



DETERMINANTS OF HOUSEHOLD VULNERABILITY TO FOOD INSECURITY IN BANGUI AND ITS SURROUNDINGS

Economy

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ABSTRACT

The objective of this research is to analyze the determinants of household vulnerability to food insecurity in Bangui and its surroundings. To achieve this objective, a sample of 200 households was randomly selected, taking into account the demographic weight of the districts and municipalities. The surveys involve heads of households and their wives in the form of spot interviews during the month of January 2020. The analysis of the data collected was carried out using the Logit econometric model. The results show that the main determinants of household food vulnerability to food insecurity in Bangui and its surroundings are the level of education, the size of the household, marital status, the case of chronic illness, the income of the head of the household, gender of the head of household and food prices. However, those that have the highest explanatory power on household vulnerability are the case of chronic diseases, food prices, the income of the head of household, marital status and household size. On the other hand, the age and occupation of the head of household have no significant influence on the food vulnerability of households. Thus, these results make it possible to make economic policy suggestions. This involves: (i) taking measures to improve the purchasing power of the population by promoting income-generating activities; (ii) invest in education and vocational training in order to increase the chance of self-employed workers in the informal sector to become entrepreneurs; (iii) developing a nutritional care program for people suffering from chronic illnesses; (iv) promoting a good income redistribution policy within households; (v) strengthen social safety network in order to support the livelihoods of poor households with the aim of promoting their access to food.

KEYWORDS

determinants, vulnerability, households, food insecurity, Bangui and its surroundings.

INTRODUCTION

On a theoretical level, it is generally accepted that food is one of the first needs of man and agricultural production, one of the first activities of humanity, which explains debates around agriculture and food in economic literature. To this end, the food question has been specially treated in economic theory since the first economists, notably the mercantilists. This specificity given to the food problem is based on the conditions for satisfying the food needs of nations, the issue of food independence and the causes of hunger (food insecurity) in the world (Azoulay and Dillon, 1998).

Among the different theories addressing the food concern, we can highlight the Malthusian theory, the theory of Engels' laws, SEN's capability theory, the microeconomic theory of the consumer, etc. Thus, SEN's theory of capabilities, when combined with the risk analysis developed by D'ERCOLE, makes it possible to better give food vulnerability a theoretical background. Thus, the theoretical framework for analyzing food vulnerability seems firmly established if we judge the very wide diffusion of the definition which inspires it (Hamelin et al., 1998; JANIN et al., 2004). The latter is organized around the notions of exposure, sensitivity and reactivity (also called resilience), differentiated in the face of risks of food insecurity and malnutrition by the mobilization of physiological, economic, social or eco-geographic resources (Courade et al., 2001; World Bank, 2001). The notion of food safety has evolved significantly since the World Food Conference of 1974 in order to take into account risk factors (Maxwell and Frankenberger, 1995; Maxwell, 1999).

Furthermore, food insecurity affects more than a billion people around the world (i.e. 1 in 7 people). As a result, universal food security goals are far from being achieved. Developing countries register 98% of the world's undernourished (Faivre-Dupaigre and Goura Soulé, 2023). Thus, the region with the hungriest people continues to be Asia and the Pacific. However, it is in sub-Saharan Africa where the percentage of undernourished people per country remains highest. Over the past decade, around 200 million people (or 28% of the total population) suffered from chronic hunger. The prevalence of severe or moderate food insecurity in Africa remains double the global scale with a rate of 75% in Central Africa, 67% in East Africa and 60% in West Africa (FAO, 2023). In the Central African Republic, acute food insecurity remains very worrying, with 44% of the population classified in a crisis and emergency situation over the period from September 2022 to March 2023. Thus, around 2.7 million people are in need of immediate food assistance (IPC, 2023).

Indeed, for several decades, monetary poverty has become an exploratory, particularly innovative dimension of the fight against food insecurity (Alwang et al., 2001; Adger, 2006). The importance of insufficient and insecure income as a factor in food vulnerability among households around the world is well documented (FAO, 2022), and there are numerous studies demonstrating that when we eliminate income constraints, we improve food security among vulnerable households (SEN, 1981). In addition, other studies have highlighted other factors of household food vulnerability in Africa.

