

D. Houessou, F. Thoto, B. Sonneveld, A. Aoudji, S. Dossou, B. Agbandou

URBAN AGRICULTURE IN BENIN

HOW CAN POLICY SUPPORT GARDENERS?

*Report on a survey conducted among experienced urban gardeners
in Cotonou and Porto-Novo, Benin*

January 2019



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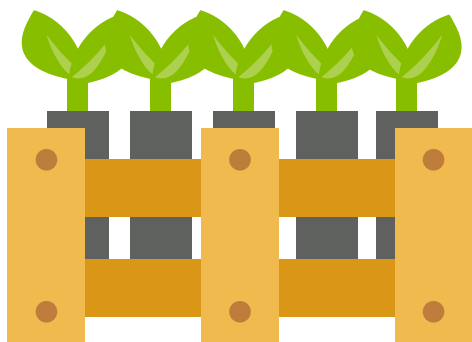
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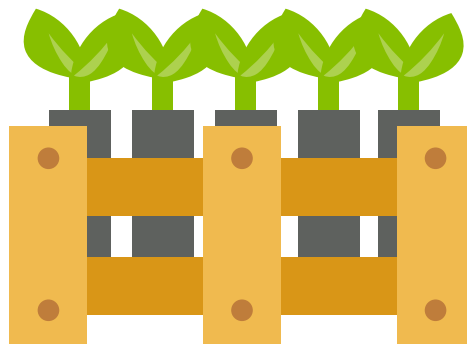


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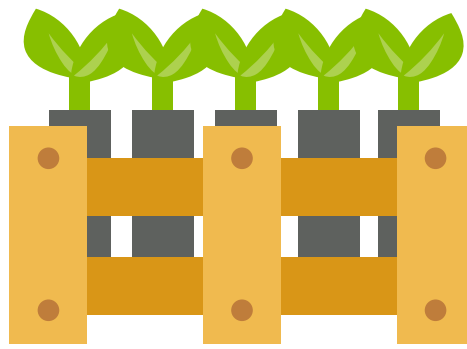


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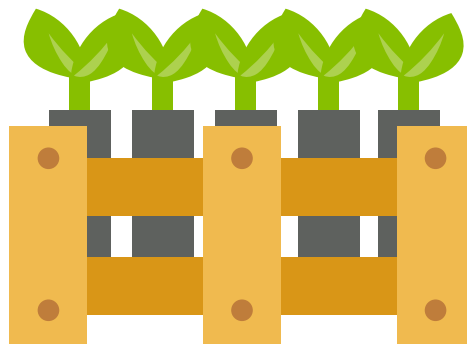


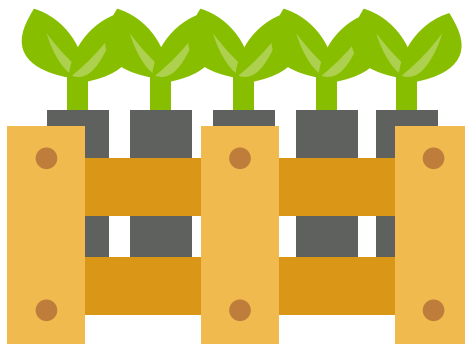
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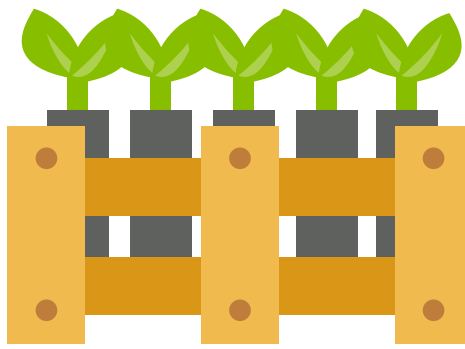
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Acronyms

| | |
|------------------|--|
| ACED | Centre d'Actions pour l'Environnement et le Développement Durable |
| ACWFS | Amsterdam Centre for World Food Studies |
| ASECNA | Agence pour la Sécurité de la Navigation Aérienne en Afrique et à Madagascar |
| CFA | Communauté Financière Africaine |
| FSA | Faculty of Agricultural Sciences |
| GCP | Food & Business Global Challenges Programme |
| NWO-WOTRO | Netherlands Organization for Scientific Research |
| UA | Urban Agriculture |
| UAC | University of Abomey-Calavi |



Abstract

Urban agriculture is a widespread activity that could contribute to realize various Sustainable Development Goals that are set by the United Nations. Calls for expanding the urban agricultural activities are, therefore, justified and merit a high priority on the political agenda. Yet, especially the organization and management of urban agriculture is much under-researched and targeted policies would benefit from more knowledge about the social structures in the allotment gardens. Urban agriculture in Benin is no exception and this study aims to address the knowledge gap with a special focus on organization and management. The study reports on findings of a survey among 261 experienced urban gardeners visited at 29 sites distributed over the cities of Cotonou and Porto Novo. The study elicited information on household characteristics, gardening activity and incomes, food and nutrition security, garden organization and management, benefits for women and socio-economic development and identified constraints on the development of urban gardens. The survey showed that urban gardening in the study is a male-dominated activity that provides income to cover the basic needs of households (housing, transport) and improves diet diversity. Although food quality improved for gardeners, education might further contribute to a better diet. Gardeners are true entrepreneurs who generate income from both gardening and side jobs throughout the year. They are mostly well organized in cooperatives with a good management system (election of a board, regular membership fee and responsibility for common tasks). However, gardeners still have to improve rules relating to ownership and revise their financing incentives to leverage their bargaining power to decrease transaction costs. The study concludes that capacity-building programs may raise awareness among gardeners on the necessity of improving their current organizational frameworks, leading to a sustainable way that capitalizes on the benefits of cooperatives, for example, to secure enough credit for a group. In addition, to address the constraints beyond the control of cooperatives (land access, tenure security, credits, high input costs and market functioning), there is a clear need for support by public institutions for urban garden development.

Keywords: Allotment gardens, cities, food and nutrition security, women, cooperatives, Benin.



Introduction

This section contextualizes the potential benefits of allotment gardens in Benin, presents the study purpose and the structure of this report.

BENEFITS OF URBAN AGRICULTURE

The definition of urban agriculture (UA) has evolved over the years and can be defined as the utilization of small areas within and around cities for growing crops, raising small livestock and processing food-related products, alone or in combination, for own-consumption or sale (FAO, 1999; Veenhuizen, 2006; Game and Primus, 2015). Urban agriculture is practiced by 800 million people worldwide and helps low-income urban residents save money on food purchases (FAO, accessed 2018). Many of these people are among the poorest in their nations (Karanja and Njenga, 2011). Roughly 15–20 percent of the world's food is grown in urban areas, a figure that is likely to increase as cities grow (Karanja and Njenga, 2011). Urban agriculture can contribute to food security and economic opportunity in low-income communities in cities worldwide. For example, it can make an important contribution to household food security, especially in times of crisis or food shortages and, provides employment and income for poor women and other disadvantaged groups (FAO, accessed 2018). This can be substantiated by numerous studies that demonstrate that urban agriculture can enhance food security and alleviate poverty in urban areas in Sub-Saharan African (SSA) countries (Ruel et al. 1998; Saldivar-Tanaka and Krasny, 2004; Wakefield et al. 2007; Teig et al. 2009; Draper and Freedman, 2010; Poulsen et al. 2015; Warren et al. 2015).

In addition, some authors emphasized the multi-functionality of urban agriculture by demonstrating that UA can provide socio-cultural and environmental benefits to local communities (Teig et al., 2009; Draper and Freedman, 2010; Lovell, 2010; Gerster-Bentaya, 2013;). They showed that UA can serve as an instrument for parents to educate their children and to preserve their cultural knowledge, such as how to sow. They demonstrate that UA can also enhance the social cohesion in neighborhoods because cultivating open-areas within cities can discourage squatting and reduce crime. Additionally, the authors show that UA can help beautify the areas and provide healthy food to communities. This shows that UA can have an array of tangible and intangible benefits for urban farmers and the community in general.

Further, recent studies have attempted to tease out the different roles UA can play in creating a livelihood for women in low-income countries (Mkwambisi et al., 2011; Ngome and Foeken, 2012). These studies revealed that UA can provide women with a source of income that can improve their social status within households and communities. UA might enable women to contribute to household food security by supplying or buying additional food. It might also allow women to better carry out their childcare responsibilities, which represents an economic and social advancement in the society. However, these benefits can vary depending on location-specific contexts, which requires additional and more rigorous research into the benefits of UA for women to inform gender-specific policies (Poulsen et al., 2015).

UA has been practiced for decades in Benin (FAO, 2012). Although UA takes various forms, allotment gardens are empirically the main practiced form of UA in Benin. An allotment garden is defined as a plot of land made available for individuals or families for growing food (Irvine et al., 1999; Stephan et al., 2010). Such plots are formed by subdividing a piece of land into a few or up to several hundreds of land parcels that are assigned to individuals or families. However, little is known about how these gardens affect the food security and income of their participants and which constraints hinder the development of such gardens in the country. Likewise, the establishment of allotment gardens re-

quires good organization and management to ensure their long-term functioning. While these issues are still unclear in the literature, they are important to inform policies and practitioners for the successful development of the sector and similar initiatives. For instance, the Republic of Benin in 2015 validated its National Strategic Development Plan of Peri-urban and Urban Agriculture to recognize and provide a legal framework for the development of UA. This political will constitutes an urgent call from policy makers to researchers to explore and recommend conditions for a successful mainstreaming and implementation of UA in Benin. This study aims to address these calls by focusing on the benefits, organization and constraints for the development of allotment gardens.

PURPOSE OF THE STUDY

The objectives of this study are threefold. First, we aim to understand to what extent allotment gardens contribute to food and nutrition security among urban households. Second, the study investigates the functioning of allotment garden systems, including organization, management and decision-making processes that prevail in the allotment gardens and third, the study investigates potential barriers to the sustainable development of allotment garden systems, considering internal and external factors and interlinkages. The study is conducted within the framework of the project “Enhancing urban food security through development of allotment gardens in and around the cities of Benin”, funded by the Netherlands Organization for Scientific Research (NWO-WOTRO) through the Global Challenges Program (GCP). The project focuses on improving food security among the urban poor, especially women and children, through the development of allotment gardens in the urban and peri-urban areas of Benin. The project aims to create an operational integrated framework for the selection and management of allotment gardens in urban areas of Benin. The project, therefore, focuses on solutions that can be integrated into national policy agendas to create an enabling environment for the expansion of allotment gardens.

STRUCTURE OF THE REPORT

The report is organized as follows: section 2 presents the methodology of the study and section 3 reports on the results on the survey by category: general and socio-economic information of the gardeners, garden characteristics, food and nutrition security, garden organization and management, gender-related issues, constraints for gardening and mitigation and validation. Section 4 synthesizes and formulates policy recommendations.



Methodology

This section presents the methodology of the study through the sampling, design and implementation of the survey and processing of the data.

STUDY AREA

The study was conducted in two cities in southern Benin: Cotonou and Porto-Novo. Benin is a West African nation that is bordered by Togo, Nigeria, Burkina Faso and Niger. Cotonou is the biggest city and seat of government of Benin while Porto-Novo is the second biggest city and capital of the country¹. Cotonou is Benin's most populous city and the country's economic center. The city is located between the Atlantic Ocean and Lake Nokoué in the south-eastern part of the country. The city also hosts a free trade zone in the interior that allows the landlocked Saharan states to exchange goods. Porto-Novo is the capital city and the seat of the national legislature of Benin. The city is located in an inlet on the Gulf of Guinea and is also a thriving center of commerce, especially with Nigeria.

SAMPLING

The survey was conducted in 29 gardens where local agencies of the Ministry of Agriculture provide their extension services. The number of people involved in these gardens was aggregated and revealed 828 gardeners. Hence, the study chose to survey 30 percent of these gardeners and applied a stratified sampling based on two criteria: number of gardeners per city and number of participants per allotment garden that were randomly selected from their corresponding population. The study also ensured that at least three respondents were interviewed per allotment garden during the survey; thus, the survey sample was determined.

