REPORT ON A BASELINE SURVEY CONDUCTED AMONG POOR URBAN DWELLERS IN ABOMEY-CALAVI AND PORTO-NOVO, BENIN

THE URBAN POOR :

food insecurity and willingness to engage in urban agriculture

May 2019

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D. Houessou, B. Sonneveld, A. Aoudji, F. Thoto

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Report on a baseline survey conducted among poor urban dwellers in Abomey-Calavi and Porto-Novo, Benin

Donald Houessou, Ben Sonneveld, Augustin Aoudji, Frejus Thoto

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ACRONYMS

1	ACED	Centre d'Actions pour l'Environnement et le Développement Durable
2	ACWFS	Amsterdam Centre for World Food Studies
3	FSA	Faculty of Agricultural Sciences
4	GCP	Food & Business Global Challenges Programme
5	NWO-WOTRO	Netherlands Organization for Scientific Research
6	SSA	Sub-Saharan African
7	UA	Urban Agriculture
8	UAC	University of Abomey-Calavi
9	VU	Vrije Universiteit Amsterdam

ABSTRACT

Rapid global urbanization has to keep pace with a fast-growing number of poor urban dwellers that miss natural endowments to cope with food shortages and price volatility. Hence, a broadening of safety nets for food insecure urban poor merits urgent attention on political agendas, yet, that is not an easy task, basically for two reasons. First, targeted policies require a profiling to identify food insecure urban poor. Second, access to food can only be assured if urban poor are empowered to determine, independently, their own destination. Benin is a typical case in point; 31% of urban households are poor and hidden in large metropoles without means to improve their food security. This paper aims to support policies that improve food security of urban poor: first, by identifying the food insecure segment within the urban population; second, by analyzing possibilities and constraints for participation in allotment gardens; a policy intervention that let urban poor take matter in their own hands. The survey, conducted among 88 urban poor, shows low education levels, lack of financial resources, overcrowded and unsanitary housing conditions and limited access to social services and health facilities; 76% are food insecure. A stepwise ordered logistic regression shows that food security is influenced by city, gender, ownership of a motorbike and access to formal health system. Concerning allotment garden participation, we found that 99% are willing to participate, yet, technical skills, time, capital, distance to allotments, intra-household's relations and safety are potential constraints for participation.

Keywords : Urbanization; poverty; food security; urban planning; cities; Benin.

1. INTRODUCTION

" THIS SECTION CONTEXTUALIZES THE STUDY, PRESENTS ITS PURPOSE AND DETAILS THE STRUCTURE OF THE DOCUMENT.

1.1.
CONTEXT

In 2008, more than half of the globe's population, 3.3 billion people, were living in towns and cities UNFPA (2007) and, this figure has continued to rise quickly since a decade. Urban population will grow to 4.9 billion by 2030 while, in comparison, the world's rural population is expected to decrease by some 28 million between 2005 and 2030 (UNFPA 2007). Hence, at global level, future population growth will predominantly be in towns and cities.

It is anticipated that most of this growth will be in developing countries in general and for Sub-Saharan Africa (SSA) in particular. The World Bank (2017) reports that SSA countries are undergoing the fastest rates of urban population growth and fears that expected population increase outstrips the capacity of city administrations to provide appropriate services for their citizens. A specific feature of the urban population growth is its composition of a great number of poor people (UNFPA 2007).

For instance, the Global Monitoring Report 2013 revealed that in 2008, the share of poor within urban population worldwide and in SSA was 12 and 34 per cent, respectively (World Bank 2013). As these figures continue to grow, little is being done by urban policies to address the economic and social challenges faced by the urban poor.

Compared to rural areas, specific aspects of food security in the urban context include that most of the food for households needs to be purchased and there is a greater dependence on the market system and commercially processed food (Armar-Klemesu 2000; Tacoli 2017; UNFPA 2007; Richards et al. 2016).

However, a great number of urban dwellers, especially in SSA countries, has limited purchasing power, as most are engaged in unsure and low-paying employment in the informal sector. Food expenditures can, therefore, make up as much as 60 to 80 per cent of total income among low-income urban households (Frayne et al. 2010; Maxwell et al. 1998; Tabatabai 1993).

Numerous studies have argued that, for the urban poor, it is the dominance of the cash economy over access to such a basic need as food that links urban food systems to poverty and vulnerability to food insecurity (Armar-Klemesu 2000; Orsini et al. 2013; Zezza et al. 2008; Mutisya et al. 2016). In addition, the urban poor are highly prone to food insecurity when food prices rise on the market (Arene and Anyaeji 2010; Kc et al. 2018; Cohen and Garrett 2010; Ruel et al. 1998).

During price hikes, poorer households reduce their purchasing or substitute important food groups to satisfy their hunger. This situation reduces diet diversity and increases vulnerability to nutrition insecurity. Furthermore, high costs of shelter, transport and healthcare further undermine the affordability of sufficient food (Cohen and Garrett 2010). Poor women are at a particular disadvantage because they, additionally encounter socio-cultural barriers which undermine their capability to escape from the poverty trap (UNFPA 2007). Hence, the calls to support the urban poor and increase their resilience and especially their food security situation are clearly justified and merit political attention at local, national and regional level.