In Côte d'Ivoire, human capital endowments captured by the educational level of the head of household and his professional experience are supposed to reduce the probability of a household being affected by food insecurity in Bouaké (Briand, 2004) . . , which is confirmed at the national level by other work (Yabilé, 2011). In Nigeria, the size of the household, the gender, the education level of the head of the household, the main occupation of the head of the household, the sector of activity and the area of residence have more explanatory power on the food vulnerability of households (Babatunde et al., 2010). In Mali, in addition to lack of income, household size and the profession of the head of household are important factors in household food vulnerability (Bocoum, 2012). In Senegal, marital status, place of residence, the case of sick people and the profession of the head of household are factors that have the highest explanatory power on the food vulnerability of households (Sané, 2020). In Burkina Faso, Reardon and Matlon (2023) established that inequalities worsened due to a sharp increase in food prices over the period 2007 - 2020 at a time when vulnerable households in urban areas were largely dependent on imported food products. In the Central African Republic, some authors have focused on the issue of food insecurity, however few address the vulnerability of households to food insecurity; such an investigation in urban areas is essential in the fight against food insecurity (Mbétid-Bessane et al., 2018).

Thus, the objective of this research is to analyze the determinants of household vulnerability to food insecurity in Bangui and its surroundings.

Methodology

Analysis Model and Presentation of Variables

To achieve the objective of this research, the model used to analyze the determinants of household vulnerability to food insecurity is a logistic model which makes it possible to estimate the probability for a household to be more or less exposed to the phenomenon (Hosmer and

Lemshow, 1989).

The approach consists of explaining the dichotomous variable y , designating vulnerability to food insecurity, which takes the value 1 if the household is vulnerable to food insecurity and 0 otherwise from a set of p variables ($x_1, \dots, x_2, \dots, x_p$). The sample is thus subdivided into two groups: households exposed to the risk of food insecurity ($y=1$) and those who are not ($y=0$).

Theoretically, we assume that the probability, for a household belonging to the first group ($y=1$) is a function of a certain number of socio-economic characteristics. An estimate of the probability that a household belongs to class 1 knowing that it is characterized by the vector $X=(x_1, \dots, x_2, \dots, x_p)$ is given by the following logistic function:

$$P_i = P(y_i=1) = P(y_i>0) = P(\beta_0 + \beta_1 x_i + \varepsilon_i > 0) = P(\varepsilon_i > -(\beta_0 + \beta_1 x_i)) = \Phi(\beta_0 + \beta_1 x_i) \quad (1)$$

The distribution function of the logistics law.

$$P_i = P(y_i=1) = \Phi(\beta_0 + \beta_1 x_i) = \frac{\exp(\beta_0 + \beta_1 x_i)}{1 + \exp(\beta_0 + \beta_1 x_i)} = \frac{1}{1 + \exp(-(\beta_0 + \beta_1 x_i))} \quad (2)$$

Generalizing, we can state that:

$$P_i = P(y_i=1) = \frac{1}{1 + \exp(-n_{ij})} \quad (3)$$

By transforming equation (3), we can predict, as follows, the logarithm of the ratio between the probability of being affected by food insecurity and the probability of not suffering from the phenomenon:

$$n_{ij} = \log\left(\frac{P_{ij}}{1 - P_{ij}}\right) \quad (4)$$

We note that P_{ij} , being a probability, is constrained to take values between 0 and 1, while n_{ij} can take any real value. The probability of suffering from food insecurity predicted by equation (3) thus also results from a transformation of n_{ij} . Indeed, the logit model is a model where the n_{ij} is obtained by a linear combination of the explanatory variables where the X_{qij} represent the explanatory variables, and the β_{qij} the parameters to be estimated.

$$n_{ij} = \beta_{0ij} + \beta_{1ij} X_{1ij} + \beta_{2ij} X_{2ij} + \dots + \beta_{9ij} X_{9ij} + \varepsilon \quad (5)$$

We have the variable to explain: VIA, vulnerability to food insecurity. It has two modalities 0 if the household is resilient and 1 if the household is vulnerable; it is measured through the number of meals per day and their composition (breakfast, lunch and dinner).