Table 1: Sample of gardeners for the survey

| CITY | NUMBER OF GARDENS | POPULATION OF GARDENERS | SAMPLE OF GARDENERS | |
|------------|-------------------|-------------------------|---------------------|---------|
| | | | COUNT | PERCENT |
| Cotonou | 9 | 619 | 189 | 72.41 |
| Porto-Novo | 20 | 209 | 72 | 27.59 |
| Total | 29 | 828 | 261 | 100.00 |

SURVEY IMPLEMENTATION

The survey was designed in spreadsheet format with validated lists in scroll-down menus as a standard response with dedicated fields for open answers. Inserted data was stored in a vector format that facilitated further processing. Data collected encompasses general and socio-economic information, garden characteristics, food and nutrition security, garden organization and management, benefits for women, multi-functional benefits, and constraints and mitigation. The selection of gardeners for inclusion in this study was conducted at random with replacements, if required i.e. in case a participant was not available, another person was randomly chosen. Survey instructions were given to interviewers to guide them in: i) using the hard copy of the survey in the field, ii) using the digital

¹ <https://www.worldatlas.com/articles/the-major-cities-of-benin.html>

questionnaire to store data, iii) using sampling schemes for gardeners and d) approaching the gardeners; gaining trust and dealing with controversial answers. A storyline was written to introduce the purpose of the survey, its processing and translation into policy measures and the follow-up of the project through active participation of the gardeners.

DATA PROCESSING

The survey was processed in Minitab 14. The collated output was read as a vector and labelled according to the question codes. Answers were standardized where needed. Categorical answers were harmonized in standard formats and presented as frequencies. Numerical answers were processed and presented as mean and quartiles.

FINDINGS VALIDATION

After the data was analyzed, the study organized a focus group discussion with twenty-two (22) participants: twenty (20) urban gardeners (men and women) and two (2) experts from the local agencies of the Ministry of Agriculture of Cotonou and Porto-Novo. The aim was to discuss the main findings of the study with the participants – gardening profitability, food security, organization and management, joint regimes and lack of credit for gardening. The discussions were summarized in the results section and recommendations were added in the synthesis section.

Results



This section is presented over six categories: general and socio-economic information, garden characteristics, food and nutrition security, garden organization and management, benefits for women and socio-economic development and constraints on gardening, and mitigation.

GENERAL AND SOCIOECONOMIC INFORMATION

A total of 261 gardeners were included in this study. Seventy-two percent and 28 percent of surveyed gardeners live in Cotonou and Porto-Novo respectively (Table 1), with a majority of adults (35–50 years; 43 percent) followed by youth (<35 years; 34 percent) and older persons (>50 years; 23 percent) (Table A 1). Only 22 percent were female (Table A 2), which shows that gardening is a male-dominated activity in the surveyed gardens.

EDUCATION

The majority (62 percent) of gardeners attended school – primary school (33 percent), secondary school (52 percent) and university (15 percent) (Table 2; Table A 3; Table A 4). Of those who attended school, 9 percent cannot read and 11 percent cannot write in French (Table A 5; Table A 6). This implies that 10 percent on average did not finish primary school.

Table 2: School attendance

| A1. DID YOU GO TO SCHOOL? | | |
|---------------------------|-------|---------|
| A1 | Count | Percent |
| No | 100 | 38.31 |
| Yes | 161 | 61.69 |

OWNERSHIP OF MEANS OF TRANSPORT

Having a means of transport is an asset in the city and for transporting produce. Sixty-three percent of gardeners indicated that they own transport (Table 3). Categorizing the available means of transport among this group shows that 4 percent have a car (Table A 7) and 96 percent have one motor-bike or more (Table A 8). Likewise, 3 percent of the respondents have a bike (Table A 9).

Table 3: Ownership of means of transport

| A2. DO YOU HAVE A MEANS OF TRANSPORT? | | |
|---------------------------------------|-------|---------|
| A2 | Count | Percent |
| No | 97 | 37.16 |
| Yes | 164 | 62.84 |

N=261

HOUSING AND ASSETS

Housing condition is an important indicator of human welfare. Of the gardeners interviewed 24 percent own a house, 39 percent rent a house and 30 percent live in a house of a family member (Table 4). The rest (7 percent) indicated that they live for free in big family houses, in the garden or were allocated a house by the government (Table A 10). Of the home owners, 45 percent inherited the house while 53 percent built or bought it (Table A 11). Of the houses owned by respondents, 50 percent have four or fewer rooms, while 75 percent of them have five or fewer (Table A 12).

Table 4: Housing

| A3. WHERE DO YOU LIVE? | | |
|-------------------------------|-------|---------|
| A3 | Count | Percent |
| Own house | 64 | 24.52 |
| Rental | 101 | 38.70 |
| Free house of a family member | 78 | 29.89 |
| Others | 18 | 6.90 |

N=261

Of the gardeners living in their own houses, 91 percent have access to electricity and 92 percent have access to radio/television, while only 25 percent have a refrigerator in their house (Table A 13; Table A 14; Table A 15). Three-quarters (75 percent) of those living in rental houses have two or fewer rooms while the maximum number of rooms in rental houses is four (Table A 16). Of those who rent, 93 percent are responsible for rental costs while family members pay for the remaining 7 percent (Table A 17). The respondents renting a house have access to a radio/television (86 percent) and a refrigerator (10 percent) (Table A 18; Table A 19). Overall, these figures show that gardeners live in a rather comfortable environment.

OTHER ACTIVITIES NEXT TO GARDENING

Forty-three percent have other sources of livelihood or income besides gardening (Table 5). Categorizing these non-gardening activities, the survey showed that 15 percent run motorbike-taxi businesses, 32 percent are involved in commercial activities while 6 percent have security jobs. A high number (47 percent) practice a range of other side jobs such as teacher, carpenter, tailor and barber. (Table A 20).

Table 5: Other activities next to gardening

| A4. DO YOU HAVE OTHER WORKING ACTIVITIES BESIDES YOUR ALLOTMENT GARDEN ACTIVITIES? | | |
|--|-------|---------|
| A4 | Count | Percent |
| No | 149 | 57.09 |
| Yes | 112 | 42.91 |

N=261

The number of days spent per month on other activities is fewer than 10 days for 18 percent, between 10 and 20 days for 28 percent and 20 or more days for 54 percent of the respondents (Table A 21); these activities take place throughout the year (Table A 22). Depending on the side job, these activities consume on average 40 percent of but can even reach up to 80 percent of the working time of gardeners (Table A 23).

Table 6: Other activities besides gardening: approximate income per day

| MEAN | MINIMUM | Q1 | MEDIAN | Q3 | MAXIMUM |
|-------|---------|-----|--------|------|---------|
| 1 781 | 100 | 700 | 1 500 | 2000 | 10 000 |

On average, the daily estimate of income from these activities by gardeners is at XOF² 1 781 (2.71 euros) (Table 6). Fifty percent of these gardeners earn XOF 1 500 (2.29 euros) or less per day and 75 percent earn XOF 2 000 (3.05 euros) or less per day (Table 6). We can conclude that the side jobs consume a considerable portion of working time of gardeners and also represent an important source of income.

GARDEN CHARACTERISTICS

Gardeners engage in allotment garden for many reasons. Income generation and household consumption were mentioned by 42 percent and 3 percent respectively, while 47 percent engage in allotment gardens for both reasons (Table 7). Another 3 percent engage in allotment either for a hobby or because it was an inheritance or their first opportunity (Table 7; Table A 24).

Table 7: Reason of engagement in allotment garden

| B1. WHY DID YOU ENGAGE IN ALLOTMENT GARDEN? | | |
|---|-------|---------|
| B1 | COUNT | PERCENT |
| Household consumption | 8 | 3.07 |
| Income generation | 110 | 42.15 |
| Both | 123 | 47.13 |
| Hobby | 01 | 0.38 |
| Others | 7 | 2.68 |
| Na | 12 | 4.60 |

N=261

The study explored the literature and plots cultivated in the study area and suggested the categorization of allotment garden systems based on the following types of products: vegetables, staple crops, livestock, fish.

2 XOF: African Financial Community Franc, XOF 1 = 0.0015244901723741 euro

Table 8: Allotment garden system practiced?

| ALLOTMENT SYSTEM | COUNT | PERCENT |
|--|------------|---------------|
| Vegetables-only | 216 | 82.76 |
| Vegetables/staple crops | 13 | 4.98 |
| Vegetables/livestock | 27 | 10.34 |
| Vegetables/fish | 0 | 0.00 |
| Vegetables/staple crops/livestock | 3 | 1.15 |
| Vegetable/staple crops/fish | 0 | 0.00 |
| Vegetables/staple crops/livestock/fish | 0 | 0.00 |
| Na | 2 | 0.77 |
| Total | 261 | 100.00 |

By categorizing the cultivated crops, the survey showed that gardeners practiced four allotment garden systems: vegetables-only; vegetables/staple crops; vegetables/livestock; and vegetables/staple crops/livestock (Table A 25). The 'vegetables-only' is the dominant system (83 percent) while the 'vegetables/staple crops'; 'vegetables/livestock'; and 'vegetables/staple crops/livestock' systems represent 5 percent, 10 percent and 1 percent of the garden systems, respectively (Table 8).

Table 9: Size of the plots of gardeners (in m²)

| COUNT | N* | MEAN | MINIMUM | Q1 | MEDIAN | Q3 | MAXIMUM |
|-------|----|------|---------|-----|--------|------|---------|
| 260 | 1 | 1362 | 15.0 | 240 | 500 | 1200 | 60000 |

Gardeners work on different sizes of plots. While the mean of the reported sizes of the plots of respondents is 1 362 square meters, the quartile showed that 75 percent of gardeners work on a plot of 1 200 or fewer square meters (Table 9).

Table 10: Criteria for choosing an allotment area

| CRITERIA | | MEAN OF SCORES | | RANK |
|---|--------|----------------|------|------|
| (1=high priority, 2=runner up... 8 lowest priority) | | | | |
| Soil quality | | | 2.35 | 2 |
| Water accessibility | | | 2.22 | 1 |
| Water quality | | | 3.61 | 3 |
| Topography | | | 5.02 | 5 |
| Distance and access to markets | | | 5.15 | 6 |
| Available transport and easy access to the road network | | | 6.08 | 7 |
| Safety (fence, robbery, etc.) | Male | 6.21 | 6.20 | 8 |
| | Female | | 6.27 | |
| Land tenure (private or public) | | | 4.58 | 4 |

To choose an allotment area, gardeners base their decision on various criteria. Gardeners ranked eight criteria underlying the choice of an allotment area. They accounted for physical, spatial, socio-economic as well as safety aspects. The results showed that water accessibility, soil quality and water quality, respectively, rank highest, (Table 10) followed in terms of priority, by land tenure, topography, distance and access to markets, available transport and easy access to the road network, and safety.

Table 11: Employment of workers in the garden

| B6. DO YOU EMPLOY WORKERS IN YOUR GARDEN? | | | |
|---|-------|---------|--|
| B6 others | Count | Percent | |
| No | 89 | 34.10 | |
| Yes | 172 | 65.90 | |

N=261

A high number of gardeners (94 percent) farms throughout the year (Table A 26) while the remainder of gardeners (6 percent) concentrate farming activities during the dry season, rainy season and when there are no floods (Table A 26; Table A 27; Table A 28). When farming, 66 percent of gardeners employ workers in the garden (Table 11).

Table 12: Approximate income after deducting inputs and workers' costs in XOF for a harvest

| COUNT | N* | MEAN | MINIMUM | Q1 | MEDIAN | Q3 | MAXIMUM |
|-------|----|--------|---------|-------|--------|--------|---------|
| 259 | 2 | 154115 | 5000 | 30000 | 75000 | 175000 | 3000000 |

An estimate by gardeners of the approximate income after deducting inputs and workers' labour costs for a harvest gives XOF 154 115 (235 euros) on average to a gardener (Table 12). The quartile showed that 50 percent of gardeners earn XOF 75 000 (114 euros) or less and 75 percent of gardeners earn XOF 175 000 (267 euros) or less for a harvest (Table 12).

FOOD AND NUTRITION SECURITY

An important indicator of the welfare and health of gardeners is their food and nutrition security. While all respondents sell their produce (on average 86 percent of their production), 84 percent self-consume on average 13 percent of their production (Table A 29; Table A 30; Table A 31). We expected that the share of the production that was self-consumed would cover most of the food needed by the household. However, the survey showed that 83 percent of the food consumed in the gardeners' household was purchased; the remainder came from own production and gifts of friends (Table A 34; Table A 35; Table A 36; Table A 37). This implies that gardeners' objective is oriented more towards the market than self-consumption.