Yet, the status of urban poor is much under-researched and urban policies that aim to tackle their food insecurity situation require solid information on their profile, needs and constraints; in short, 'who are the urban poor'.

Benin, is a typical case in point. With a national urban poverty headcount ratio of 31 per cent (World Bank 2018) and urban food insecure households estimated at 9 percent (INSAE and WFP 2017) Benin figures among the poorest nations in Africa. Furthermore, the urban poor population in Benin remains unidentified and concrete policies that address their food insecure situation are largely absent. This study aims to address these knowledge gaps and lack of policies as follows. First, it

creates a socioeconomic and demographic profile of food insecure urban poor to facilitate targeting of policies. Second, it creates a special focus on allotment gardens as specific policy intervention that might empower the urban poor to improve their food security situation.

1.2.
ALLOTMENT GARDENS AS POLICY INTERVENTION

An allotment garden or, simply allotment, is defined as a plot of land made available by governments for individuals or families for growing foods (Barthel et al. 2010). Plots are formed by subdividing a piece of land into a few or up to several hundreds of parcels that are assigned to individuals or families. Allotments can be a cost-effective intervention to address food insecurity among urban poor, for two reasons (Escaler et al. 2010).

First, allotment gardens provide urban poor and their households with fresh and nutritious foods, second, selling surplus produce generates extra-income to cover other basic needs and improve living conditions of urban poor. Despite these benefits, engaging in allotment garden projects depends on people's own choice that necessarily accounts for personal conditions (Sen et al. 1987). Hence, for policy makers it is important to consider various constraints that impede the participation of urban poor in allotment garden projects.

The literature provides some information on some of these typical limitations like: distance (Teka et al. 2018), lack of capital, safety and intra-household relations (Teka et al. 2018; Arene and Anyaeji 2010; Sonneveld et al. 2018) and lack of technical skills (Kc et al. 2018)). Also, in Benin the practice of allotment gardens is not widely adopted. Hence, this study aims to identify the constraints that impede participation of urban poor in Benin in allotment garden projects.

1.3.
STRUCTURE OF THE DOCUMENT

This paper is organized as follows. Section 2 details the materials and methods that were used to conduct and analyze a survey held among 88 urban poor. Section 3 discusses the results on the identification of urban poor and the major constraints for their allotment garden participation. Section 4 discusses the results in detail. Section 5 concludes and provides policy recommendations.

2. METHODOLOGY

THE METHODOLOGY JUSTIFIES THE STUDY AREAS, PRESENTS THE RESEARCH DESIGN AND DETAILS THE TECHNIQUES THAT ANALYZE THE DATA.

2.1.
STUDY AREAS

The research was conducted in two big cities in the southern part of the republic of Benin: Abomey-Calavi and Porto-Novo. These cities provide a good context for this study because of the prevailing urbanization process in Benin. The municipality of Abomey-Calavi covers an area of 539 square kilometers (Mairie d'Abomey-Calavi 2006) and host a 656,358 inhabitants in 2013 that doubled in a decade (2002-2013) (INSAE 2015, 2012). There are 11 public and 90 private hospitals and the schooling rate was high (more than 90 per cent) (Mairie d'Abomey-Calavi 2006).

Prevailing economic activities are motorbike-taxi, commerce, craftsmen (barber, tailor, carpenter, welder and others) and agriculture. The municipality of Porto-Novo covers 52 square kilometers (Mairie de Porto-Novo 2006) with a population of 264,320 inhabitants in 2013, that increased by 18 per cent from 2002 (INSAE 2012, 2015).

Christianism, traditional and Muslim were the practiced religions. There were 14 public and more than 43 private hospitals and the schooling rate was high (85 per cent) (Mairie de Porto-Novo 2006). The economic activities were as follows: commerce, industries, craftsmen, motorbike-taxi and agriculture.

2.2.
SAMPLING AND RESEARCH DESIGN

We derived the data for this paper from the baseline survey of an ongoing research project that conducted a randomized control trial to test the marginal effect of participation of urban poor to an allotment garden on their food security within the two cities. The experiment used pre-defined criteria to target the urban poor in the two cities (Table 1). The sampling went as follows:

PEOPLE WERE RANDOMLY APPROACHED AND ASKED IF THEY MET CRITERIA NUMBER 1-3 AND AT LEAST ONE OF THE CRITERIA 4-6. FROM THESE RESPONDENTS A GROUP OF 88 (48 IN ABOMEY-CALAVI AND 40 IN PORTO-NOVO) WERE SELECTED FOR INTERVIEWS.

From April to August 2017 a survey was conducted. The questionnaire was structured and designed in a spreadsheet format with, validated lists in scroll-down menus as a standard response and dedicated fields for open answers.

The inserted data were stored in a vector format that facilitated further processing. Survey instructions were given to interviewers to guide them in: using the hard copy of the questionnaire in the field, using the digital questionnaire to store data, approaching and gaining trust of the respondents and dealing with controversial answers.