The variables X_{qij} are the components of the vector X , the unknown coefficients of the model with j ranging from 1 to 9. The 9 explanatory variables retained for this model are the following: AGE, age of head of household. It is a quantitative variable which is calculated from the date of birth of the head of household until the date of the survey, but presented in three modalities: 1 if he is under 30 years old, 2 if he is between 30 and 40, and 3 if it is greater than 40 people; GEN, gender of head of household. It is a qualitative variable which indicates the sex of the head of the household, it has two modalities, 1 if man and 0 if woman; TAM, household size. The size of the family of the head of household is a quantitative variable, that is to say the number of dependents but presented in three modalities: 1 if it is less than 5, 2 if it is between 5 and 10, and 3 if it exceeds 10 people; NIN, educational level of head of household. It is a qualitative variable with 4 modalities. These are: level 1 if the head of the household is illiterate, level 2 if he has completed the primary cycle, level 3 if he has completed the secondary cycle, and level 4 if he has completed the higher cycle; PCM, occupation of head of household. It is a qualitative variable with 4 categories which indicates the main profession of the head of household; 1 if he is a trader; 2 if he is a civil servant; 3 if he is an employee in the private sector; 4 if he has another profession; SMA, marital status of head of household. It is a qualitative variable with 5 modalities: 1 if he is married; 2 if he lives in cohabitation; 3 if he is single; 4 if he/she is a widow/widow and 5 if he/she is divorced; RCM, income of the Head of Household. It is a quantitative variable which indicates the amount of monthly income of the head of household but presented in four modalities. It takes the value 1 if the income is less than 50,000 FCFA; 2 if the income is between 50,000 FCFA to 100,000 FCFA; 3 if the income is between 100,000 to 200,000 FCFA and 4 if the income is greater than 200,000 FCFA; PDA, perception of prices of foodstuffs on the market. It is a variable with two modalities; it takes the value 1 if the household can cope with the increase in food prices on the market; and 0 otherwise; CMC, cases of chronic diseases within the household. It is a binary variable which takes the value 1 if there is a

case of chronic illness in the household; 0 otherwise.

Thus, the Logit model can be specified as follows:

$$VIA = \alpha_0 + \alpha_1 AGE + \alpha_2 GEN + \alpha_3 TAM + \alpha_4 NIN + \alpha_5 PCM + \alpha_6 SMA + \alpha_7 RCM + \alpha_8 PDA + \alpha_9 CMC + \varepsilon$$

Research Field and Data Collection

The research area covers the city of Bangui and its surroundings, notably the communes of Bimbo and Bégoua. The choice of this research site is due to the fact that the city of Bangui and its surroundings represents the largest urban center in the country. It is experiencing unprecedented demographic expansion due to internally displaced people who are increasingly flocking to the capital.

The latest analysis (IPC, 2023) shows that more than 162,000 people, or 20% of the total population of the city of Bangui and its surroundings analyzed, are in a situation of high acute food insecurity (IPC phases 3 and 4) and 335,324 in a stressful situation (phase 2). These people are in need of immediate food assistance in order to maintain their level of food consumption and protect their livelihoods. All 8 districts of the city of Bangui and the two suburban communes (Bimbo and Bégoua) were the subject of the survey. A sample of 200 households was constituted taking into account the demographic weight of the districts and municipalities. The surveys mainly concerned heads of households and their wives in the form of face-to-face interviews during the month of January 2020. The questionnaire administered to respondents is structured essentially around the following points: age, gender, marital status, occupation, level of education and income of the head of household, size of the household, prices of foodstuffs on the market and cases of illness in the household. The data are analyzed by SPSS econometric software.

RESULTS AND DISCUSSION

RESULTS

The results of descriptive statistical analysis from a sample of 200 households in Bangui and its surroundings are recorded in the table above.

Table 1: Simple Statistics

Variables	Proportions (%)
Age 1	30
Age 2	40
Age 3	30
Sex 0	24
Sex 1	76
Size 1	36
Size 2	60
Size 3	4
Education level 0	4
Education level 1	18
Education level 2	39
Education Level 3	39
Occupation 1	30
Profession 2	33
Profession 3	25
Occupation 4	12
Marital status 1	22
Marital status 2	52
Marital status 3	16
Marital status 4	8
Marital status 5	2
Income 1	26
Income 2	48
Income 3	22
Income 4	4
Food prices 0	71
Food prices 1	29
Cases of chronic diseases 0	67
Case of chronic diseases 1	33
Vulnerability 0	40
Vulnerability 1	60