Table 13: Cross-frequency table for the number of days in one week on which fruit and vegetables are consumed by gardeners by city

| CITY | COUNT | N* | MEAN | MINIMUM | Q1 | MEDIAN | Q3 | MAXIMUM |
|------------|-------|----|-------|---------|-------|--------|-------|---------|
| Cotonou | 136 | 0 | 3.831 | 0.00000 | 2.000 | 4.000 | 6.000 | 7.000 |
| Porto-Novo | 72 | 0 | 3.472 | 1.000 | 2.000 | 3.000 | 5.000 | 7.000 |

The quality of the food consumed by gardeners was estimated by comparing the food consumed during a day to twelve food groups. Results showed that more than half of the gardeners consume six food groups which are: cereals; pulses, nuts and seeds; vegetables; fish and seafood; oils and fats; miscellaneous (Table A 38). The study also observed a low consumption of milk and dairy products (19 percent), eggs (21 percent), and meat (30 percent). For a better understanding of the food quality issues, the survey assessed the number of days in one week on which gardeners consume fruit and vegetables. It was observed that fruit and vegetables are on average consumed four days per week in both Cotonou and Porto-Novo but consumption was slightly higher in Cotonou than Porto-Novo (Table 13). It may be deduced that the food quality of participants can be slightly improved when they participate in urban gardening, though improved food quality also depends on other factors such as education.

Table 14: Cross-frequency table for number of meals per day by city

| COUNT | | | | |
|--------------|-----------------|---------------------|-------------------|-----------------------------|
| % OF TOTAL | NO MEAL PER DAY | SINGLE MEAL PER DAY | TWO MEALS PER DAY | THREE OR MORE MEALS PER DAY |
| % OF ROW | | | | |
| % OF COLUMN | | | | |
| Cotonou | 10 | 51 | 124 | 180 |
| | 3.83 | 19.54 | 47.51 | 68.97 |
| | 5.29 | 26.98 | 65.61 | 95.24 |
| | 100.00 | 89.47 | 67.39 | 71.43 |
| Porto-Novo | 0 | 06 | 60 | 72 |
| | 0.00 | 2.30 | 22.99 | 27.59 |
| | 0.00 | 8.33 | 83.33 | 100 |
| | 0.00 | 10.53 | 32.61 | 28.57 |
| Total | 10 | 57 | 184 | 252 |
| | 3.83 | 21.84 | 70.50 | 96.55 |

To assess the food security, the survey asked for situations where gardeners had no meal, a single meal or more than one meal per day (Table 14). It was observed that 4 percent of gardeners experienced situations where they had no meal per day. This situation is observed only in Cotonou. Twenty-two percent of the respondents experienced a single meal per day. This was found in both cities, with a higher percentage in Cotonou. The remainder of gardeners always have two meals or more per day. It can be deduced that participation in urban gardening does not totally guarantee the food security of its participants.

Table 15: Food shortage per year

| C9. HOW OFTEN IN THE LAST 12 MONTHS DID YOU WORRY THAT YOUR FOOD WOULD RUN OUT BEFORE YOU GOT MORE FOOD OR MORE MONEY TO BUY FOOD? | | |
|---|--------------|----------------|
| C9 | COUNT | PERCENT |
| Almost every month | 8 | 3.07 |
| Some months but not every month | 70 | 26.82 |
| In only 1 or 2 months | 81 | 31.03 |
| Never true for me in the last 12 months | 102 | 39.08 |

N=261

The survey aimed to further improve the understanding of the food security by assessing food availability, accessibility, utilization and stability over a year. Regarding food shortage in the year, 3 percent indicated that they worry about food availability ‘almost every month’ and 27 percent indicated ‘some months but not every month’ (Table 15). Regarding the food quantity consumed during a year, 4 percent indicated that they cut the size of their meals or skip meals ‘almost every month’ while 28 percent indicated they did so ‘some months but not every month’ (Table A 41). This situation was translated to children (15 percent) who do not eat enough because their parents cannot afford enough food ‘some months but not every month’ (Table A 42). These figures show that urban gardening does not guarantee a total improvement of food security among participants.

Table 16: Food quality improvement after starting gardening

| C14. DID YOUR MEALS IMPROVE IN QUALITY AFTER YOU STARTED GARDENING? | | |
|--|--------------|----------------|
| C14 | COUNT | PERCENT |
| No | 4 | 1.53 |
| Yes | 257 | 98.47 |

N=261

Respondents indicated in 7 percent of cases that they cannot afford to eat balanced meals³ ‘almost every month’; ‘some months but not every month’ (31 percent); and ‘only one or two months’ (43 percent) (Table A 39). In addition, 4 percent indicated that they eat food that is less preferred because they cannot afford culturally acceptable food ‘almost every month’; 31 percent indicated they do so ‘some months but not every month’ while 40 percent said ‘only one or two months’ (Table A 40). Hence, while 99 percent of respondents indicated that their meals improved in quality after they started gardening (Table 16; Table A 43), about 40 percent are yet to consume balanced and cultural meals.

Noteworthy is that gardeners also contribute to improving the food security of other households. For instance, 6 percent allocate a share of their production as payment in kind to hired workers and 46 percent share produce with friends and other family members as gifts (Table A 29). On average 8 percent is allocated to workers and 6 percent to friends/other family members (Table A 32; Table A 33). This shows that the gardening activity can contribute to community food security.

3 A balanced meal needs to contain foods from all the main food groups such as dairy products; protein (meats, fish and seafood, eggs, pulses, nuts, and seeds); fruit; vegetables; grains (bread, cereals, pasta), fats and oils.

GARDEN ORGANIZATION AND MANAGEMENT

Organization among gardeners

A majority (89 percent) of respondents indicated that they are organized in a group (Table 17). Of those, 94 percent belonged to a cooperative (Table A 44). Half (50 percent) of the organized groups had 42 members or fewer, with on average 37 men or fewer and five women or fewer. Three-quarters (75 percent) of the organized groups had 60 members or fewer, with 54 men or fewer and 10 women or fewer (Table A 45).

Table 17: Existence of organization among gardeners

| D1. ARE YOU ORGANIZED IN A GROUP? | | |
|-----------------------------------|-------|---------|
| D1 | COUNT | PERCENT |
| No | 29 | 11.11 |
| Yes | 232 | 88.89 |

N=261

Seventy-seven percent of group members paid a membership fee regularly (Table A 46). The frequency of the fee varies per group but the three most prevalent periods were monthly (31 percent), yearly (26 percent) and weekly (20 percent) (Table A 47). On average, 75 percent of gardeners paid XOF 2 500 (3.8 euros) and XOF 500 (0.76 euro) per month and week respectively for the membership fee, while the reported yearly fee is unclear (Table A 48). Among the purposes associated with the membership fee, the two main reasons were the purchase of fertilizer (43 percent) and the purchase of seeds (36 percent) (Table A 49; Table A 50). These figures show that there is a sense of organization among most gardeners who are members of cooperatives and pay a regular membership fee to the organization

Authority of the management board

Almost all members (99 percent) organized in a group indicated that the organization had a management committee (Table 18). Of those who had a management committee, 50 percent elected the committee, while the rest showed a diverse leadership choice – formed by first occupants (9 percent), elders (17 percent) and others (74 percent) such as the ability to manage, honesty and simple designation (Table A 51; Table A 52; Table A 53).

Table 18: Existence of a management committee

| D1.4 DOES THE ORGANIZATION HAVE A MANAGEMENT COMMITTEE? | | |
|---|-------|---------|
| D14 | COUNT | PERCENT |
| No | 2 | 0.86 |
| Yes | 229 | 98.71 |
| Na | 1 | 0.43 |

N=232

In any case, 76 percent of those recognizing management indicated that the committee has a term of office (Table A 54). Ninety-six percent of those organized in a group acknowledge the authority of

the cooperative leader or board (Table A 55; Table A 56). It can be deduced that gardeners recognize the boards' authority.

Responsibility of common tasks

Of those who are organized in a group, 95 percent indicated that they share the responsibility for common tasks (site surveillance, participation in meetings and labour help to other members) (Table 19). However, this works in practice in 84 percent of the cases (Table A 57).

Table 19: Share the responsibility for common tasks

| D1.6 DO YOU SHARE THE RESPONSIBILITY FOR COMMON TASKS (SITE SURVEILLANCE, PARTICIPATION IN MEETINGS, HELP TO OTHER MEMBERS, ETC.)? | | |
|---|--------------|----------------|
| D16 | COUNT | PERCENT |
| No | 8 | 3.45 |
| Yes | 220 | 94.83 |
| Na | 4 | 1.72 |

N=232

To better understand the management aspect, the gardeners were asked if the groups had a constitution and an agreement on the rules of ownership. A majority –98 percent – indicated that their organization has a constitution, but only 44 percent have agreement on rules of ownership (individual plots or communal lands/fair share of profits) (Table A 58; Table A 59). The figures show that respondents mostly manage their cooperatives well.

Means of acquisition of the gardening area

Fifty percent of gardeners have a free access contract⁴ on the land where they garden, while 7 percent lease the area, 3 percent obtained the area through donation, and 41 percent indicated that the area belongs to a member's parent or a private person or they have free access without a contract (Table 20; Table A 60). Gardeners with a free access contract obtained it from public institutions (70 percent), private persons (12 percent), private institutions (11 percent), and others (4 percent) (Table A 64; Table A 65).

Table 20: Means of acquisition of the gardening's area

| D2. HOW DID YOU GET THE AREA WHERE YOU GARDEN? | | |
|---|--------------|----------------|
| D2 | COUNT | PERCENT |
| Lease contract | 17 | 6.51 |
| Free access contract | 130 | 49.81 |
| Donation | 7 | 2.68 |
| Others | 107 | 41.00 |

N=261

The contract was written or verbal for 39 percent but respondents did not know the duration of the contract (Table A 66; Table A 67). Those with a lease contract mostly (94 percent) have a written or verbal contract; 50 percent pay XOF 4 000 (6.10 euros) or less and 75 percent pay XOF 7 000 (10.67 eu-

⁴ They did not pay a contribution for their participation

ros) or less per month (Table A 61; Table A 63). The duration of the contract is two years or less for 50 percent and five years or less for 75 percent (Table A 62). In all cases, gardeners have been working on the area now for 14 years on average, with 50 percent working for 10 years or less and 75 percent for 20 years or less (Table A 68). Although the free access contract is not clearly defined in most cases, gardeners have been working continuously for more than 10 years now. It can be concluded that public authorities play a key support role in the practice of gardening in the cities.

Methods of purchasing inputs

More than three-quarters – 77 percent – of gardeners purchase their own inputs individually while 20 percent have a joint purchase arrangement and 2 percent employ both methods (Table 21; Table A 69). Of those who jointly purchase their inputs, 89 percent are satisfied with the organization while the remainder (11 percent) cited two reasons for their dissatisfaction – the quantity does not suit their needs and they don't trust the management team or other members (Table A 70; Table A 71).

Table 21: Methods of purchase of inputs

| D3. HOW DO YOU PURCHASE THE SEEDS AND FERTILIZER? | | |
|--|--------------|----------------|
| | COUNT | PERCENT |
| Joint purchase | 53 | 20.31 |
| Individual purchase | 200 | 76.63 |
| Others | 5 | 1.92 |
| Na | 3 | 1.15 |

N=261

Of those who individually purchase their inputs, 73 percent are satisfied with this method while the rest are willing to make a joint purchase (Table A 72; Table A 73). It may be concluded that although most of gardeners currently purchase their inputs individually, there is a rising interest to make a joint purchase.

Methods of transport of produce

Depending on sale opportunities, gardeners employ different methods to organize the transport of their produce. For example, 67 percent of gardeners sell their produce on a farm while 26 percent use their own transport and 2 percent lease a taxi (motorbike or car) to transport their produce (Table A 74). Of those who mentioned other methods, 77 percent combine their own transport with selling on a farm while 23 percent indicated they deliver the produce but did not mention the means of transport (Table A 74; Table A 75).

Methods of sale of produce

Ninety-two percent of gardeners sell their produce individually while 5 percent make a joint sale, 1 percent sell under contract and 1 percent combine individual and under-contract sale (Table 22). Of the gardeners who sell their produce jointly, 67 percent are satisfied while the rest indicated three reasons for their dissatisfaction – they don't trust the management team or other members (25 percent), the period of sale does not correspond with their harvest period (50 percent), and they don't agree with the sale price (25 percent) (Table A 76; Table A 77).

Table 22: Methods of sale of produce

| D5. HOW DO YOU SELL THE PRODUCE? | | |
|---|-------|---------|
| D5 | COUNT | PERCENT |
| Joint sale | 12 | 4.60 |
| Individual sale | 241 | 92.34 |
| Under contract | 2 | 0.77 |
| Others (individual sale & under contract) | 2 | 0.77 |
| Na | 4 | 1.53 |

N=261

Of gardeners who sell their produce individually, 86 percent are satisfied while the rest are mostly (85 percent) willing to make a joint sale (Table A 78; Table A 79). The remainder of dissatisfied gardeners who sell individually who are not willing to make a joint sale gave four reasons – they don't trust the management team or other members (20 percent), they don't produce the same produce as the other members (20 percent), they have more liberty on the price (40 percent), and they want to avoid quarrels (20 percent) (Table A 80). Gardeners under contract sell their produce to markets and restaurants/hotel and the contract is valid per harvest (Table A 81; Table A 82). In case of non-compliance with the contract, they indicated that either nothing happens or they do not get another contract (Table A 83).