TABLE 1: CRITERIA FOR SELECTION OF RESPONDENTS

Nr	Criteria	Respondents	Supporting references
1	Age	20 – 45	(UNFPA 2007)
2	High-paying employment	No	(Armar-Klemesu 2000; Orsini et al. 2013; Zezza et al. 2008)
3	Purchase power	Less than 1,90 $	(Frayne et al. 2010; Maxwell et al. 1998; Tabatabai 1993)
4	Access to formal health system	No	(Teka et al. 2018; Cohen and Garrett 2010)
5	Access to credit	No	(Teka et al. 2018)
6	Access to farmland	No	(Teka et al. 2018)

The survey covered socioeconomic and demographic information, overview of diet patterns and constraints for development (Table 2). The socioeconomic and demographic information encompassed variables that are used to profile the urban poor: age, sex, schooling, French literacy, marital status, schooling of spouse, French literacy of spouse, presence of children, school attendance/ planning for children, household size, ownership of motorbike, housing, occupation, access to farmland, access to credit, access to formal health systems.

The diet patterns asked questions related to food access, utilization and stability for respondents (Table 3). The constraints for development identified potential obstacles that may undermine the respondents to engage in allotments: skills, time, distance, capital, households' relations, safety (Table 2).

TABLE 2: SUMMARY OF VARIABLES OF THE SURVEY

Variables	Meaning	Quantification	Range	Supporting references
Age	Age of the respondent (years old)	Real-value number	18 44	(Teka et al. 2018; Arene and Anyaeji 2010)
Sex	Sex of the respondent	Category	Female Male	(Teka et al. 2018; Arene and Anyaeji 2010)
Schooling	Did you go to school; if so, what level did you reach?	Category	No schooling Primary Secondary or more	(Teka et al. 2018; Arene and Anyaeji 2010; Mutisya et al. 2016)
French literacy (reading and writing)	Can you read and write in French?	Dummy	No Yes	(Sonneveld et al. 2018)
Marital status	Are you married?	Dummy	No Yes	(Teka et al. 2018)
Schooling of spouse	Did your partner go to school?	Dummy	No Yes	(Sonneveld et al. 2018)
French literacy of spouse	Can she/he read and write in French?	Dummy	No Yes	(Sonneveld et al. 2018)
Presence of children	Do you have children?	Dummy	No Yes	(Teka et al. 2018)
School attendance/ planning for children	Do they attend or are you planning to let them go to school?	Dummy	No Yes	(Sonneveld et al. 2018)
Household size	Number of persons in the household	Real-value number	1 8	(Teka et al. 2018; Arene and Anyaeji 2010)
Ownership of motorbike	Do you have a motorbike?	Dummy	No Yes	(Mairie d'Abomey-Calavi 2006; Mairie de Porto-Novo 2006)
Housing	Where do you live?	Category	Own house Rental House of family members Others ¥	(Teka et al. 2018)

Occupation	How do you earn an income to cover your needs?	Category	Employed Motorbike-taxi Commerce Occasional jobs Others ¥¥	(Kc et al. 2018; Oldewage-Theron and Kruger 2011; Legwegoh and Hovorka 2013; Armar-Klemesu 2000; Mairie d'Abomey-Calavi 2006; Mairie de Porto-Novo 2006)
Access to farmland	Do you have access to farmland?	Dummy	No Yes	(Arene and Anyaeji 2010)
Access to credit	Do you have access to credit?	Dummy	No Yes	(Teka et al. 2018; Arene and Anyaeji 2010)
Access to formal health Systems	Do you have access to formal health system?	Dummy	No Yes	(Teka et al. 2018; Cohen and Garrett 2010; Arene and Anyaeji 2010)
Lack of skills	Is the lack of skills a constraint for participation to an allotment?	Dummy	No Yes	(Kc et al. 2018; Mutisya et al. 2016)
Lack of time	Lack of time	Dummy	No Yes	(Sonneveld et al. 2018)
Distance to allotment	Is the distance a constraint for participating to an allotment?	Dummy	No Yes	(Teka et al. 2018)
Capital (money)	Is the lack of capital a constraint for participating to an allotment?	Dummy	No Yes	(Teka et al. 2018; Arene and Anyaeji 2010)
Households' relations	Are intra-household relations a constraint for participating to an allotment?	Dummy	No Yes	(Arene and Anyaeji 2010)
Safety	Is safety a constraint for participating to an allotment?	Dummy	No Yes	(Arene and Anyaeji 2010)

¥: Guardianship and temporal residency; ¥¥: Tailor and barber

2.3.
ANALYSIS

The study responded to the three following questions:

(i) what features a poor urban dweller?
(ii) what factors are associated to the food security among urban poor?
(iii) what barriers may undermine the willingness of urban poor to engage in allotment gardens?

We transformed the two real-value number variables in two categorical variables as follows: first, the age was transformed into two classes: Youth (≤35) and Adults (>35) using the definition youth of the African Union Commission (African Union 2006) and, second, the size of the household was transformed into two classes using the mean of household size (5) in Benin (INSAE 2015): H1≤5 and H2>5. Next, we calculated the latent variables of food security according to Table 3 (Mutisya et al. 2016).