Out of a sample of 200 households surveyed in the city of Bangui, 24% of household heads are women and 76% men. We note that 30% of household heads are aged between 18 and 25; 40% are aged between 25 and 45; and 30% are over 45 years old. For the marital status variable, 22% of the households surveyed are married; 52% live

together, 16% are single; 8% are widows/widowers and 2% are divorced people. For the level of education, 4% of household heads have no level of education; 18% have primary education; 39% have secondary level and 39% have higher level. Regarding the profession of head of household, 30% of traders; 33% are civil servants; 25% are employees in the private sector; and 12% are in the informal sector. For the household size variable, 36% of household heads have fewer than 5 dependents; 60% have between 5 to 10 dependents; and 4% have more than 10 dependents. Regarding monthly income, 26% of households have an income below 50,000 FCFA; 48% have an income between 50,000 FCFA and 100,000 FCFA; 22% have an income between 100,000 FCFA and 200,000 FCFA; and only 4% have an income greater than 200,000 FCFA. Regarding the appreciation of food prices on the market, 71% of households believe they are not able to cope with the increase in food prices on the market compared to 29% who believe they are able to cope. For cases of chronic illnesses in households, 33% of household heads confirm the presence of a person suffering from a chronic illness compared to 67% who do not confirm it. Finally, 40% of the households surveyed are not vulnerable, however 60% are vulnerable.

Table 2: Model Predictability

Variables	Proportion (%)
Negative values	60.70
Positive values	98.00
Overall value of the model	92.50

The result correctly predicts the probability of being vulnerable at 98.00% and resilient at 60.70%. Thus, the Logit model correctly predicts the overall household status value of being vulnerable or resilient at 92.50%.

Table 3: Econometric Estimation

Variables	Coefficients	Probability
Constant	2,842	0.052
AGE	7,749	0.990
GEN	0.510	0.075
TAM	1.105	0.043
NIN	0.963	0.026
PCM	0.510	0.475
SMA	-1.111	0.005
RCM	-1.634	0.001
PDA	-1.703	0.006
CMC	1,789	0.015
Number of observations: 200 R ² of Nagelkerk: 0.568 R ² of Mac Fadden: 0.235		
Cox and Snell R ² : 0.315 Chi2: 75.804 DOF: 5		
-2loglikelihood of the initial model: 112.637 2loglikelihood of the reduced model: 86.181		

The results of the econometric evaluation show that of the nine explanatory variables chosen, seven are statistically significant. These are head of household income (RCM), food price level (PDA) and marital status (SMA), all significant at the 1% threshold; variables such as educational level (NIN), household size (TAM) and chronic disease (CMC) are significant at the 5% level. A single explanatory variable, gender (GEN), is significant at the 10% level. On the other hand, other variables such as age (AGE) and occupation of the head of household (PCM) are not statistically significant at the 10% threshold.

DISCUSSION

The result of the econometric estimation shows that the marital status variable (SMA) is significant at the 1% level and negatively influences the probability of falling into food insecurity. This result is confirmed by the studies of Yabilé (2012) and Sané (2020) which indicate that marital status negatively influences the household's risk of being vulnerable to food insecurity in Côte d'Ivoire.

The variable income level of the head of household (RCM) is significant at the 1% level and has a negative effect on the possibility of falling into food insecurity. An increase in income of 10% would reduce the probability of falling into food insecurity by 16.34%. This result is in line with the results of the work of Adger et al. (2006), Alwang et al. (2001), Bocoum (2012), Audouit et al., (2023) which showed that the high rate of households in food insecurity in urban areas is explained by the low level of income.

The variable food price perception (PDA) is also significant at the 1% level and has a negative sign. The perception of a 10% increase in the

price of food would affect household purchasing power by 17.03%. This result confirms the results of the work of Briand (2004) indicating that the rise in food prices tends to reduce the purchasing power of vulnerable households in Côte d'Ivoire and those of Courlicieux (2008) noting that when rice prices have outbreak in Indonesia at the end of the 1990s, the reaction of poor mothers was to reduce their own calorie intake to better feed their children, which resulted in an increase in their vulnerability.

