), 98.5% of households had an acceptable food consumption score, compared with 87.5% during the transitional period (March-June) and 15.5% during the lean season (July-September). The lean season is the most critical with 33.6% of households having a poor food consumption score and 50.9% of households having a borderline food consumption score. The results show that the gender and educational level of the head of household, the size of the household and the size of the crops influence food security. Food insecurity is experienced cyclically (every year) by households.

*Keywords: rural households, food insecurity, determinants, Côte d'Ivoire*

## 1. INTRODUCTION

Food security is a multi-disciplinary field addressed by several fields including agriculture, anthropology, economics, nutrition, public policy and sociology, among others, and is of particular interest to many government and non-government agencies [1]. Food security is when people have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life [2]. As far as food insecurity is concerned, it is essentially located in the developing countries, where Sub-Saharan Africa still has the highest rate, with almost 47.5% of its population remaining in poverty. Conflicts, droughts, floods, soaring food prices and other disruptions have an immediate negative impact on the poorest and most vulnerable households [3]. Despite the progress made within the framework of the Sustainable Development Goals (SDG) to ensure food security, pockets of food insecurity still remain in the Ivorian landscape and have even been accentuated in recent years due to repeated socio-political unrest [4]. The food security situation since 2011, and in particular through a series of assessments, the latest of which was conducted in 2015, shows that food insecurity among rural households has increased from 12.6% to 15%. In particular, the proportion of severely food insecure rural households increased from 2.5% in 2009 to 4.3% in 2015 [4]. Food insecurity at the household level puts households at risk of undernourishment or malnutrition.

The objective of this study was to assess the food consumption of households in the department of Man in western Côte d'Ivoire and to identify the determinants of food insecurity. For this purpose, we

determined the food stocks, the frequency of family meals and the food consumption score during the year of our study period.

## 2. MATERIALS AND METHODOLOGY

This study was based on a survey of rural households in the department of Man (Tonpki region, western Côte d'Ivoire). Data collection was mainly aimed at obtaining information from household heads and focus groups through discussions and interviews. A sample of 15 randomly selected households was drawn from each selected village, giving a total of 1065 households in 71 villages. The data was collected using a survey form that included the following parts: demographic and educational characteristics, productive capital, food stocks and food consumption. For questions related to food consumption, the male heads of household were supported by the women responsible for preparing the household meal. Data quality control and analysis were performed using IBM SPSS Statistics 20 and Statistica 7.1 software.

## 3. RESULTS AND DISCUSSIONS

### 3.1 Household characteristics

Table 1 presents the socio-demographic characteristics of the households surveyed, according to certain variables. The results show that the dominant household type is that under the responsibility of men. Of the 1065 households surveyed, 88% were headed by men and 12% by women. The average age of the heads of household is 49 years, ranging from 20 to 90 years. In addition, about 61.3% of respondents had fewer than 8 members in their households. The distribution of respondents according to origin showed that 71% were aboriginal people, 19% were indigenous people and 10% were non-Ivorians. With regard to educational level, 54% of the heads of household were illiterate, 30% had primary education and 16% had secondary and higher education. These results are in line with those of the survey conducted by the Ministry of Agriculture, FAO, WFP [5] [6] in Man district which showed that households consist of an average of 6.9 people with an average age of the heads of household of 44.3 years.

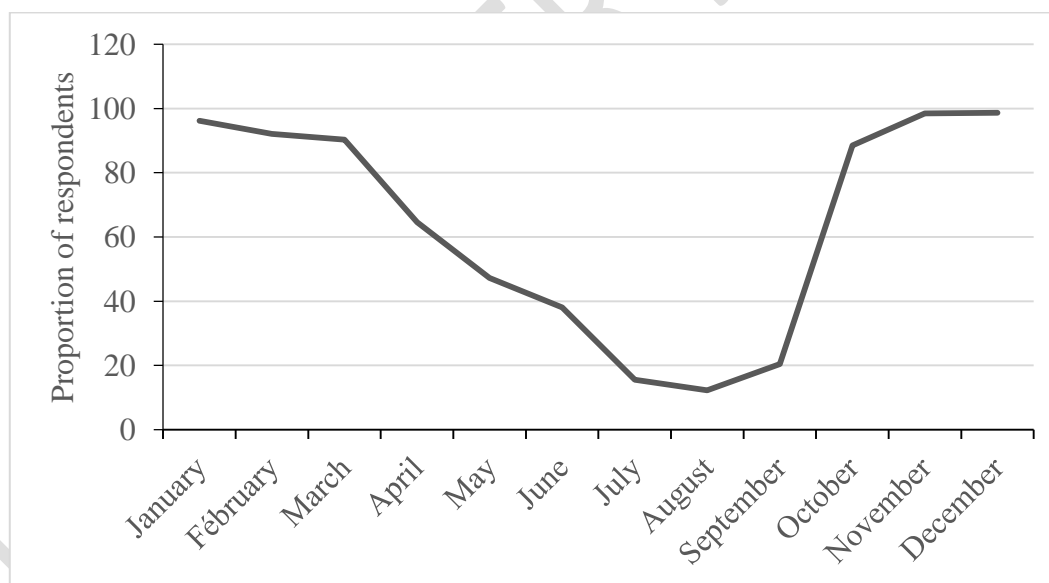
Table 1. Socio-demographic characteristics of households