TABLE 3: CLASSIFICATION OF GROUPS OF FOOD SECURITY

Variables	Questions	Range	Calculation of latent variables

Food security of respondents	How many times during the last month did you not have a single meal during the day? (A)	0
		30
			If (C)+(D)=30 then, respondents were food secure
			If (B)+(C)+(D)=30 then, respondents were moderately food insecure
			If (A)+(B)+(C)+(D)=30 then, respondents were severely food insecure

	How many times during the last month did you have one meal per day? (B)	0 30	
	How many times during the last month did you have two meals per day? (C)	0 30	
	How many times during the last month did you have three meals or more per day? (D)	0 30	

Data were analysed in Minitab version 14 and Stata version 13 in three ways. First, we used descriptive summary and chi-square statistics to profile the urban poor in the two cities. Second, a stepwise ordered logistic regression was applied to determine the characteristics that influence the food security of the urban poor. Below we briefly explain the ordered logit model.

In the ordered logit model, additive error terms are used, so that the underlying process is given by: $y_i = \beta' \mathrm{x}_\mathrm{i} + \varepsilon_\mathrm{i}$

(1)

where yi represents the food security status, i refers to observation number, ß the vector of parameters to be estimated that belong to independent variables xi (city, age, sex, schooling, French literacy, marital status, presence of children, household size, ownership motorbike, housing, occupation, access to farmland, access to credit and access to formal health systems), εi is the disturbance, assumed to be independent across observations. Observed is variable zi of the ordered food security classes (severely food insecure; moderately food insecure, food secure) that is related to yi in that adjacent intervals of yi correspond with qualitative information zi. This relation is given by:

$$z_i = 1 \quad \text{if} \quad y_i < \mu_1,$$
$$z_i = 2 \quad \text{if} \quad \mu_1 \le y_i < \mu_2,$$
$$\vdots$$
$$z_i = n \quad \text{if} \quad \mu_{n-1} \le y_i.$$

(2)

The ordering requires thresholds (μ1,..,μn-1) to satisfy μ1< μ2 < .. < μn-1. Parameters ß and thresholds (μ1,...,μn-1) are simultaneously estimated using the maximum likelihood method, which maximizes the probability of correct classifications.

We calculate the probability (Pr) that zi = 1 by:

$$\Pr(z_i = 1) = \Pr(y_i < \mu_1) = \Pr(\varepsilon_i < \mu_1 - \beta' x_i) = F(\mu_1 - \beta' x_i)$$

the probability that zi = 2 by:

$$\begin{aligned}\Pr(z_i = 2) &= \Pr(\mu_1 \le y_i < \mu_2) = \Pr(\mu_1 < \beta' x_i + \varepsilon_i < \mu_2) \\ &= \Pr(\varepsilon_i < \mu_2 - \beta' x_i) - \Pr(\varepsilon_i < \mu_1 - \beta' x_i) \\ &= F(\mu_2 - \beta' x_i) - F(\mu_1 - \beta' x_i)\end{aligned}$$

and the probability that zi = n by:

$$\Pr(z_i = n) = \Pr(y_i \ge \mu_{n-1}) = \Pr(\varepsilon_i \ge \mu_{n-1} - \beta' x_i) = F(\beta' x_i - \mu_{n-1})$$

To meet requirements of a probability model (monotonic-increasing cumulative distribution function and results lie between 0 and 1), the disturbances εi are assumed to possess a logistic distribution, leading to a cumulative logistic transformation function Λ^1 that maps the admissible area of y, i.e.(-∞,∞), à [0,1], with a first derivative that is always positive. Thus, the likelihood function for the ordered logit model that consists of (1) and (2) for n=3 is given by:

$$\ell(\beta, \mu_1, \mu_2) = \prod_{y_i=1} \Lambda(\mu_1 - \beta' x_i) \cdot \prod_{y_i=2} (\Lambda(\mu_2 - \beta' x_i) - \Lambda(\mu_1 - \beta' x_i)) \cdot \prod_{y_i=3} \Lambda(\beta' x_i - \mu_2)$$

(3)

The function is minimized with respect to the parameters ß, μ1 and μ2. See (Maddala 1986; Greene 1980; Davidson and MacKinnon 1993), for a more comprehensive description of discrete choice models.

Since reporting and interpreting logistic regression results is not straightforward and tricky to understand, the odds ratios were reported to illustrate the relationship between outcomes and observations (Peng et al. 2002a; Peng et al. 2002b). The odds ratios are directly derived from regression coefficients in a logistic model and interpreted as the change in the odds of yi given a unit change in xi when all other predictors are held at a constant (Peng et al. 2002b). The odds ratio is computed by:

Odds ratio= e^{β}

Third and finally, a principal component analysis (PCA) was used to explore the relationship between the sociodemographic information of urban poor and the constraints that may undermine their willingness to engage in allotment gardens. A PCA reduces large sets of explanatory variables into a smaller set that still explain an important part of the variation. Statistically, PCA uses an orthogonal transformation to convert a set of observations of possibly correlated variables into a set of values of linearly uncorrelated variables called principal components (Gunasekaran and Kasirajan 1901).

Practically, principal components are obtained as linear combinations of the original variables. The first principal component is required to have the largest possible variance (i.e., inertia and therefore this component will 'explain' or 'extract' the largest part of the inertia of the data table).