The chronic disease case (CMC) variable is significant at the 5% level. This result confirms the conclusions of the WFP (2014) which notes that households where a member suffers from a chronic illness or disability are prone to falling into food insecurity unlike those where all members are able to work. Likewise, the WHO (2022) shows that the disease, particularly when chronicity sets in, weakens the person in their social and professional integration, through the absenteeism that it is likely to generate, but also through the reduction in work capacity which can accompany it with the chain consequence on its food situation. Babatunde (2008), for his part, notes a risk of exclusion, stigmatization, the gaze of others, biased representations of the disease are all handicaps which further weaken household nutrition in Nigeria. Furthermore, Bogale et al., (2023) note that in sub-Saharan Africa, vulnerable households are forced to deduct the share of financial resources allocated to food consumption to devote to the purchase of medicines. In Mali, Bocoum (2012) notes that households may have to reduce the share of expenditure they devote to food in order to cope with an accident or illness.

As for the household size variable (TAM), it is statistically significant at the 5% threshold. In the literature, the effect of household size on the probability of being exposed to food insecurity is a priori ambiguous. On the one hand, the higher the number of active people (person of working age) in the household, the greater the income derived from the labor factor is assumed (Brun, 2023). On the other hand, the higher the size of the household, the higher the dependency ratio measured by the ratio of the number of inactive people to the number of active people in the household can be (Sen, 1981; Sané, 2020). Thus, the FAO (2022) underlines that among Central African households, the examination of the significance levels of the size of the household attests that this variable has a significant contribution to the probability of being affected by the phenomenon. Direct observation shows that the main consequence of the increase in the size of a household in the Central African Republic is known as the phenomenon of dependency. We notice that the number of addicts there is quite high. According to the World Bank (2022), this rate is 2.7 for the entire country. In other words, a busy working person is responsible for nearly three unemployed people. As a result, if the means available to the family do not keep up with this pace, the household will be exposed to food insecurity. This result seems contradictory because the number of active people should not appear as a factor of exposure to food insecurity. However, this situation occurs when assets do not contribute significantly to the creation of wealth to offset the burden they constitute for their family (Yabilé, 2011).

The educational level variable (NIN) is significant at the 5% level. This result is consistent with the results of the work of Cabral (2008), Zoyem et al. (2008) and Janin (2001) who mention that households headed by higher education graduates display the highest rates of resilience in terms of food. The work of Kotchi et al. (2023) maintain that the more educated head of household is capable of creating income-generating activities and thus diversifying his sources of income. Those of Andersen et al. (2011) indicate that the households most vulnerable to food insecurity are those headed by a head who has reached secondary level at most. The rate of food insecurity in urban areas is generally higher among households whose head has no level of education or at most has reached primary school according to Janin et al. (2005) and the World Bank (2022).

The gender of the head of household (GEN) is significant at the 10% level. A study carried out in Ghana showed that when a household is headed by an active woman, she allocates a greater share of her family budget to food, unlike men who have tendencies towards lavish spending (Janin et al., 2004).

The age (AGE) and occupation (PCM) of the head of household are not significant at the 10% level in the context of our research. For Yabilé (2013), the age variable (AGE) has an a priori indeterminate effect on the risk of food insecurity. However, the results of a study carried out in the United States show a significant prevalence in the population over

60 years old exposed to food insecurity (Andersen, 2013). Finally, the variable occupation of head of household (PCM), which is not statistically significant, contradicts the results of previous work due to the important place of this variable in studies on vulnerability to food insecurity. This result is unexpected due to the important place that this variable represents in the literature in the urban world. Devereux (2001) indicates that in Australia, being unemployed and being inactive are positively associated with food insecurity. Socio-professional groups with low or uncertain incomes are supposed to be the most exposed to the phenomenon of food insecurity, unlike qualified socio-professional groups (Alwang et al, 2001). This result in our research context would be explained by the limited size of our sample.

CONCLUSION

The main determinants of household vulnerability to food insecurity in Bangui and its surroundings are the level of education, the size of the household, marital status, the case of chronic illness, the income of the head of household, the gender of the head of household and food prices. However, those which have the highest explanatory power on vulnerability to food insecurity in Bangui and its surroundings are the case of diseases, food prices, income of the head of household, marital status and household size. These determinants make it possible to predict the probability of different households in the 8 districts of the city of Bangui and the communes of Bimbo and Bégoua of falling into food insecurity. On the other hand, certain explanatory variables such as the age and profession of the head of household do not have a significant influence on the food vulnerability of households in Bangui and its surroundings.