Variables	Categories	Frequency (n=1065)	Percentage (%)
<b>Gender of head of household</b>	Male	937	88
	Female	128	12
<b>Age of head of household</b>	20-60	811	76,2
	>60	254	23,8
<b>Level of education of head of household</b>	None	575	54
	Primary	320	30
	Secondary and higher education	16	16
<b>Origin of the head of</b>	Aboriginal people	756	71

<b>household</b>	Indigenous people	202	19
	Non-Ivorians	107	10
<b>Size of household</b>	≤ 7	653	61,3
	8-15	376	35,3
	≥ 16	36	3,4

### 3.2 Meeting household food needs

The results in figure 1 show that 94.7% of the households surveyed are unable to meet the family's food needs throughout the year. Overall, the difficult period or lean season (P3) runs from July to September and corresponds to the rainy season. At this time, 87.8% of households feel that there is not enough food for the whole family because the food consumed does not come from family production. The favourable period (P1) runs from October to February and 98.5% of households feel that there is enough food for the whole family. These results are corroborated by those of the Ministry of Agriculture, FAO, WFP [6] and Somé *et al.* [7], which showed that July, August and September are the months of the year when many households in western Côte d'Ivoire and Tougou (Burkina Faso) suffer from food shortages because most of the food they consume comes from outside their own farms.



**Fig. 1. Periods when food needs are met by the families surveyed**

### 3.3. Food crop stocks

The foodstuff stored as a food reserve was rice and cassava. This would be justified by the fact that these two food crops are the staple foods of the population. This result is corroborated by that of Kouamé and Enoh [8] who showed that rice and cassava are the main staple carbohydrate foods of the population. The results in Table 2 show that the proportion of households with rice stocks ranged from 90.6% to 7%, and those with cassava stocks from 95% to 45.73% from the favourable period

(P1) to the lean season (P3). The quantity of the stock and the average duration of depletion are decreasing from the favourable period to the lean period. The quantity of the stock and the average duration of depletion are decreasing from the favourable period to the lean period. The average rice stock varied from 800 to 50 kg and the average depletion time from 6 to 1 month (from period P1 to period P3). The average cassava reserve varied from 1 to 0.45 hectares and the average depletion time from 10 to 2 months from period P1 to period P3. According to Alderman and Garcia [9], food reserves are an important factor in household nutrition, either during periods of fluctuating incomes or when agricultural production falls sharply, especially for households living in rural areas. Indeed, the presence or absence of food reserves can help judge the severity of the food crisis in situations where households do not have the financial means to replenish their stocks [10] [11].

**Table 2. Stored products and their useful life**

Periods	Rice			Cassava		
	households (%)	Avg. stock (Kg)	Avg. duration (months)	households (%)	Avg. reserve (ha)	Avg. Duration (months)
P1	90,6	800	6	95	1	10
P2	48,73	350	3	80	0,75	7
P3	7	50	1	45,73	0,45	2

*Avg. : average ; P1 : october-february ; P2 : march-june ; P3 : july-september*

### 3.4 Distribution of family stocks of rice and cassava

Table 3 shows the distribution of rice and cassava stocks by origin. The results show that during the period from October to February, 90% of rice stocks and 98.5% of cassava stocks were produced by families. These different stocks from family production decrease over the different periods. It falls from 90 to 0% for rice and from 98.5% to 80.4% for cassava. On the other hand, the latter's purchases increase during these same periods. They increased from 10 to 100% for rice and from 1.5% to 19.6% for cassava. This would be justified by the fact that rice and cassava are indeed the main staple carbohydrate foods of the population [8].