The second component is computed under the constraint of being orthogonal to the first component and to have the largest possible inertia. The other components are computed likewise. The values of these new variables (components) for the observations are called factor scores and these factors scores can be interpreted geometrically as the projections of the observations onto the principal components (Abdi and Williams 2010). A more comprehensive description of principal component analysis is available (Abdi and Williams 2010; Xanthopoulos et al. 2013).

$$^1\Lambda = \frac{1}{1 + e^{-(\bullet)}}$$

3. RESULTS

" THIS SECTION PROFILES THE URBAN POOR IN URBAN AREAS, PRESENTS THE FACTORS ASSOCIATED WITH THEIR FOOD SECURITY AND EXPLORES SOME CONSTRAINTS THEY MAY FACE TO ENGAGE IN ALLOTMENT GARDENS.

3.1.
PROFILING THE POOR IN URBAN AREAS

Table 4 shows the characteristics of the respondents concerning their socioeconomic and demographic background. Overall, the data showed that there was a higher percentage of female respondents compared to males (78 and 22 per cent, respectively). The youth category outnumbered the category of adults (86 and 14 per cent, respectively).

Less than half of the respondents (40 per cent) went to school but, only very few (18 per cent) could read and write French. Most respondents were married (90 per cent) and a slightly higher number (92 per cent) had children. Approximately, half of the respondents' spouses (48 per cent) went to school but, a fewer number (35 per cent) could read and write French.

The majority of respondents (91 per cent) indicated that their children were attending school or they were planning to let them go to school. The mean of household's size of the respondents was 5.35 ±0.19 and, more than half (55 per cent) of the respondents were over the mean of household's size in Benin. However, this figure varied in Abomey-Calavi and Porto-Novo where less than half (42 per cent) and more than half (70 per cent), respectively, were over the mean household size in Benin (INSAE 2015).

The data also showed that only few numbers of respondents (15 per cent) had a motorbike. In terms of housing, the respondents indicated that they mostly lived in the house of family members (36 per cent), in their own house (26 per cent) and in a rental (23 per cent). However, there is a significant difference between the two cities. In Abomey-Calavi, the respondents mostly lived in the house of family members (40 per cent), in a rental (38 per cent), in their own house (17 per cent) and in temporal residency (6 per cent), respectively but, in Porto-Novo, they lived mostly in their own house (38 per cent), in the house of family members (33 per cent), in guardianship and temporal residency (25 per cent) and in a rental (5 per cent).

The respondents also indicated various occupations which helped them cover their basic needs: occasional jobs (44 per cent), commerce (34 per cent), low-paying permanent employment (9 per cent), motorbike-taxi (3 per cent) and others (8 per cent). Few respondents indicated that they had access to farmland (26 per cent), credit (25 per cent) and formal health system (32 per cent).

However, there is a high difference between the two cities concerning access to farmland and formal health systems. While 44 percent and 56 percent have access to farmland and formal health systems, respectively, in Abomey-Calavi, only 5 percent and 3 per cent have access to farmland and formal health systems, respectively, in Porto-Novo. Finally, few respondents were food secure (24 per cent) while almost half of them (49 per cent) were severely food insecure. The remainder (27 per cent) were moderately food insecure.

Noteworthy was that, the food insecurity phenomenon was significantly worse in Porto-Novo where only 13 per cent were food secure and 70 per cent were severely food insecure.

TABLE 4 : SOCIO-ECONOMIC AND DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS

Variables	Modalities	Frequency (%)		Average
		Abomey-Calavi	Porto-Novo	
Sex	Female	70.83	87.50	78.41
	Male	29.17	12.50	21.59
Age	Youth (≤35)	85.42	87.50	86.36
	Adult (>35)	14.58	12.50	13.64
Schooling	No schooling	52.08	70.00	60.23
	Primary	35.42	25.00	30.68
	Secondary or more	12.50	5.00	9.09
French literacy (reading and writing)	No	79.17	85.00	81.82
	Yes	20.83	15.00	18.18
Marital status	No	10.42	10.00	10.23
	Yes	89.58	90.00	89.77
Schooling of spouses*	No	29.17	55.00	40.91
	Yes	58.33	35.00	47.73
French literacy of spouses**	No	39.58	42.50	40.91
	Yes	47.92	20.00	35.23
Children	No	8.33	0.00	4.55
	Yes	89.58	95.00	92.05
School attendance / planning for children	No	0.00	2.50	1.14
	Yes	89.58	92.50	90.91
Household size**	≤5	58.33	30.00	45.45
	>5	41.67	70.00	54.55
Ownership of motorbike	No	85.42	85.00	85.23
	Yes	14.58	15.00	14.77

Housing**	Own house	16.67	37.50	26.14
	Rental	37.50	5.00	22.73
	House of family members	39.58	32.50	36.36
	Others¥	6.25	25.00	14.77
Occupation*	Employed	4.17	15.00	9.09
	Motorbike-taxi	6.25	0.00	3.41
	Commerce	33.33	35.00	34.09
	Occasional jobs	41.67	47.50	44.32
	Others¥¥	14.58	0.00	7.95
Access to farmland**	No	56.25	95.00	73.86
	Yes	43.75	5.00	26.14
Access to credit	No	68.75	82.50	75.00
	Yes	31.25	17.50	25.00
Access to formal health systems**	No	43.75	97.50	68.18
	Yes	56.25	2.50	31.82
Food security status of respondents**	Food secure	33.33	12.50	23.86
	Moderately food insecure	35.42	17.50	27.27
	Severely food insecure	31.25	70.00	48.86

¥: Guardianship and temporal residency; ¥¥: Tailor and barber

***Significant at 5%; **Significant at 1%**

3.2.