Credit sources for the production

Credit is of high importance for the gardening activity. Sixty percent of gardeners indicated that they have obtained credit from financial institution while 9 percent indicated that they obtained credit through a tontine/informal group, 3 percent obtained credit from family members and 19 percent have no access to credit (Table 23). Gardeners obtaining credit from a tontine/informal group and family members indicated that they chose this route because: it is less risky (32 percent), they have no collateral (26 percent), it has a low interest rate (26 percent) and others (13%) such as the desire to avoid the long administrative procedure in financial institution or because they have no access to formal credit (Table A 84; Table A 85).

Table 23: Credit for the production

| D6. WHERE DO YOU GET THE CREDIT FOR PRODUCTION? | | |
|---|-------|---------|
| D6 | COUNT | PERCENT |
| From financial institution | 156 | 59.77 |
| From tontine/informal group | 24 | 9.20 |
| From family members | 7 | 2.68 |
| No access to credit | 50 | 19.16 |
| Na | 24 | 9.20 |

N=261

Gardeners indicated they obtain credit either in a group (74 percent) or alone (20 percent) or both in a group and alone (2 percent) (Table A 86; Table A 87). When respondents were asked why they did not obtain credit in a group, they indicated different reasons: they depend on other members before obtaining another credit (41 percent), they will not actually obtain the amount they need (21 percent),

they don't trust the management team or other members (17 percent) and others (12 percent), (Table A 88; Table A 89).

Of those who obtained credit for production, 40 percent indicated that the credit suits their needs (Table A 90). Of those who were not satisfied with the credit 79 percent indicated they are willing to obtain credit in a group (Table A 91). Those (17 percent) who are not willing to obtain credit in a group cited different reasons – they'd rather depend on other members before obtaining additional credit (78 percent), they don't trust the management team or other members anymore (5 percent) and others (17 percent) such as credit is insufficient and the high costs of credit (Table A 91; Table A 92; Table A 93). The figures show that respondents self-organized themselves well to obtain credit in a group and from financial institutions. However, the amount of credit is insufficient for more than half and the majority are still willing to obtain credit in a group.

Table 24: Purpose of the credit

| 6.3 FOR WHAT DO YOU USE THE CREDIT? (MORE THAN ONE ANSWER POSSIBLE) | | |
|---|-------|---------|
| D63 | COUNT | PERCENT |
| Purchase of fertilizer | 6 | 3.21 |
| Purchase of seeds | 7 | 3.74 |
| Purchase of garden equipment | 8 | 4.28 |
| Others | 149 | 79.68 |
| Na | 17 | 9.09 |

N=187

Gardeners use the credit for different purposes. While only 3 percent use the credit for the purchase of fertilizer, 4 percent for seeds and 4 percent for garden equipment, a high number of gardeners (80 percent) use the credit for a combination of purposes (Table 24). The two dominant combinations of functions of the credit are the purchase of fertilizer, seeds, pesticides and garden equipment (61 percent) and the purchase of fertilizer, seeds and pesticides (36 percent) (Table A 94). Regarding the flexibility of the purpose of the credit, 66 percent of gardeners indicated that they stick to the credit purpose while 23 percent sometimes change the credit purpose when unforeseen costs or crises arise at home (93 percent) or in other situations (Table A 95; Table A 96; Table A 97). This change in purpose happened once for 28 percent of the gardeners, twice for 42 percent, three times for 19 percent and four times or more for 5 percent (Table A 98). It may be concluded that most gardeners assign multiple functions to the credit. However, about one quarter of gardeners change the credit purpose when crises arise at home, which should be tackled to improve credit perspectives among gardeners.

PERCEPTION OF BENEFITS FOR WOMEN AND SOCIO-ECONOMIC DEVELOPMENT

Gardening may have many benefits for the livelihood of women.

Table 25: Financial benefits for women

| E1. DO YOU THINK THAT GARDENING PROVIDES WOMEN WITH A FINANCIAL CUSHION FOR THEMSELVES OR OTHER OBLIGATIONS? | | |
|--|-------|---------|
| E1 | COUNT | PERCENT |
| No | 2 | 0.77 |
| Yes | 259 | 99.23 |

N=261

Almost all – 99 percent – of gardeners indicated that gardening provides women with a financial cushion for themselves or other obligations and also assures women of economic and social advancement (Table 25; Table A 99). In practice, gardening empowers women in many ways – extra income enables women to meet their social responsibilities (99 percent); it enhances a sense of independence and status among women both within the household and in the community (96 percent); extra income is a means to raise the capital necessary to start other income-generating activities (93 percent); gardening is a means for building social capital, by way of sharing their produce with friends and neighbors and meeting their obligations to social networks, including self-help groups and religious congregations (76 percent); and gardening, in an important way, vaults women into the vanguard of decision-making at the household level, enabling them to exercise some control over patterns of household resource use and allocation (52 percent) (Table A 100). In addition, 95 percent of gardeners indicated that women can combine gardening with proper parental care for their children (Table A 101).

Table 26: Benefits on health

| F1. DO YOU THINK THAT GARDENING HAS HEALTH BENEFITS? | | |
|--|-------|---------|
| F1 | COUNT | PERCENT |
| No | 11 | 4.21 |
| Yes | 249 | 95.40 |
| Na | 1 | 0.38 |

N=261

A majority – 95 percent – gardeners indicated that gardening has health benefits for themselves while 89 percent indicated that gardening contributes to economic development (Table 26; Table A 102). Although gardening requires time, skill and effort, 78 percent indicated that they would continue gardening even if other opportunities (job, etc.) emerged for them (Table A 103). In addition, a high number of gardeners indicated that gardening contributes to youth education, development and employment, as well as to the use and preservation of urban open space, neighborhood beautification, cultural preservation and expression, social interaction/cultivation of relationships, and community organization, empowerment, and mobilization (more than 96 percent) (Table A 104; Table A 105; Table A 106; Table A 107; Table A 108; Table A 109).

CONSTRAINTS FOR GARDENING AND MITIGATION

Land access and tenure insecurity

The development of allotment gardens has many constraints. Ninety-seven percent of gardeners considered land access and tenure insecurity as a constraint for gardening (Table 27). The main reasons included land unavailability (47 percent), lack of policy regulation (30 percent), the difficulty of leasing land (20 percent), and others (Table A 110). By recategorizing the others, there were a combination of the aforementioned reasons as well as a lack of security with the landlord and a lack of space (Table A 111).

Table 27: Constraint of land access and tenure insecurity

| G1. DO YOU CONSIDER LAND ACCESS AND TENURE INSECURITY AS A CONSTRAINT FOR GARDENING? | | |
|--|-------|---------|
| G1 | COUNT | PERCENT |
| No | 9 | 3.45 |
| Yes | 252 | 96.55 |

N=261

Sixty-two percent of gardeners indicated that municipalities are not willing to solve the problem (Table A 112). Possible solutions included the promotion of intercommunal partnership to provide cities with large areas for urban agriculture (39 percent), the enhancement of urban planning mainstreaming zoning (32 percent), negotiating with public and private institutions to lease their open spaces for an extended period (20 percent), and others (Table A 113; Table A 114).

Financial capital

A high number of gardeners (94 percent) indicated that the lack of financial capital is a constraint for gardening (Table 28). The main reasons cited included the lack of credit for agricultural activities (33 percent), the high interest rate of financial institutions (29 percent), the lack of collateral to obtain credit from financial institutions (24 percent), the lack of a deferred period (3 percent) and others (10 percent) such as the absence of an agricultural bank and difficulty in obtaining credit (Table A 115; Table A 116).

Table 28: Constraint of financial capital

| G2. DO YOU CONSIDER LACK OF FINANCIAL CAPITAL AS A CONSTRAINT FOR GARDENING? | | |
|--|-------|---------|
| G2 | COUNT | PERCENT |
| No | 16 | 6.13 |
| Yes | 245 | 93.87 |

N=261

Gardeners suggested possible solutions including the adaptation of loan access conditions (collateral and a deferred period) for the agricultural sector (42 percent), reducing financial institutions' interest rates (28 percent), the encouragement of cooperative formation between gardeners to access loans

(23 percent) and others such as the creation of an agricultural bank (6 percent) (Table A 117; Table A 118).

Access to clean and reliable water

Sixty-four percent of gardeners considered the lack of access to clean and reliable water as a constraint for gardening (Table 29). The main reasons included the unavailability of equipment for irrigation (70 percent), pollution of shallow water in wells (15 percent), seasonal rainfall patterns (11 percent) and others (4 percent) such as no control of water; floods; and leaching in rainy season (Table A 119; Table A 120).

Table 29: Constraint of access to clean and reliable water

| G3. DO YOU CONSIDER LACK OF ACCESS TO CLEAN AND RELIABLE WATER AS A CONSTRAINT FOR GARDENING? | | |
|--|--------------|----------------|
| G3 | COUNT | PERCENT |
| No | 93 | 35.63 |
| Yes | 167 | 63.98 |
| Na | 1 | 0.38 |

N=261

To tackle these constraints, gardeners suggested the policy support to farmers to access loans to purchase water equipment (69 percent), support for securing land tenure so that gardeners can invest in irrigation or water de-pollution (29 percent) and others (2 percent) such as conserving nature (Table A 121; Table A 122).

High cost of inputs

A majority – 68 percent – of gardeners considered high input costs as a constraint for gardening (Table 30). The main reasons could be the frequent rupture of inputs such as fertilizer and pesticide (52 percent), the shortage of input providers on the market (42 percent) and others (6 percent,) such as the lack of government subsidy, the market monopoly and the lack of money (Table A 123; Table A 124).

Table 30: Constraint of high input costs

| G4. DO YOU CONSIDER HIGH INPUT COSTS AS A CONSTRAINT FOR GARDENING? | | |
|--|--------------|----------------|
| G4 OTHERS | COUNT | PERCENT |
| No | 84 | 32.18 |
| Yes | 177 | 67.82 |

N=261

Among the possible solutions, there were the enablement of more businesses to enter the industry to reduce the inputs price (60 percent), the regulation of input costs through policy instruments such as customs reduction (30 percent) and others (7 percent) such as installing a local manufacturing unit in Benin (Table A 125; Table A 126).

Market functioning

More than two-thirds – 67 percent – considered market functioning as a constraint for gardening (Table 31). They indicated that the reasons could be low prices in general (74 percent), unreliable relationships with traders (9 percent), the distance (4 percent), unreliable relationships with brokers (1 percent) and others (12 percent) such as the lack of clients, the lack of control over vegetable imports, the bias against local produce among customers, the lack of contracts with hotels, restaurants and consumers (Table A 127; Table A 128).

Table 31: Constraint of market functioning

| G5. DO YOU CONSIDER MARKET FUNCTIONING AS A CONSTRAINT FOR GARDENING? | | | | |
|---|-----|-----|-------|--------|
| NO | 87 | 87 | 33.33 | 33.33 |
| Yes | 174 | 261 | 66.67 | 100.00 |

N=261

Suggested solutions included the access to markets in other cities (31 percent), the avoidance of fixed-price arrangements (23 percent), making direct contact with traders (14 percent), the access to export markets (06 percent) and others (24 percent), such as price regulation, avoidance of vegetable imports, and the promotion of local consumption. (Table A 129; Table A 130).

Conflict with neighbors

The proportion of gardeners who considered their partnership with neighbors (gardeners or people on the immediate outskirts) as a constraint for gardening was low (5 percent) (Table 32; Table A 131).

Table 32: Constraint of conflict with neighbours

| G6. DO YOU CONSIDER YOUR PARTNERSHIP WITH NEIGHBORS AS A CONSTRAINT FOR GARDENING? | | |
|--|-------|---------|
| G6 | COUNT | PERCENT |
| No | 248 | 95.02 |
| Yes | 13 | 4.98 |

N=261

They thought that the relationship with neighbors could be improved most efficiently through negotiations (69 percent) and better agreements on use of land/water (31 percent) (Table A 132). They also thought that improved conflict resolution should be organized by the management committee board (69 percent), local authorities (23 percent) and amicably by the affected parties (8 percent) (Table A 133).

Lack of farming skills

About three-quarters of gardeners considered the lack of farming skills as a constraint for gardening and they thought that capacity-building programs (58 percent), the customization of extension services to the needs and comprehension levels of gardeners (36 percent) or both (1 percent) are possible solutions to this issue (Table 33; Table A 135).