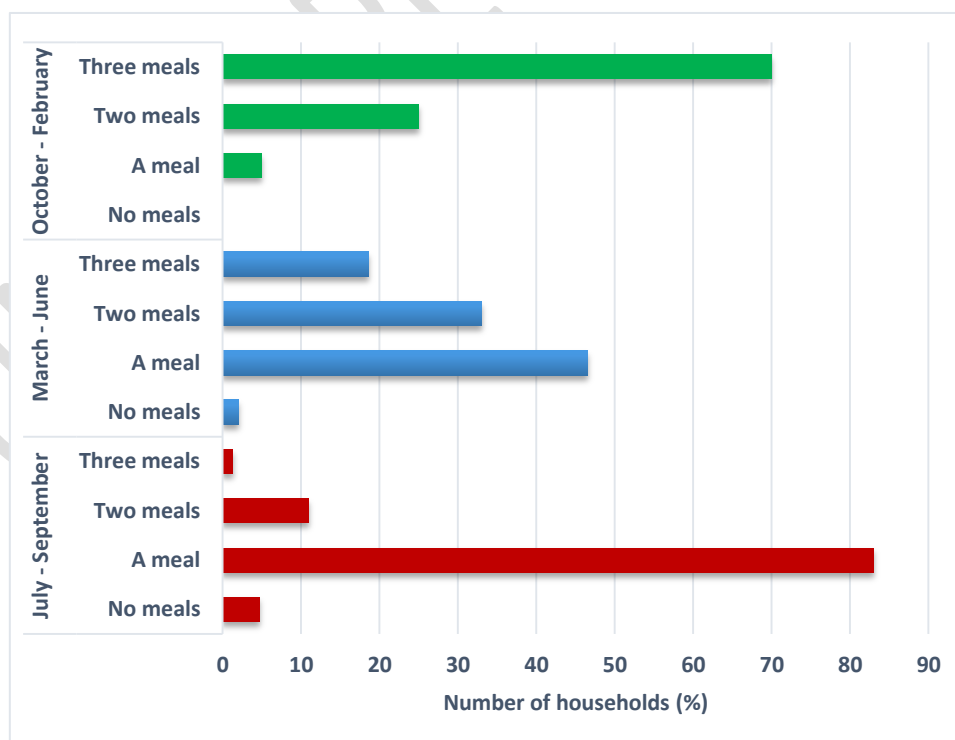
**Table 3. Origin of rice and cassava stocks**

Food processor	Periods	Stocks (%)	
		Family production	Purchase on the market
Rice	P1	90	10
	P2	31,8	68,2
	P3	0	100
Cassava	P1	98,5	1,5
	P2	90,7	9,3
	P3	80,4	19,6

*P1 : october-february ; P2 : march-june ; P3 : july-september*

### 3.5 Frequency of consumption of family meals

Figure 2 shows the proportion of households according to the number of meals eaten at different times of the year. The number of meals eaten by adults varied according to the time of year and especially according to access to basic foods. In the October-February period, 70% of households ate three meals a day. During the March-June period, the proportion of households eating 3 meals decreased. It fell from 70% to 20.5%. In addition, 33% and 46.5% of households ate 2 meals and 1 meal per day respectively. The July-September period was characterised by a single meal in 83% of households. This decrease in the number of daily meals is justified by the progressive depletion of food reserves and the lack of financial means. These results are supported by those of Yao et al. [12] and Somé et al. [7] who showed that July, August and September are the months of the year when many households suffer food shortages in rural areas.



**Fig. 2. Meal frequency by period**

### **3.5 Distribution of households by food consumption score (FCS) and household characteristics**

The household consumption score was used to classify households into three categories: poor food consumption score (severely food insecure household), borderline food consumption score (moderately food insecure household) and acceptable food consumption score (food secure household). The results on the distribution according to the food consumption score are presented in Table 4. They show that in period P1, 98% of households were food secure. In addition, during periods P2 and P3, 12.5% and 84.51% of households respectively were food insecure. The number of moderately food insecure households increases (borderline food consumption score) from period P1 to period P2 while the number of food secure households (high food consumption) decreases [13]. Only P3 was full of severely food insecure households, which accounted for 33.61% of households. This is the most critical period for food insecurity. Regarding the distribution by household characteristics, the results show that the proportion of food insecure households (moderate and severe) is higher for female-headed households than for male-headed households in the different periods. Households headed by these women represent 62.5% and 73.9% of households with a borderline consumption score in periods P1 and P2 respectively. All female-headed households have a poor consumption score in period P3. These households are therefore vulnerable to food insecurity because the female heads of household are generally widows or divorcees, of advanced age, who generally have very little arable land and are unable to afford labour for the farm. These findings are corroborated by those of Felker-Kantor and Wood [14], Tsai et al. [15] and Ministry of Agriculture, FAO, WFP [16] who showed that female-headed households very often have lower levels of food access and this vulnerability is explained by social and economic inequities that disadvantage women. Also, regardless of the level of food insecurity considered, the proportion of households is higher among those with no education or at most primary education. The results show that households with a borderline consumption score are 75%, 78.95% and 60.05% headed by households with no education or at most primary education. Household food consumption improves with the level of education of the household head and women [17] [18] [5] [19]. The household food consumption score decreases as the household size increases. The results show that households with more than 10 members represent 68.72%, 54.89% and 61.17% of households with borderline and poor food consumption scores respectively in P1, P2 and P3. This finding implies that in these larger households, food and financial resources are not sufficient and thus do not support access to a variety of foods [17] [18]. Also, households with less than one hectare of food and perennial crops represent 87.5% and 100% of households with a borderline food consumption score in period P1, respectively. In addition, 56.39% of households with a borderline food consumption score in P2 have less than one hectare of food crops and 48.88% have more than two hectares of perennial crops. For period P3, the results show that 80.45% of households with a borderline consumption score have less than 1 hectare of food crops and 75.42% have more than 2 hectares of perennial crops. The household food consumption score also improves as the area under food crops increases. This food consumption decreases when the area under perennial crops increases and the area under food crops decreases. Indeed, households with large areas (over 2 hectares) of food crops and perennial crops have food stocks and