UNDERSTANDING THE FACTORS ASSOCIATED WITH THE FOOD SECURITY STATUS OF THE URBAN POOR

Table 5 showed the results of the stepwise ordered logistic regression on the food security status of respondents. The final model was highly significant (p<0.1%). The estimated ordered logit model shows that four variables were important in explaining the food security status of the urban poor: city, sex, ownership of motorbike, and access to formal health system. In the city of Porto-Novo, the odds of urban poor being food secure versus the combined moderately and severely food insecurity status were 0.25 times lower compared to the city of Abomey-Calavi, given the other variables were held constant. For males, the odds of being food secure versus the combined moderately and severally food insecurity status were 0.14 times lower compared to females, given the other variables were held constant.

For urban poor who owned a motorbike, the odds of being food secure versus the combined moderately and severely food insecurity status were 4.41 times higher compared to those who did not own a motorbike, given the other variables were held constant. Similarly, the odds of being food secure versus the combined moderately and severally food insecurity status for those who had access to formal health system were 3.16 times higher compared to those who did not have access to formal health system, given the other variables were held constant.

TABLE 5 : RESULTS OF THE ORDERED LOGISTIC MODEL ON FOOD SECURITY GROUPS

Variables	Food security of respondents		
	Odds ratio	Robust Std. Error	Z
City †: Porto-Novo	0.25	0.16	-2.15*
Sex ††: Male	0.14	0.10	-2.68**
Motorbike †††: Yes	4.41	3.23	2.03*
AHealthSyst ††††: Yes	3.16	1.72	2.12*

†:The reference was Abomey-Calavi; ††: Female; †††: Do not own a motorbike; ††††: Do not have access to the formal health system
*Significant at 5%; **Significant at 1%

Concerning the model's reliability, the hit ratio (Table 6), mapping observed data against model results, showed that 61 per cent of our observations were correctly classified. In 17 cases the model overestimated the food insecurity situation.

In 9 out of the 21 cases that observations were food secure, the model predicted a moderately (5) or severely (4) food insecurity; when observations were moderately food insecure the model predicted in 8 cases a severe food insecurity.

More serious, the model underestimated food insecurity in 17 cases. In 10 cases, the observation was moderately food insecure while the model predicted a food secure situation.

In 3 and 4 cases, the model predicted food secure and moderately food secure, respectively, while corresponding observations reported a severe food insecure situation.

TABLE 6 : HIT RATIO OF THE ORDERED LOGISTIC MODEL

Food security status	Observations	Predicted probabilities		
		Food secure	Moderately food insecure	Severely food insecure
Food secure	21 23.86	12 13.64	5 5.68	4 4.55
Moderately food insecure	24 27.27	10 11.36	6 6.82	8 9.09
Severely food insecure	43 48.86	3 3.41	4 4.55	36 40.91

3.3.
EXPLORING THE CONSTRAINTS FOR THE URBAN POOR TO ENGAGE IN ALLOTMENT GARDENS

Since, engaging in allotment gardens depends on people's own choice, we asked urban poor if they were willing to engage in such projects. As result, 99 per cent of them indicated that they were willing to engage in allotment garden projects to diversify their livelihoods;

74 per cent indicating that this choice was motivated for consumption and additional income. Afterwards, we explored constraints they may face in such endeavors.

The PCA shows that the first two principal components summarized 98 per cent of the information (Figure 1). All variables were explained by the first component while households' relations and safety were explained by the second component.

In addition, youth, adults, women, men, children and no-children had good contribution on the first component while small households with less than five members (Hsize1) and large households with more than five members (Hsize2) were related to the second component. Furthermore, youth, women, family with children were set at the positive part of component 1 while adults, men, family with no-children were set at the negative part. Hence, the constraints of youth, women, family with children were lack of skills, lack of time, distance, lack of capital, safety and households 'relations while adults, men and family with no-children don't have these constraints.

In the same vein, households' relations and small households were set in the negative part of the component 2 while safety and large households were set in the positive part of the component 2.

Hence, small households had households' relations constraint, not the constraint of

safety, while large households had the constraint of safety, not the constraint of households' relations.

Households 'relations were related to the behavior of husbands who may forbid their wives to engage in an activity while the safety issue was related to the risks associated to the commute to gardens and thefts around in the neighborhood.