Table 33: Constraint of lack of farming skills

| G8. DO YOU CONSIDER THE LACK OF FARMING SKILLS AS A CONSTRAINT FOR GARDENING? | | |
|---|-------|---------|
| G8 | COUNT | PERCENT |
| No | 73 | 27.97 |
| Yes | 188 | 72.03 |

N=261

Lack of public authorities' commitment

A high number of gardeners (96 percent) considered the lack of commitment on the part of public authorities as a constraint for gardening (Table 34).

Table 34: Constraint of lack of public authorities' commitment

| G9.1 DO YOU CONSIDER THE LACK OF PUBLIC AUTHORITIES' COMMITMENT AS A CONSTRAINT FOR GARDENING? | | |
|--|-------|---------|
| G9.1 | COUNT | PERCENT |
| No | 8 | 3.07 |
| Yes | 251 | 96.17 |
| Na | 2 | 0.77 |

N=261

To tackle that issue, they suggested the financial support for urban agriculture (72 percent), the legitimization of urban agriculture (21 percent) and others (4 percent) such as setting up a discussion platform between the government and gardeners (Table A 136; Table A 137).

Labour shortage

About half of gardeners considered labour shortage as a constraint for gardening but, only 5 percent of them thought that the labour shortage could be addressed (Table 35; Table A 138).

Table 35: Constraint of labour shortage

| G10. DO YOU CONSIDER LABOUR SHORTAGE AS A CONSTRAINT FOR GARDENING? | | |
|---|-------|---------|
| G10 | COUNT | PERCENT |
| No | 130 | 49.81 |
| Yes | 125 | 47.89 |
| Na | 6 | 2.30 |

N=261

They suggested raising awareness among youth on the benefits of gardening and automation through technical capacity-building (Table A 139).

Other constraints

Theft and robbery (36 percent) and diseases such as malaria, diarrhea, etc. (60 percent) were two other factors considered by gardeners as constraints for gardening (Table A 134; Table A 140).

Constraints ranking

Gardeners gave scores to rank the constraints for gardening from the most important to the least important (Table A 141). Land access and tenure insecurity, lack of financial capital and lack of public authorities' commitment were the first set of three constraints identified by gardeners. The second set of constraints comprises the lack of access to clean and reliable water and the high cost of inputs. The third set includes market functioning, the lack of farming skills and to some extent diseases. The last set of constraints covers relationships with neighbors, theft and robbery and labour shortage. This ranking progressively identifies the constraints that are of high importance to better support gardeners.

VALIDATION

A focus group discussion was organized with twenty (20) urban gardeners (men and women) and two (2) experts from the local agencies of the Ministry of Agriculture of Cotonou and Porto-Novo to corroborate the main findings of the study on: gardening profitability, food security, organization and management, joint ventures and lack of credit for gardening.

Urban gardening is profitable for gardeners. Gardeners confirmed the profitability of their business, which allows them to cover their basic needs. They added that if the gardening was not profitable, they would have already abandoned it. As proof, a gardener said that he left his job (electronic technician) to start gardening. They also indicated that the great variance in income highlighted in the study is due to a great difference in the cultivated areas, which, in turn, is due to land and tenure insecurity in the cities.

Food insecurity among urban gardeners (26%). Participants confirmed the result but offered clarity on two points: the gardeners who experience food insecurity either have a low labour productivity or their areas under cultivation are not large enough to generate enough income. In the latter case, they indicated that gardeners generally engage in other income-generating activities to improve their income. They also indicated that, in general, gardeners studied other professions before engaging in gardening.

Good sense of organization and management (77%). Participants confirmed the finding and indicated that they are organized in cooperatives that are registered and have bank accounts to receive their membership fees. They indicated that the frequency of these fees payment varies widely. In general, they indicated that the fees allow them to make loans to members or to provide collateral for taking credit, but this is not yet effective due to a lack of trust between members. They also indicated that there is a good cohesion between their communal, departmental and national representations.

Few gardeners form joint ventures/partnerships to purchase inputs (23%) or sell produce (8%). Participants confirmed the result and explained that gardeners within the cooperatives have different sale perspectives. Therefore, each gardener decides what to produce because the sale perspectives vary per product and per period, which does not easily enable joint sales. They also indicated that the lack of land and the fact that the cultivated areas are scattered as two additional factors that prevent partnerships. In addition, they indicated the difference in the production itineraries as a brake on joint ventures because the products are ready at different times and the quality of products sometimes differs within gardeners.

Credit is insufficient and unsuitable for urban gardeners (60%). Gardeners confirmed the conclusion and added that besides the fact that it is insufficient, the conditions to obtain credit are unsuitable for gardening (no deferred period, high interest rates and short repayment period). They added that the reluctance of many financial structures to provide loans to gardeners is a constraint on them obtaining credit.



Synthesis and recommendations

The survey brought to light some notable insights on gardening activity in the two biggest cities of Benin. The results revealed that urban gardening in Benin is a male-dominated activity, mostly practiced by adults and youth. This is contrary to many other African countries like Kenya, Zimbabwe, Cameroon, Democratic Republic of Congo, Guinea-Bissau, Zambia and Central African Republic where gardening is mostly practiced by women (Tibesigwa and Visser, 2015). More than half of gardeners attended school, of whom at least 50 percent and 15 percent went to secondary school and university, respectively. This may imply that most of the gardeners started this activity because they could not find other opportunities. However, the activity seems to be profitable to such a level that most gardeners can easily afford to purchase and maintain at least a motorbike with 4 percent even able to buy a car. Likewise, gardeners live in a rather comfortable environment (electricity, radio, television) by either building or renting their homes. This means that urban gardening probably provides either enough money for gardeners to meet their basic needs or, urban gardeners are well off and therefore, have time and resources to venture in this garden activity. In that perspective, governmental institutions may leverage the potential of this activity to encourage more youth to enter the industry and reduce youth-dominated unemployment in Benin. For instance, the country has since 2015 adopted a national strategy to promote peri-urban and urban agriculture. By considering the experience and indigenous knowledge of gardeners who view water accessibility, soil quality and water quality respectively as the first three priority criteria to select a site for gardening, the government could create a large area for youth to unleash their potential in this rising and profitable industry. This is already slightly practiced by some public institutions, which have awarded free access contracts to 50 percent of gardeners for more than 10 years now in the cities. This implies that public authorities can provide strong support for the development of urban allotment gardens if there is an enabling environment. The focus group indicated that a gradual integration of urban agriculture into urban policies and urban land-use plans, the promotion of vertical agriculture and support from local authorities for the creation of spaces dedicated to urban agriculture through the promotion of inter-communality for example, are three policy options to address the lack of land in urban areas.

Gardeners mostly engage in this activity for income generation, which may explain why they only allocate a small share of their production to household consumption and still buy a large proportion of the food consumed in the household. However, 26 percent of gardeners experienced situations where they had no meal (4 percent) or only a single meal (22 percent) per day. This situation, which is more evident in Cotonou than Porto-Novo, is further confirmed when gardeners were asked about their food security over time (one year) and, most likely, reveals the presence of the very poor and poor among gardeners. Even for gardeners who indicated an improvement in their food quality, 40 percent of them can afford to eat neither balanced nor culturally acceptable meals almost every month of the year. This implies that participation in urban gardening does not fully guarantee food security for its participants. For example, by analyzing the food consumed in a day, it was found that only six food groups (cereals; pulses, nuts and seeds; vegetables; fish and seafood; oils and fats; miscellaneous) of the twelve expected food groups were consumed, with a notable absence of important food groups but, the most expensive ones, such as meat, eggs and dairy. Therefore, civil society organizations can step up raising awareness among gardeners about the importance of consuming balanced meals. The government can also build the capacity of agricultural extension workers to include nutrition issues as part of their advice because an improvement in food quality also depends on many socio-cultural and hygienic factors as well as education. The focus group discussion suggested the promotion of integrated agriculture (gardening-breeding) and the provision of specific fertilizers for gardening at a lower cost to increase yields and income.

There is a sense of organization among gardeners, who are mostly organized in cooperatives and regularly subscribe (weekly, monthly, yearly) to a membership fee. This membership fee is intended to purchase fertilizer and seeds but in practice gardeners individually purchase needed inputs. The cooperatives in most of the cases have a management board, which is elected in 50 percent of the cases. Gardeners also recognize the authority of the management board, share the responsibility for common tasks (site surveillance, participation in meetings and help to other members) and have a constitution. This implies that the management system of cooperatives is good, though some aspects such as the agreement on rules of ownership (individual plots or communal lands/fair share of profits) need improvements. However, very few gardeners form joint partnerships to purchase inputs and sell produce. This implies that there is still room to find financial incentives that will encourage gardeners to form joint ventures to deal with outside partners (suppliers, clients). Already, those who are dissatisfied with individual experiences are willing to enter joint ventures if, in general, the issues of mistrust and adaptation to their needs are tackled. This may also influence the transport of produce, which is diversely (own transport, taxi rental, etc.) dealt with by gardeners. They may use their bargaining power to obtain better prices on inputs and produce, and better transport modalities, which can reduce transport costs and increase revenues. The focus group suggested the creation of gardening markets where gardeners can route their products for sale; the reduction by government authorities of vegetable imports; and raising awareness among gardeners about the functioning of a cooperative as ways to increase demand for their produce and encourage joint partnerships. An additional research component could, therefore, concentrate on the creation of a value chain that can be organized as a joint effort by the participating gardeners.

The majority of the gardeners obtained their credit in a group and from financial institutions. However, the amount of credit is insufficient for the majority of gardeners who are willing to obtain more credit in a group. In addition, while most of the gardeners usually assign multiple functions (fertilizer, seeds, pesticides, equipment) to their credit, a considerable number (23 percent) change the credit purpose when unforeseen costs or crises arise at home, which may jeopardize the repaying structure of the loan and label urban gardeners as a risk group for credit institutions. We assume that this situation is why some gardeners are not willing to apply for credit in a group. Hence, there is room to work with gardeners to raise their awareness about the power of negotiating as a group with outside entities. This power of negotiation could also influence their chance of obtaining enough credit for production. However, sensitization and capacity-building of gardeners on the use of credit are important to avoid situations where the few financial institutions that risk financing some agricultural activities decide to stop the venture. While these recommendations can be implemented by civil society organizations, the government can also play two key roles by: (i) assigning extension workers to ensure long-term sustainability even in the absence of other partners and (ii) establishing a guarantee fund, which may encourage financial institutions to take more risks in agriculture financing. In the end, this may sustainably reduce the number of poor among gardeners and create additional benefits such as meeting the rising food demand and supplying the community with locally and healthily produced foods. The focus group indicated that support from the National Fund for Agricultural Development (*FNDA*) to farmers to facilitate access to credit (reduction of the interest rate and an increase in the deferral and repayment periods) and the establishment by the *FNDA* of a guarantee fund within financial structures to reduce the agricultural risk and encourage these structures to finance gardening are two key policy options.

Gardening activity may have benefits for women empowerment. For instance, gardening not only provides women with money to make their own purchases, it also enhances their social status within their household and community. It may also improve their status regarding decision-making at the household level, enabling them to exercise some control over patterns of household resource use and allocation. In addition, urban gardening may have benefits for economic, social, health and environment aspects. For example, gardening enables other actors such as middlemen to enter the value chain and make profits. While gardening may help in reusing urban waste through composting, it may also foster cultural preservation because gardening can reflect cultural heritage through, for example, planting or harvesting methods.

Among the constraints that undermine the development of allotment gardens, land access and tenure insecurity, lack of financial capital and lack of public authorities' commitment were very important to gardeners. In general, municipalities are not willing to solve the problems. This calls for advocacy at local and government authority levels to help address the challenges. Hence, policy recommendations encompass (i) the promotion of intercommunal partnerships to provide cities with large areas of land for urban agriculture, (ii) the enhancement of urban planning mainstreaming gardening as a type of land use and (iii) the constitution of a guarantee fund to encourage financial institutions to finance agriculture. However, gardeners are also encouraged to improve their current levels of cooperation, which for now do not sustainably pave the way for leveraging the benefits of a cooperative. Furthermore, the lack of access to clean and reliable water; high input costs; the market functioning and the lack of farming skills all hinder gardening activity. Suggestions to solving these issues include: (i) public support for securing land tenure to allow investment in irrigation, (ii) policy regulations (industry de-monopolization, customs reduction, avoidance of vegetable imports) to increase production, export and the access to local produce and (iii) the customization of capacity-building and extensions programs to meet the needs of the gardeners. Likewise, it is recommended to gardeners to search relevant information on other markets (other cities and countries) to obtain direct contracts with clients.