financial income that allow them to diversify their food sources. The problem of unacceptable food can be caused by an insufficient harvest or high losses during storage, and more rarely by excessive marketing of foodstuffs, which jeopardises the household's food self-sufficiency [20].

Table 4. Distribution of food consumption score by household characteristics

UNDER PEER REVIEW

Class	Poor FCS			Borderline FCS			Acceptable FCS			
	P1	P2	P3	P1	P2	P3	P1	P2	P3	
Households	0	0	358	16	133	542	1049	932	165	
Number of households (%)										
Gender of head of household										
Male	0	0	67,6 (242)	37,5 (06)	26,31 (35)	98,15 (532)	88,46 (928)	96,46 (899)	96,97 (160)	
Female	0	0	32,4 (116)	62,5 (10)	73,69 (98)	1,85 (10)	11,54 (121)	3,54 (33)	3,03 (05)	
Size of household										
≤ 7	0	0	61,17 (219)	0	45,11 (60)	60,33 (327)	62,25 (653)	63,63 (593)	64,85 (107)	
8 – 15	0	0	30,17 (108)	31,25 (05)	39,85 (53)	38,74 (210)	35,36 (371)	34,66 (323)	35,15 (58)	
≥ 16	0	0	8,66 (31)	68,75 (11)	15,04 (20)	0,93 (05)	2,39 (25)	1,71 (16)	0 (0)	
Level of education										
none	0	0	60,05 (215)	75 (12)	78,95 (105)	58,67 (318)	53,67 (563)	50,43 (470)	25,45 (42)	
Primary	0	0	34,08 (122)	25 (04)	15,04 (20)	29,9 (162)	30,03 (315)	32,08 (299)	21,21 (35)	
Medium	0	0	4,47 (16)	0	4,5 (6)	9,04 (49)	12,20 (128)	13,09 (122)	38,18 (63)	
Secondary	0	0	1,4 (05)	0	1,51 (2)	2,39 (13)	4,1 (43)	4,4 (41)	15,16 (25)	
Food crops (areas)										
<1 ha	0	0	80,45 (288)	87,5 (14)	56,39 (75)	8,86 (48)	31,65 (332)	29,07 (271)	6,06 (10)	
1 – 2 ha	0	0	16,76 (60)	12,5 (02)	30,07 (40)	83,21 (451)	53,86 (565)	56,54 (527)	33,94 (56)	
>2 ha	0	0	2,79 (10)	0	13,54 (18)	7,93 (43)	14,49 (152)	14,39 (134)	60 (99)	
Perennial crops (areas)										
<1 ha	0	0	10,61 (38)	100 (16)	21,80 (29)	16,24 (88)	11,44 (120)	11,48 (107)	6,1 (10)	
1 – 2 ha	0	0	13,97 (50)	0	29,32 (39)	39,11 (212)	29,55 (310)	29,08 (271)	29,1 (48)	
>2 ha	0	0	75,42 (270)	0	48,88 (65)	44,65 (242)	59,01 (619)	59,44 (554)	64,8 (107)	
P1	=	October-February ;		P2	=	March-June ;		P3	=	July-September

#### 4. CONCLUSION

The satisfaction of food needs varies according to the availability of food reserves and the time of year. The difficult or lean period is from July to September and the favourable period from October to February. Rice and cassava are the food crops stored as a food reserve by households as they are the main carbohydrate staples of the population. During the favourable period, food is produced by the family, whereas during the lean period, most of the food consumed comes from outside their own farm. This situation negatively influences food security indicators such as the number of meals per day and the food consumption score. Households experience cyclical food insecurity that is correlated with certain household characteristics (gender of the head of household, level of education, household size, etc.).

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