Indeed, certain results obtained are consistent with the literature while others are not in the context of our research. However, the results obtained make it possible to make economic policy proposals. This involves: (i) taking measures to improve the purchasing power of the population by promoting the promotion of income-generating activities; (ii) invest in education and vocational training in order to increase the chance of self-employed workers in the informal sector to become entrepreneurs; (iii) develop a nutritional care program for people suffering from chronic illnesses; (iv) promote a good income redistribution policy within households; (v) strengthen social safety nets in order to support the livelihoods of poor households with the aim of promoting their access to food.

REFERENCES

- Adger W.N, 1999. Social vulnerability to climate change and extremes in coastal Vietnam. *World Development*, vol. 27, n°2, pp.249-269.
- Alwang J., Siegel P.B et Jorgensen S., 2001. Vulnérabilité vue de différentes disciplines. *Sciences de l'alimentation et de la nutrition*, vol.5, n°20, pp.42-59.
- Andresen S. and Fegter S., 2011. Children growing up in poverty and their ideas on what constitutes a good life: Childhood Studies in Germany. *Child Indicators Research*, vol.4, n°1, pp.1-19.
- Audouit C., Hinnewinkel C., Sauboua P. et Menthonex D., 2023. Le diagnostic socio-économique des DOCOB, un outil pour renforcer l'ancrage territorial des sites Natura, *Open Edition Journal*, vol.23, n°1, pp.5-23.
- Azoulay G. et Dillon J.C., 1998. La sécurité alimentaire en Afrique, Manuel d'analyse et d'élaboration des stratégies, *Revue Tiers Monde*, vol.35, n°135, pp.709-711.
- Babatunde R.O. and Qaim M., 2010. Impact of off-farm income on food security and nutrition in Nigeria. *Food Policy*, v.35, n°19, pp.303-311.
- Babatunde R.O., Omotesho O.A., Olorunsanya E.O. and Owotoki G.M., 2008. Determinants of vulnerability to food insecurity: A Gender-based analysis of farming household in Nigeria. *India Journal of Agricultural Economic*, vol. 63, n°1, pp.1-10.
- Banque mondiale, 2001. Aider les pauvres à gérer les risques. *Rapport mondial sur le développement dans le monde 2000-2001*. Washington, 98p.
- Banque mondiale, 2022. Point sur la sécurité alimentaire mondiale. *Rapport d'évaluation*, Washington D.C, 87p.
- Bocoum I., 2012. Sécurité alimentaire et pauvreté. *Analyse économique des déterminants de la consommation des ménages : Application au Mali*. Thèse de doctorat en sciences économiques, Université Montpellier, 245p.
- Bogale A. and Shimelis A., 2023. Household level determinants of food insecurity in rural areas of Dire Dawa, Eastern Ethiopia. *African Journal of Food, Agriculture, Nutrition and Development*, vol.9, n°9, pp.333-364.
- Briand V., 2004. Vulnérabilité et insécurité alimentaire. Le cas des unités domestiques de Bouaké. *Thèse de doctorat en sciences économiques*, Université Paris X-Nanterre, 451p.
- Brun M., 2023. Afrique : le retour de la faim ? *Politique étrangère*, vol.23, n°1, pp139-150.
- Cabral F. J., 2008. L'insécurité alimentaire en milieu urbain et rural au Sénégal : les mêmes causes créent-elles les mêmes effets ? *Cahier de recherche / Working Paper*, pp.8-12.
- Courade G., De Suremain C.E. et Janin P., 2001. Inégalités, vulnérabilité et résilience : les voies étroites d'un nouveau contrat social en Afrique subsaharienne. *Edition Karthala, Coll. Economies et sociétés*, Paris, 133p.
- Courlieux F., 2008. De la hausse à la baisse des prix : impacts de la crise économique sur l'agriculture et les industries agroalimentaires. *Document de Travail, Ministère de l'Agriculture et de la Pêche*, Paris, 56p.
- Devereux S., 2001. Livelihood insecurity and social protection: Re-emerging issue rural development, *Development Policy Review*, vol°19, n°4, pp.507-519.