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Appendix

Table A 1: Age of gardeners

| CLASS OF AGES | COUNT | PERCENT |
|-------------------------|-------|---------|
| Class1 (<35 years) | 87 | 33.59 |
| Class2 (35-50 years) | 111 | 42.86 |
| Class3 (>50 years) | 61 | 23.55 |

N=259; Missing values=2

Table A 2: Repartition of gardeners by gender

| GENDER | COUNT | PERCENT |
|--------|-------|---------|
| Female | 57 | 21.84 |
| Male | 204 | 78.16 |

N=261

Table A 3: Highest school attended

| A1.1. WHICH HIGHEST SCHOOL DID YOU ATTEND? | | |
|--|-------|---------|
| A1.1 | COUNT | PERCENT |
| Primary | 54 | 33.54 |
| Secondary | 83 | 51.55 |
| University | 24 | 14.91 |

N=161

Table A 4: Highest grade obtained

| A1.2. WHICH HIGHEST GRADE DID YOU OBTAINED? | | |
|---|-------|---------|
| A12 | COUNT | PERCENT |
| BAC (secondary) | 12 | 07.45 |
| BEPC (secondary) | 26 | 16.15 |
| CAP (secondary) | 1 | 0.62 |
| CEP (primary) | 71 | 44.10 |
| DTI (secondary) | 2 | 01.24 |
| Licence (university) | 8 | 04.97 |
| Maitrise (university) | 3 | 01.86 |
| Master (university) | 1 | 0.62 |
| Na | 37 | 22.98 |

N=161

Table A 5: Literacy reading

| A1.3. CAN YOU READ IN FRENCH? | | |
|-------------------------------|-------|---------|
| A13 | COUNT | PERCENT |
| No | 15 | 09.32 |
| Yes | 146 | 90.68 |

*N=161***Table A 6: Literacy writing**

| A1.4. CAN YOU WRITE IN FRENCH? | | |
|--------------------------------|-------|---------|
| A14 | COUNT | PERCENT |
| No | 18 | 11.18 |
| Yes | 143 | 88.82 |

*N=161***Table A 7: Ownership of means of transport: number of cars**

| NCAR | COUNT | PERCENT |
|------|-------|---------|
| 0 | 157 | 95.73 |
| 1 | 7 | 4.27 |

*N=164***Table A 8: Ownership of means of transport: number of motorbikes**

| NMOTORBIKE | COUNT | PERCENT |
|------------|-------|---------|
| 0 | 6 | 3.66 |
| 1 | 149 | 90.85 |
| 2 | 7 | 4.27 |
| 3 | 2 | 1.22 |

*N=164***Table A 9: Ownership of means of transport: number of bikes**

| NBIKE | COUNT | PERCENT |
|-------|-------|---------|
| 0 | 159 | 96.95 |
| 1 | 4 | 2.44 |
| 2 | 1 | 0.61 |

N=164

Table A 10: Housing: others

| A3OTHERS | COUNT | PERCENT |
|-------------------------|-------|---------|
| in the big family house | 5 | 27.78 |
| in the garden | 6 | 33.33 |
| Na | 6 | 33.33 |
| State's support | 1 | 5.56 |

N=18

Table A 11: Housing: means of ownership of own house

| A3.1 HOW DID YOU GET IT? | | |
|---------------------------|-------|---------|
| A3OTHERS | COUNT | PERCENT |
| heritage | 29 | 45.31 |
| we built/bought the house | 34 | 53.13 |
| Na | 1 | 1.56 |

N=64

Table A 12: Housing: number of rooms in own house

| VARIABLE | COUNT | MINIMUM | Q1 | MEDIAN | Q3 | MAXIMUM |
|----------|-------|---------|-------|--------|-------|---------|
| A311 | 64 | 1.000 | 3.000 | 4.000 | 5.000 | 14.000 |

Table A 13: Housing: electricity in own house

| A3.1.1 DO YOU HAVE ELECTRICITY IN YOUR HOUSE? | | |
|---|-------|---------|
| A312 | COUNT | PERCENT |
| No | 6 | 9.38 |
| Yes | 58 | 90.63 |

N=64

Table A 14: Housing: refrigerator in own house

| A3.1.2 DO YOU HAVE A REFRIGERATOR IN YOUR HOUSE? | | |
|--|-------|---------|
| A313 | COUNT | PERCENT |
| No | 48 | 75.00 |
| Yes | 16 | 25.00 |

N=64

Table A 15: Housing: television/radio in own house

| A3.1.3 DO YOU HAVE TELEVISION/RADIO IN YOUR HOUSE? | | |
|--|-------|---------|
| A314 | COUNT | PERCENT |
| No | 5 | 7.81 |
| Yes | 59 | 92.19 |

N=64

Table A 16: Housing: number of rooms in the rental

| A3.2. HOW MANY ROOMS HAS THE RENTAL? | | | | | | |
|--------------------------------------|-------|---------|--------|--------|--------|---------|
| VARIABLE | COUNT | MINIMUM | Q1 | MEDIAN | Q3 | MAXIMUM |
| A32 | 101 | 1.0000 | 2.0000 | 2.0000 | 2.0000 | 4.0000 |

Table A 17: Housing: rental costs responsibility

| A3.2.1 ARE YOU RESPONSIBLE OF THE RENTAL COSTS? | | |
|---|-------|---------|
| A321 | COUNT | PERCENT |
| Yes, I am responsible | 94 | 93.07 |
| Family members | 7 | 6.93 |

N=101

Table A 18: Housing: refrigerator in the rental

| A3.2.2 DO YOU HAVE A REFRIGERATOR IN YOUR ROOM? | | |
|---|-------|---------|
| A322 | COUNT | PERCENT |
| No | 90 | 89.11 |
| Yes | 10 | 9.90 |
| Na | 1 | 0.99 |

N=101

Table A 19: Housing: television/radio in the rental

| A3.2.3 DO YOU HAVE TELEVISION/RADIO IN YOUR ROOM? | | |
|---|-------|---------|
| A323 | COUNT | PERCENT |
| No | 14 | 13.86 |
| Yes | 87 | 86.14 |

N=101

Table A 20: Other activities next to gardening: types of activities

| A4.1. WHAT KIND OF OTHER WORKS DO YOU PRACTICE? | | |
|---|-------|---------|
| A41 | COUNT | PERCENT |
| motorbike-taxi | 17 | 15.18 |
| commerce | 35 | 31.25 |
| security | 7 | 6.25 |
| others | 53 | 47.32 |

N=112

Table A 21: Other activities next to gardening: number of days spent per month

| A4.2. HOW MANY DAYS PER MONTH DO YOU PRACTICE THESE OTHER WORK ACTIVITIES? | | |
|--|-------|---------|
| A42 | COUNT | PERCENT |
| Period1 (<10) | 20 | 17.86 |
| Period2 (10-<20) | 31 | 27.68 |
| Period3 (>=20) | 61 | 54.46 |

N=112

Table A 22: Other activities next to gardening: months of practice

| MONTH | COUNT (N=112) | PERCENT |
|-----------|---------------|---------|
| January | 111 | 99.11 |
| February | 110 | 98.21 |
| March | 110 | 98.21 |
| April | 108 | 96.43 |
| May | 108 | 96.43 |
| June | 107 | 95.54 |
| July | 102 | 91.07 |
| August | 105 | 93.75 |
| September | 105 | 93.75 |
| October | 107 | 95.54 |
| November | 111 | 99.11 |
| December | 111 | 99.11 |

N=112

Table A 23: Other activities next to gardening: share of time spent on each activity

| ACTIVITY | MEAN | MEDIAN | MIN | MAX |
|------------------|-------|--------|-----|-----|
| Allotment garden | 61.14 | 60 | 20 | 95 |
| Motorbike-taxi | 37.06 | 40 | 15 | 60 |
| Commerce | 40.68 | 40 | 25 | 70 |
| Construction | 0 | 0 | 0 | 0 |
| Security | 43.33 | 40 | 30 | 70 |
| Others (specify) | 35.47 | 30 | 5 | 80 |

Table A 24: Reason of engagement in allotment garden: others

| B1OTHERS | COUNT | PERCENT |
|-------------------|-------|---------|
| Heritage | 1 | 14.29 |
| First opportunity | 1 | 14.29 |
| Na | 1 | 14.29 |
| Passion | 4 | 57.14 |

N=7

Table A 25: Composition of allotment garden systems

| TYPE OF PRODUCTION SYSTEM | COMPOSITION OF THE CULTIVATED FOODS AND/OR ANIMALS |
|--|---|
| Only vegetables | Carrot, lettuce, vernonia, pepper, tomato, amaranth, cabbage, large nightshade, beetroot, crinocrin, mint, basil, radish, pepper, cucumber, zucchini, coriander, turnip, parsley, green bean, onion |
| Vegetables + staple crops | Vegetables + maize, soya, cassava, peanut |
| Vegetables + livestock | Veg + Pork, chicken, goat |
| Vegetables + fish | 0 |
| Vegetables + staple crops + livestock | Vegetables + staple crops and Bean + duck |
| Vegetables + staple crops + fish | 0 |
| Vegetables + staple crops + livestock + fish | 0 |

Table A 26: Period of gardening

| B5. DO YOU FARM ALL THE YEAR? | | |
|-------------------------------|-------|---------|
| B5 | COUNT | PERCENT |
| No | 16 | 6,13 |
| Yes | 245 | 93,87 |

N=261

Table A 27: Period of gardening: season of occupation

| B5.1 DURING WHICH SEASON DO YOU FARM? | | |
|---------------------------------------|-------|---------|
| B51 | COUNT | PERCENT |
| dry season | 10 | 62.50 |
| rainy season | 1 | 6.25 |
| others | 4 | 25.00 |
| Na | 1 | 6.25 |

N=16

Table A 28: Period of gardening: others

| B51 OTHERS | COUNT | PERCENT |
|-----------------------------------|-------|---------|
| February to April | 1 | 25 |
| Na | 1 | 25 |
| When there is no flood (09 month) | 2 | 50.00 |

N=4

Table A 29: Distribution of the produce

| REASONS JUSTIFYING THE SHARING | COUNT | PERCENT |
|--------------------------------------|-------|---------|
| Self-consumption | 219 | 83.91 |
| Sale | 261 | 100.00 |
| Workers' salaries to be paid in kg | 16 | 6.13 |
| Gift to friends/other family members | 121 | 46.36 |

N=261

Table A 30: Distribution of the produce: self-consumption

| TOTAL VARIABLE | COUNT | N* | MEAN | MINIMUM | Q1 | MEDIAN | Q3 | MAXIMUM |
|------------------|-------|----|--------|---------|-------|--------|---------|---------|
| Self-Consump (%) | 219 | 0 | 12.822 | 1. 000 | 5.000 | 10.000 | 20. 000 | 40.000 |

Table A 31: Distribution of the produce: sale

| TOTAL VARIABLE | COUNT | N* | MEAN | MINIMUM | Q1 | MEDIAN | Q3 | MAXIMUM |
|----------------|-------|----|--------|---------|---------|--------|--------|----------|
| Sale (%) | 261 | 0 | 86.046 | 50.000 | 80. 000 | 90.000 | 95.000 | 100. 000 |

Table A 32: Distribution of the produce: workers' salaries to be paid in kg

| TOTAL VARIABLE | COUNT | N* | MEAN | MINIMUM | Q1 | MEDIAN | Q3 | MAXIMUM |
|----------------|-------|----|--------|---------|--------|--------|---------|---------|
| WorkSaLKg (%) | 16 | 0 | 7. 938 | 5. 000 | 5. 000 | 6. 000 | 10. 000 | 16. 000 |

Table A 33: Distribution of the produce: gift to friends/other family members

| TOTAL VARIABLE | COUNT | N* | MEAN | MINIMUM | Q1 | MEDIAN | Q3 | MAXIMUM |
|------------------|-------|----|--------|---------|--------|--------|--------|---------|
| GiftoFriends (%) | 120 | 1 | 5. 575 | 1. 000 | 2. 000 | 5. 000 | 9. 500 | 25. 000 |

Table A 34: Sources of the food consumed in the household

| MEANS OF ACQUIRING FOOD | COUNT | PERCENT |
|--|-------|---------|
| Own production | 214 | 81.99 |
| Purchase | 261 | 100.00 |
| Gift from friends/other family members | 36 | 13.79 |

N=261

Table A 35: Sources of the food consumed in the household: own production

| TOTAL VARIABLE | COUNT | N* | MEAN | MINIMUM | Q1 | MEDIAN | Q3 | MAXIMUM |
|----------------|-------|----|-------|---------|------|--------|-------|---------|
| OwnProd (%) | 214 | 0 | 19.73 | 1.00 | 5.00 | 10.00 | 25.00 | 80.00 |