99 PER CENT OF THEM INDICATED THAT THEY WERE WILLING TO ENGAGE IN ALLOTMENT GARDEN PROJECTS

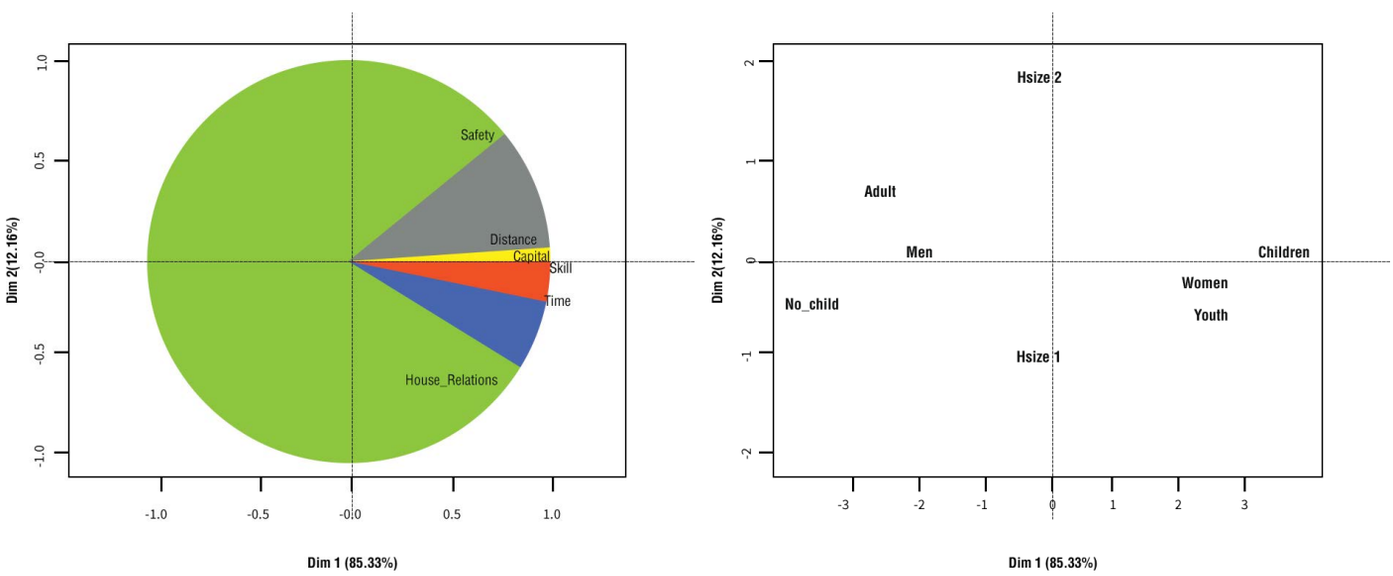

FIGURE 1: : CONSTRAINTS FACED BY THE URBAN POOR TO ENGAGE IN ALLOTMENT GARDENS

4. DISCUSSION

" THE SECTION DISCUSSES HOW THE SOCIOECONOMIC AND DEMOGRAPHIC FEATURES OF URBAN POOR WERE ASSOCIATED TO THEIR FOOD SECURITY STATUS AND POSSIBLE OPTIONS THAT MAY TACKLE POTENTIAL CONSTRAINTS THAT MAY UNDERMINE THEM TO ENGAGE IN ALLOTMENT GARDENS.

4.1.
FEATURES OF AN URBAN POOR

The study reveals that urban poor are less educated in Abomey-Calavi and Porto-Novo as compared to the high schooling rates of the two cities (90 per cent and 85 per cent), respectively (Mairie d'Abomey-Calavi 2006; Mairie de Porto-Novo 2006). For example, although, less than half (40 per cent) of them indicated that they went to school, only a few (18 per cent) can actually read and write French.

That means that 22 per cent dropped out earlier after the school starts which is a worrisome situation. This low level of education is also confirmed by Acquah et al. (2016) who reported for the capital Gaborone in Botswana that in the city's poorer areas only 21 per cent had completed high school or more. Yet, it is assuring that most of the urban poor (91 per cent) plan to let their children go to school, broadening their chances to get out of the poverty trap. Indeed, deciding to spend for school fees (private school), school uniforms and meals at school shows a willingness of parents to help their children improve their lives. Urban poor have on average five members in their households which equates the average for the entire nation (INSAE 2015). Our survey shows that 70 per cent households in Porto-Novo have larger families.

As the urban poor have few financial capacities, they cannot live in a comfortable housing. For instance, a small number (26 per cent) builds their own house with precarious materials and the rest lives either in the house of family members (36 per cent) or in a rental (23 per cent). Urban poor cover basic needs, such as food, by performing some economic activities such as occasional jobs (44 per cent), commerce (34 per cent), low-paying employment (9 per cent), small services like tailor and barber (8 per cent) and motorbike-taxi (3 per cent). However, the food security status of the urban poor is worrisome: 76 per cent are food insecure and we assume that their earnings are very low and insufficient to substantially cover their food needs.

The food insecurity situation is worse for larger households (more than five members) (55 per cent) which might be explained by the commitment of family members to support each other, preventing individual escapes to better situations (Adegbidi 2019). Hence, this might be the reason of a higher incidence of food insecure people in Porto-Novo as compared to Abomey-Calavi. This nexus of poverty-large households-food insecurity is confirmed by Teka et al. (2018) who find correlations between high poverty incidence and food insecurity as a consequence of large family sizes, especially when supplementary jobs are lacking.