- Faigre-Faivre B. et Goura Soulé B., 2023. L'insécurité alimentaire en Afrique. *Revue L'Economie Africaine*, vol.14, n°12, pp.166-175.
- FAO, 2022. L'état de l'insécurité alimentaire dans le monde. *Rapport d'étude*, Rome, 40p.
- FAO, 2023. Promouvoir la volonté politique de lutter contre la faim. *Rapport du Comité de la sécurité alimentaire*, 43ème session, Rome, 28 mai - 1er juin, 20p.
- Hamelin A.M, Beaudry M. et Habicht J.P., 1998. La vulnérabilité des ménages à l'insécurité. *Revue canadienne d'études du développement*, vol.19, pp.278-306.
- Hosmer D. and Lemshow S., 2000. *Applied Logistic Regression*. Editions John Wiley, New York, 396p.
- IPC, 2023. Analyse de l'insécurité alimentaire aiguë en République Centrafricaine. *Cadre intégré de classification de l'insécurité alimentaire*, session 19-30 Avril, Boali, 16p.
- Janin P., 2001. L'insécurité alimentaire rurale en Côte d'Ivoire : une réalité cachée, aggravée par la société et le marché. *Cahiers Agricultures*, vol.10, n°4, pp.233-241.
- Janin P. et Suremain D., 2005. La question alimentaire en Afrique : risque et politisation. *Revue Tiers-Monde*, n°184, pp.727-859.
- Janin P. et Martin-Prével Y., 2005. Des indicateurs à l'action : vulnérabilité alimentaire et états nutritionnels en milieu rural sahélien burkinabé. *Canadian Journal of African Studies*, pp.727-859.
- Kotchi J. K., Ouattara-Coulibaly Y. R. et N'guessan G. K., 2023. Impact socio-économique de l'aménagement hydro-rizicole de Guiguidou dans la sous-préfecture de Divo (Côte d'Ivoire). *Open Edition Journal*, vol.43, n°18, pp.214-231.
- Maxwell D., 1999. Alternative food, Security indicators: Revising the frequency and severity of coping strategies. *Food policy*, vol.25, n°4, pp.411-429.
- Maxwell S. and Frankenberger T.R, 1995. *Household Food Security: Concepts, Indicators Measurements, A technical Review*. UNICEF/IFAD, New-York.
- Mbétid-Bessane E., Mandjeka J.C.A, Yara E. et Demande L. et. Koyara M.N, 2018. *Examen stratégique faim zéro en République Centrafricaine*. Rapport PAM, Bangui, 88p.
- OMS, 2022. *Rapport Annuel en République Centrafricaine*, Bangui, 20p.
- Reardon T. and Malton P., 2023. Seasonal food insecurity and vulnerability in drought-affected regions of Burkina Faso. *Seasonal Variation in the Third World Agriculture*, Baltimore Johns Hopkins University Press, pp.118-130.
- Sané M., 2020. Analyse empirique des déterminants de la consommation alimentaire et leurs corrélations avec l'insécurité alimentaire chez les ménages vulnérables Sénégalais. *Revue d'Economie et de Gestion*, vol.4, n°1, pp1-19.
- Sen A., 1981. *Poverty and famines "an essay on entitlements and deprivation*. Clarendon Press, 25p.
- Sow F., 2003. Du concept d'insécurité alimentaire à la notion de vulnérabilité. Les chemins de l'adaptation du système de sécurité alimentaire à l'évolution du risque. *Thèse de doctorat*, Université Paris Sud XI, 295p.
- Varian A.H., 2006. *Introduction à la microéconomie*. Editions Cujas, Paris, 896p.
- Yabilé K., 1986. Autosuffisance alimentaire en Côte d'Ivoire : paradoxe ou réalisme socioéconomique. *Revue française d'économie rurale*, n°175, pp.44-49.
- Yabilé K., 2010. Déterminants et mesure de l'incidence de la sous-alimentation en Côte d'Ivoire. *Revue française d'économie rurale*, n°18, pp.23-46.
- Yabilé K., 2011. Vulnérabilité des populations à l'insécurité alimentaire en Côte d'Ivoire : cas des régions de Worodougou de la Vallée du Bandama du N'zi Comoe et du Zanzan. *Agronomie Africaine* vol.23, n°2, pp.179-192.
- Zoyem J.P. et Diang'a E.W, 2008. Mesures et déterminants de l'insécurité alimentaire au Burundi selon l'approche de l'apport calorifique. *Journal africain de la statistique*, vol. 6, pp.35-66.