Table A 36: Sources of the food consumed in the household: purchase

| TOTAL VARIABLE | COUNT | N* | MEAN | MINIMUM | Q1 | MEDIAN | Q3 | MAXIMUM |
|----------------|-------|----|-------|---------|-------|--------|-------|---------|
| Purchase (%) | 261 | 0 | 82.56 | 15.00 | 75.00 | 90.00 | 97.00 | 100.00 |

**Table A 37: Sources of the food consumed in the household:
gift from friends/other family members**

| TOTAL VARIABLE | COUNT | N* | MEAN | MINIMUM | Q1 | MEDIAN | Q3 | MAXIMUM |
|-------------------|-------|----|------|---------|------|--------|-------|---------|
| GiftFroFriend (%) | 36 | 0 | 9.08 | 1.00 | 5.00 | 5.00 | 10.00 | 70.00 |

Table A 38: Share of gardeners by the food consumed during a day

| FOOD GROUPS | COUNT | PERCENT |
|---|-------|---------|
| Cereals (wheat, rice, maize, sorghum, millet, etc.) | 234 | 89.66 |
| Roots, tubers, and plantains (Potatoes, sweet potatoes, yams, cocoyams, cassava, etc.) | 105 | 40.23 |
| Pulses, nuts, and seeds (Beans, dry peas, lentils, groundnuts, peanuts, coconuts, cashews, sesame seeds, soybeans) | 136 | 52.11 |
| Vegetables (beets, carrots, leeks, onions, garlic, okra, bean sprouts, beet greens, cabbage, cassava leaves, lettuce, spinach, parsley, sweet potato leaves, tomatoes, cucumbers, eggplant, fresh peppers, mushrooms, local indigenous fruit vegetables) | 217 | 83.14 |
| Fruits (Sweet bananas, oranges, tangerines, grapefruit, lemons, limes, avocados, olives, apples, apricots, berries, cherries, guavas, mangoes, melons, papayas, passion fruit, pears, pineapples, jack fruit, watermelons, grapes, durian, star fruit, local indigenous fruits) | 120 | 45.98 |
| Meats (Beef, pork, goat, mutton, buffalo, rabbit, "wild meat," chicken, duck, goose, pigeon, turkey, Guinea hen, insects) | 77 | 29.50 |
| Fish and seafood (salmon, trout, herring, mackerel, cod, haddock, crawfish, crab, shrimp, oysters) | 203 | 77.78 |
| Milk and dairy products (Liquid milk, powdered milk, cheese, cream, yogurt, ice cream, cheese, curd) | 49 | 18.77 |
| Eggs (Hen eggs, duck eggs, goose eggs, turtle eggs) | 55 | 21.07 |
| Oils and fats (vegetable oils, peanut oil, palm oil, margarine, butter, shea butter, mayonnaise) | 216 | 82.76 |
| Beverages (industrial beers, wines, local beers, fruit juices, soft drinks, coffee, tea) | 88 | 33.72 |
| Miscellaneous (Spices, salt, sugar, honey, syrups, jams, sugarcane, vinegar, ketchup, mustard, chewing gum, chocolate, candy) | 141 | 54.02 |

Table A 39: Balanced meals affordability per year

| C10. HOW OFTEN IN THE LAST 12 MONTHS YOU COULDN'T AFFORD TO EAT BALANCED ⁵ MEALS? | | |
|---|-------|---------|
| C10 | COUNT | PERCENT |
| almost every month | 19 | 7.28 |
| some months but not every month | 81 | 31.03 |
| in only 1 or 2 months | 112 | 42.91 |
| never true for me in the last 12 months | 49 | 18.77 |

N=261

⁵ A balanced meal needs to contain foods from all the main food groups such as dairy products, protein (meats, fish and seafood, eggs, Pulses, nuts, and seeds), fruits, vegetables, grains (bread, cereals, pasta), fats and oils.

Table A 40: Culturally acceptable food affordability in a year

| C11. HOW OFTEN IN THE LAST 12 MONTHS DID YOU EAT FOOD THAT IS LESS PREFERRED BECAUSE YOU COULDN'T AFFORD CULTURALLY ACCEPTABLE FOOD? | | |
|--|-------|---------|
| C11 | COUNT | PERCENT |
| almost every month | 10 | 3.83 |
| some months but not every month | 81 | 31.03 |
| in only 1 or 2 months | 105 | 40.23 |
| never true for me in the last 12 months | 65 | 24.90 |

Table A 41: Food quantity consumed during the year

| C12. HOW OFTEN IN THE LAST 12 MONTHS, DID YOU OR OTHER ADULTS IN THE HOUSEHOLD CUT THE SIZE OF YOUR MEALS OR SKIP MEALS BECAUSE THERE WASN'T ENOUGH FOOD OR MONEY TO BUY FOOD? | | |
|--|-------|---------|
| C12 | COUNT | PERCENT |
| almost every month | 1 | 0.38 |
| some months but not every month | 73 | 27.97 |
| in only 1 or 2 months | 56 | 21.46 |
| never true for me in the last 12 months | 129 | 49.43 |
| Na | 2 | 0.77 |

N=261

Table A 42: Food quantity consumed by children in the year

| C13. HOW OFTEN IN THE LAST 12 MONTHS THE CHILDREN WERE NOT EATING ENOUGH BECAUSE YOU JUST COULDN'T AFFORD ENOUGH FOOD? | | | | |
|--|-------|--------|---------|--------|
| C13 | COUNT | CUMCNT | PERCENT | CUMPCT |
| some months but not every month | 40 | 40 | 15.33 | 15.33 |
| in only 1 or 2 months | 28 | 68 | 10.73 | 26.05 |
| never true for me in the last 12 months | 188 | 256 | 72.03 | 98.08 |
| Na | 5 | 261 | 1.92 | 100.00 |

N=261

Table A 43: Food quality improvement after starting gardening: reasons of no improvement

| C14.1 WHAT ARE THE REASONS THAT GARDENING DID NOT IMPROVE THE QUALITY OF YOUR MEALS? | | |
|--|-------|---------|
| C141 | COUNT | PERCENT |
| no yields for home consumption | 1 | 25.00 |
| I do not grow crops which I consume | 3 | 75.00 |

N=261

Table A 44: Type of organisation

| D1.1 WHAT IS THE TYPE OF ORGANIZATION? | | |
|--|-------|---------|
| D11 | COUNT | PERCENT |
| informal group | 11 | 4.74 |
| cooperative | 219 | 94.40 |
| Na | 2 | 0.86 |

N=232

Table A 45: Members of the organisation

| D1.2 HOW MANY PERSONS ARE MEMBERS OF THE ORGANIZATION? | | | | | | | | |
|--|-------|----|-------|-------------|-------|--------|-------|---------|
| D1.2.1 HOW MANY MEN ARE MEMBERS OF THE ORGANIZATION? | | | | | | | | |
| D1.2.2 HOW MANY WOMEN ARE MEMBERS OF THE ORGANIZATION? | | | | | | | | |
| Variables | Count | N* | Mean | Minimum | Q1 | Median | Q3 | Maximum |
| D12 | 229 | 3 | 73.48 | 6.00 | 12.00 | 42.00 | 60.00 | 400.00 |
| D121 | 226 | 6 | 58.95 | 0.000000000 | 9.00 | 37.00 | 54.00 | 310.00 |
| D122 | 229 | 6 | 14.74 | 0.000000000 | 3.00 | 5.00 | 10.00 | 100.00 |

Table A 46: Membership fees

| D1.3 DO YOU PAY A CONTRIBUTION TO THE ORGANIZATION? | | |
|---|-------|---------|
| D13 | COUNT | PERCENT |
| No | 52 | 22.41 |
| Yes | 179 | 77.16 |
| Na | 1 | 0.43 |

N=232

Table A 47: Membership fees: periodicity

| D1.3.1 WHAT IS THE PERIODICITY OF THE CONTRIBUTIONS? | | |
|--|-------|---------|
| D131 | COUNT | PERCENT |
| bimonthly | 16 | 8.94 |
| daily | 4 | 2.23 |
| four-monthly | 9 | 5.03 |
| half-yearly | 1 | 0.56 |
| monthly | 55 | 30.73 |
| quarterly | 2 | 1.12 |
| weekly | 36 | 20.11 |
| when needed | 10 | 5.59 |
| yearly | 46 | 25.70 |

N=179

Table A 48: Membership fees: paid contribution respectively by month, year and week

| D1.3.2 HOW MUCH CONTRIBUTION DO YOU PAY TO THE GROUP PER PERIOD? | | | | | | | | |
|--|-------|----|-------|---------|-------|--------|-------|---------|
| VARIABLE | COUNT | N* | MEAN | MINIMUM | Q1 | MEDIAN | Q3 | MAXIMUM |
| D132 | 55 | 0 | 1844 | 200 | 1000 | 1500 | 2500 | 10000 |
| D132_1 | 46 | 0 | 2846 | 100 | 2000 | 2000 | 2000 | 12000 |
| D132_2 | 36 | 0 | 438.9 | 100.0 | 500.0 | 500.0 | 500.0 | 500.0 |

Table A 49: Membership fees: purpose of the contribution (first choice)

| D1.3.3 WHAT IS THE CONTRIBUTION FEE FOR? (MORE THAN ONE ANSWER POSSIBLE) | | |
|--|-------|---------|
| D133_8 | COUNT | PERCENT |
| common land lease | 4 | 2.23 |
| common land purchase | 19 | 10.61 |
| purchase of fertilizer | 77 | 43.02 |
| purchase of seeds | 5 | 2.79 |
| purchase of garden equipment | 14 | 7.82 |
| credit to members | 6 | 3.35 |
| social help to members | 22 | 12.29 |
| others | 29 | 16.20 |
| Na | 3 | 1.68 |

N=179

Table A 50: Membership fees: purpose of the contribution (second choice)

| D1.3.3 WHAT IS THE CONTRIBUTION FEE FOR? (MORE THAN ONE ANSWER POSSIBLE) | | |
|--|-------|---------|
| D133_2 | COUNT | PERCENT |
| common land purchase | 4 | 2.23 |
| purchase of fertilizer | 8 | 4.47 |
| purchase of seeds | 65 | 36.31 |
| purchase of garden equipment | 7 | 3.91 |
| credit to members | 9 | 5.03 |
| social help to members | 8 | 4.47 |
| Na | 78 | 43.58 |

N=179

Table A 51: Election of committee

| D1.4.1 IS THE COMMITTEE ELECTED? | | |
|----------------------------------|-------|---------|
| D141 | COUNT | PERCENT |
| No | 115 | 50.22 |
| Yes | 114 | 49.78 |

N=229

Table A 52: Election of committee: formation of committee

| D1.4.2 HOW IS THE COMMITTEE FORMED? | | |
|-------------------------------------|-------|---------|
| D142 | COUNT | PERCENT |
| by the first occupants of the land | 10 | 8.70 |
| by the elders | 20 | 17.39 |
| others | 85 | 73.91 |

N=115

Table A 53: Election of committee: other formation of committee

| D1.4.2 OTHERS | COUNT | PERCENT |
|--------------------|-------|---------|
| Ability to manage | 16 | 18.82 |
| Honesty | 4 | 4.71 |
| Na | 7 | 8.24 |
| Simple designation | 58 | 68.24 |

N=85

Table A 54: Term of the committee

| D1.4.3 DOES THE COMMITTEE HAVE A TERM? | | |
|--|-------|---------|
| D143 | COUNT | PERCENT |
| No | 55 | 24.02 |
| Yes | 174 | 75.98 |

N=229

Table A 55: Acknowledgement of the authority of the cooperative leader/board

| D1.5 DO YOU ACKNOWLEDGE THE AUTHORITY OF THE COOPERATIVE LEADER/BOARD? | | |
|--|-------|---------|
| D143 | COUNT | PERCENT |
| No | 9 | 3.88 |
| Yes | 222 | 95.69 |
| Na | 1 | 0.43 |

N=232

Table A 56: Acknowledgement of board authority: reason of no acknowledgement

| D1.5.1 WHY DON'T YOU ACKNOWLEDGE THE AUTHORITY OF THE COOPERATIVE LEADER/BOARD? | | |
|---|-------|---------|
| D151 | COUNT | PERCENT |
| I don't trust the leader/board | 3 | 33.33 |
| no value addition | 5 | 55.56 |
| Na | 1 | 11.11 |

N=9

Table A 57: Share of the responsibility of common tasks: actual practice

| D1.7 DOES THIS WORK IN PRACTICE? | | |
|----------------------------------|-------|---------|
| D17 | COUNT | PERCENT |
| No | 30 | 12.93 |
| Yes | 195 | 84.05 |
| Na | 7 | 3.02 |