Having assets for the urban dweller favors involvement in side jobs to increase income and improve food security. However, from our survey we observe that few urban poor avails of these assets. For example, a mere 15 per cent owns a motorbike, 26 per cent has access to farmland and 25 per cent access to credit, reducing their capacities to improve well-being. This situation may also explain why only 32 per cent have access to formal health services because of their weak financial means. For instance, we found in this study that this finding is consistent with the conclusion of Teka et al. (2018) who find a relatively higher incidence of poverty and food insecurity among households who do not have access to health facilities.

4.2.

FOOD SECURITY AMONG URBAN POOR (ASSOCIATED FACTORS)

The findings suggest that the food security status is, among others, influenced by ownership of a motorbike, which reflects the economic status and possibility of a side job. Indeed, owning a motorbike in the urban areas of Benin tends to broaden the possibilities for poor urban dwellers to diversify opportunities to secure income and improve food security.

Findings show that the odds of being food secure for urban poor who own a motorbike are more than four times greater compared to those who do not own a motorbike. In addition, food security status is correlated by the access to formal health system, a conclusion supported by (Teka et al. 2018) who find that a relatively lower incidence of poverty is related to access to health facilities. Indeed, avoiding traditional medicine that is widely used by poor communities and having access to formal health systems implies that this group of urban dwellers has, to some extent, the financial means to cover some basic needs such as food.

Ownership of a motorbike and access to formal health systems jointly give a picture of availing of some financial capacity of the urban poor dweller. Furthermore, findings suggest that odds of being food secure for males are lower as compared to females which, plausibly may be explained by the fact that, as women process the food in the household, they have more opportunities to eat. Men are working or looking for jobs outside and have only scarce time to eat (against the trade-off of working and earning money). This explanation is also found in a study in the slums of India by Lumagbas (2017) who found that women tend to have more access to food (mostly because they are homemakers) than men.

Last but not the least, the findings suggest that in Porto-Novo, the odds of being food secure are lower compared to the city of Abomey-Calavi. This result was surprising because we were expecting that the location of Porto-Novo near Nigeria brings economic opportunities that might not be available at Abomey-Calavi. However, the explanation of this result might be twofold: first, Abomey-Calavi is more populated and economic activities are more active offering more jobs opportunities than Porto-Novo and, second, the predominantly larges families with many dependents in Porto-Novo reduces their odds to be food secure.

4.3.

ALLOTMENT GARDENS AND ASSOCIATED CONSTRAINTS FOR URBAN POOR

We found that urban poor may face important constraints if they make the choice to engage in allotment gardens. The constraints are as follows: lack of skills, time and capital, distance to allotment, intra-household's relations and safety. Nevertheless, the magnitude of these constraints is not the same within urban poor.

For instance, we found that youth, women and families with children are prone to lack of skills, time and capital, distance to allotments, intra-household's relations and safety if they have to participate in an allotment project. In addition, we found that small families with less than five members undergo more pressure of husbands who can forbid their wives to engage in an income-generating activity while large families with more than five members raise up the issue of safety such as risks associated to commute to gardens and thefts in the neighborhood.

These findings most likely show that adults in some extent may accumulate experiences during their life that influence their decisions when considering their participation in allotment gardens. Furthermore, it is most likely that in small families as opposed to larger ones, there are more children to take care of by women which may justify the behavior of husbands to choose against activities that keep women out of the house for a long time on a daily basis. In a qualitative study in the populated city of Blantyre (Malawi), Riley and Dodson (2016) find that gender shapes a household's ability to produce its own food mitigating effects of low incomes on household food security.

Yet, the same study indicates that women with small children, often find it difficult to carry children up the steep slope or to leave them home alone to go to the market. Therefore, policy interventions could include these gender-sensitive constraints to account for gender issues in engaging urban poor in allotment gardens.

5. CONCLUSION AND POLICY RECOMMENDATIONS

Our paper contributes to the body of knowledge on the characterization and identification of poor urban dwellers in developing countries. Moreover, the study suggests a concrete policy intervention by focusing on allotment gardens that should improve the food security situation of the urban poor.

The findings show that the level of education is low among the urban poor who lack financial resources and suffer from overcrowded and unsanitary housing conditions. The high prevalence of food insecurity among them due a lack of economic opportunities is worrisome and requires that policies define targeted programs such as allotment gardens, as a way to offer a social security net for them and, therefore, improve their food security.

We found that 99 per cent of urban poor were willing to engage in allotment gardens to diversify their livelihoods. However, we found that important constraints like, lack of skills, capital and time, distance, households' relations and safety, may hinder urban poor from successfully participating in allotment gardens. Tackling these constraints is not an easy task and needs that policy-interventions take into account the following elements:

(i) focus on technical and financial capacity building programs in allotment gardens development and management especially for youth and women who experience more the lack of skills and capital;

(ii) design gender-sensitive programs by considering aspects of distance to allotments, lack of time and safety because women who have to take care of children may face social pressure from husbands.

Our study used a purpose-sampling method to assure that we could answer the research questions on urban poor. We acknowledge that information about wealth level especially, income, was missing in our survey which is an important determinant to justify some findings.

For instance, wealth level would have been used to support the argument that the economic status of urban poor is correlated with owning a motorbike and having access to health facilities. From the above-mentioned, we recommend that further research uses wealth level to measure the economic status of respondents.

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