N=232

Table A 58: Existence of a constitution

| D1.8 DOES THE ORGANIZATION HAVE A CONSTITUTION | | |
|--|-------|---------|
| D18 | COUNT | PERCENT |
| No | 3 | 1.29 |
| Yes | 228 | 98.28 |
| Na | 1 | 0.43 |

N=232

Table A 59: Agreement on rules of ownership aspects

| D1.9 IS THERE AN AGREEMENT ON RULES OF OWNERSHIP ASPECTS (INDIVIDUAL PLOTS OR COMMUNAL LANDS/FAIR SHARE OF PROFITS) | | |
|---|-------|---------|
| D19 | COUNT | PERCENT |
| No | 129 | 55.60 |
| Yes | 102 | 43.97 |
| Na | 1 | 0.43 |

N=232

Table A 60: Means of acquisition of the gardening's area: others

| D2. HOW DID YOU GET THE AREA WHERE YOU PRACTICE YOUR GARDEN? | | |
|--|-------|---------|
| D2 OTHERS | COUNT | PERCENT |
| Belongs to a member's parent | 3 | 1.15 |
| Belongs to a private person | 1 | 0.38 |
| Free access without contract | 101 | 38.70 |
| Na | 156 | 59.77 |

N=261

Table A 61: Lease contract: amount paid per month

| D2.1 HOW MUCH CFA PER MONTH DO YOU PAY FOR LEASING THE AREA? | | | | | | | | |
|--|-------|----|-------|---------|------|--------|------|---------|
| TOTAL VARIABLE | COUNT | N* | MEAN | MINIMUM | Q1 | MEDIAN | Q3 | MAXIMUM |
| D21 | 17 | 0 | 12588 | 1000 | 1000 | 4000 | 7000 | 57000 |

Table A 62: Lease contract: duration of the contract in years

| D2.1 HOW MUCH CFA PER MONTH DO YOU PAY FOR LEASING THE AREA? | | | | | | | | |
|--|-------|----|-------|---------|-------|--------|-------|---------|
| VARIABLE | COUNT | N* | MEAN | MINIMUM | Q1 | MEDIAN | Q3 | MAXIMUM |
| D211 | 16 | 1 | 3.563 | 2.000 | 2.000 | 2.000 | 5.000 | 10.000 |

Table A 63: Lease contract: type of contract

| D2.1.2 IS THE CONTRACT WRITTEN OR VERBAL? | | |
|---|-------|---------|
| D212 | COUNT | PERCENT |
| No | 1 | 5.88 |
| Yes | 16 | 94.12 |

N=17

Table A 64: Free access contract: type of owner

| D2.2 WHO GIVES YOU FREE ACCESS? | | |
|---------------------------------|-------|---------|
| D22 | COUNT | PERCENT |
| private person | 16 | 12.31 |
| private institution | 14 | 10.77 |
| public institution | 80 | 61.54 |
| others | 12 | 9.23 |
| Na | 8 | 6.15 |

N=130

Table A 65: Free access contract: type of owner: others

| D22OTHERS | COUNT | PERCENT |
|-------------------------------|-------|---------|
| a public institution (ASECNA) | 11 | 8.46 |
| a public space | 3 | 2.31 |
| Na | 114 | 87.69 |
| Unidentified area | 2 | 1.54 |

N=130

Table A 66: Free access contract: duration of the contract in years

| D2.2.1 FOR HOW LONG IS YOUR FREE ACCESS CONTRACT WITH THE OWNER? (IN YEARS) | | | | | | | | |
|---|-------|-----|-------|---------|------|--------|-------|---------|
| VARIABLE | COUNT | N* | MEAN | MINIMUM | Q1 | MEDIAN | Q3 | MAXIMUM |
| D221 | 17 | 113 | 14.84 | 0.250 | 1.50 | 5.00 | 31.00 | 50.00 |

Table A 67: Free access contract: type of contract

| D2.2.2 IS THE CONTRACT WRITTEN OR VERBAL? | | |
|---|-------|---------|
| D222 OTHERS | COUNT | PERCENT |
| No | 40 | 30.77 |
| Yes | 50 | 38.46 |

| D2.2.2 IS THE CONTRACT WRITTEN OR VERBAL? | | |
|---|-------|---------|
| D222 OTHERS | COUNT | PERCENT |
| Na | 40 | 30.77 |

N=130

Table A 68: Number of years of gardening in the area

| D2.3 FOR HOW LONG ARE YOU WORKING IN THE AREA? (IN YEARS) | | | | | | | | |
|---|-------|----|--------|---------|-------|--------|--------|---------|
| VARIABLE | COUNT | N* | MEAN | MINIMUM | Q1 | MEDIAN | Q3 | MAXIMUM |
| D23 | 190 | 71 | 13.674 | 1.000 | 6.000 | 10.000 | 20.000 | 45.000 |

Table A 69: Method of purchase of inputs: others

| D30OTHERS | COUNT | PERCENT |
|------------------|-------|---------|
| A mix of the two | 5 | 100.00 |

N=5

Table A 70: Joint purchase: satisfaction of gardeners

| D3.1. IS IT WELL ORGANIZED? | | |
|-----------------------------|-------|---------|
| D31 | COUNT | PERCENT |
| No | 5 | 9.43 |
| Yes | 47 | 88.68 |
| Na | 1 | 1.89 |

N=53

Table A 71: Joint purchase: reason of no satisfaction

| D3.1.1 WHAT IS NOT FUNCTIONING? | | |
|---|-------|---------|
| D311 | COUNT | PERCENT |
| the quantity does not suit my need | 2 | 40.00 |
| I don't trust the management team/other members | 1 | 20.00 |
| Na | 2 | 40.00 |

N=5

Table A 72: Individual purchase: satisfaction of gardeners

| D3.2. DOES IT SATISFY YOUR NEEDS? | | |
|-----------------------------------|-------|---------|
| D32 | COUNT | PERCENT |
| No | 51 | 25.50 |
| Yes | 146 | 73.00 |
| Na | 3 | 1.50 |

N=200

Table A 73: Individual purchase: willingness to make a joint purchase

| D3.2.1 WOULD YOU LIKE TO MAKE A JOINT PURCHASE? | | |
|---|-------|---------|
| D321 | COUNT | PERCENT |
| Yes | 49 | 96.08 |
| Na | 2 | 3.92 |

N=51

Table A 74: Organisation of the transport of produce

| D4. HOW DO YOU ORGANIZE THE TRANSPORT OF THE PRODUCE? | | |
|---|-------|---------|
| D31 | COUNT | PERCENT |
| own transport | 67 | 25.67 |
| taxi rental | 6 | 2.30 |
| I sell the produce on farm | 175 | 67.05 |
| others | 13 | 4.98 |

N=261

Table A 75: Organisation of the transport of produce: others

| D4. OTHER | COUNT | PERCENT |
|---------------------------|-------|---------|
| delivery | 3 | 23.08 |
| own transport and on farm | 10 | 76.92 |

N=13

Table A 76: Joint sale: satisfaction of gardeners

| D5.1 IS IT WELL ORGANIZED? | | |
|----------------------------|-------|---------|
| D51 | COUNT | PERCENT |
| No | 4 | 33.33 |
| Yes | 8 | 66.67 |

N=12

Table A 77: Joint sale: reason of no satisfaction

| D5.1.1 WHAT IS NOT FUNCTIONING? | | |
|---|-------|---------|
| D511 | COUNT | PERCENT |
| I don't trust the management team/other members | 1 | 25.00 |
| the period of sale does not correspond to my harvest period | 2 | 50.00 |
| I don't agree with the sale price | 1 | 25.00 |

N=4

Table A 78: Individual sale: satisfaction of gardeners

| D5.2. ARE YOU SATISFIED? | | |
|--------------------------|-------|---------|
| D51 | COUNT | PERCENT |
| No | 33 | 13.69 |
| Yes | 206 | 85.48 |
| Na | 2 | 0.83 |

N=241

Table A 79: Individual sale: willingness to make a joint sale

| D5.2.1 WOULD YOU LIKE TO MAKE A JOINT SALE? | | |
|---|-------|---------|
| D521 | COUNT | PERCENT |
| No | 5 | 15.15 |
| Yes | 28 | 84.85 |

N= 33

Table A 80: Individual sale: reason of no willingness

| D5.2.2 WOULD YOU LIKE TO MAKE A JOINT SALE? | | |
|---|-------|---------|
| D522 | COUNT | PERCENT |
| I don't trust the management team/other members | 1 | 20.00 |
| I don't produce the same thing with the other members | 1 | 20.00 |
| I have more liberty on the price | 2 | 40.00 |
| Others (Avoid quarrels) | 1 | 20.00 |

N= 5

Table A 81: Under contract

| D5.3. WITH WHOM DO YOU HAVE A CONTRACT? | | |
|---|-------|---------|
| D53 | COUNT | PERCENT |
| market man | 1 | 50.00 |
| restaurant/hotel | 1 | 50.00 |
| N= 2 | | |

Table A 82: Under contract: duration

| D5.3.1. FOR HOW LONG IS THE CONTRACT VALID? | | |
|---|-------|---------|
| D531 | COUNT | PERCENT |
| per harvest | 1 | 50.00 |
| Na | 1 | 50.00 |
| N= 2 | | |

Table A 83: Under contract: consequence of no compliance

| D5.3.2. WHAT HAPPENS IF YOU DO NOT COMPLY WITH THE CONTRACT? | | |
|--|-------|---------|
| D532 | COUNT | PERCENT |
| I do not get another contract | 1 | 50.00 |
| nothing | 1 | 50.00 |
| N= 2 | | |

Table A 84: Credit from tontine and family members: reason of this choice

| D6.1. WHY DO YOU GET YOUR CREDIT FROM TONTINE/FAMILY MEMBERS? | | |
|---|-------|---------|
| D61 | COUNT | PERCENT |
| lack of collaterals to get credit from financial institution | 8 | 25.81 |
| low interest rate | 8 | 25.81 |
| less risky | 10 | 32.26 |
| others | 4 | 12.90 |
| Na | 1 | 3.23 |
| N= 31 | | |

Table A 85: Credit from tontine and family members: other reasons of this choice

| D61 OTHERS | COUNT | PERCENT |
|---|-------|---------|
| long procedure in financial institution | 1 | 25.00 |
| no access to formal credit | 3 | 75.00 |
| N= 4 | | |

Table A 86: Mechanism to obtain credit

| D6.2 TO WHOM IS THE CREDIT ASSIGNED? | | |
|--------------------------------------|-------|---------|
| D62 OTHERS | COUNT | PERCENT |
| to a group | 138 | 73.80 |
| to me alone | 38 | 20.32 |
| others | 4 | 2.14 |
| Na | 7 | 3.74 |

N= 187

Table A 87: Mechanism to obtain credit: others

| D62 OTHERS | COUNT | PERCENT |
|----------------------|-------|---------|
| In a group and alone | 4 | 100.00 |

N= 4

Table A 88: Reasons of credit not in a group

| D6.2.1 WHY DON'T YOU TAKE YOUR CREDIT IN A GROUP? | | | | |
|--|-------|---------|-------|--------|
| D621 OTHERS | COUNT | PERCENT | | |
| I don't trust the management team/other members | 7 | 16.67 | | |
| I will not actually get the amount I need | 9 | 21.43 | | |
| I depend on other members before getting another one | 17 | 40.48 | | |
| Other | 5 | 38 | 11.90 | 90.48 |
| Na | 4 | 42 | 9.52 | 100.00 |

N=42

Table A 89: Reasons of credit not in a group: others

| D61 OTHERS | COUNT | PERCENT |
|--|-------|---------|
| I will not actually get the amount I need and depend on other members before getting another one | 2 | 40.00 |
| I don't trust the management team | 1 | 20.00 |
| I don't trust the team | 1 | 20.00 |
| We just started with credit in group | 1 | 20.00 |

N=5

Table A 90: Credit satisfaction

| D6.2.2 DOES THE CREDIT SUIT YOUR NEED? | | |
|--|-------|---------|
| D622 | COUNT | PERCENT |
| No | 104 | 55.61 |
| Yes | 75 | 40.11 |
| Na | 8 | 4.28 |

N= 187

Table A 91: Credit satisfaction: willingness to take it in a group

| D6.2.3 WOULD YOU LIKE TO GET MORE CREDIT IN A GROUP? | | |
|--|-------|---------|
| D623 | COUNT | PERCENT |
| No | 18 | 17.31 |
| Yes | 82 | 78.85 |
| Na | 4 | 3.85 |

N=104

Table A 92: Credit satisfaction: reasons of no willingness to take it in a group

| D6.2.4 WHY DON'T YOU WANT TO TAKE MORE CREDIT IN A GROUP? | | |
|--|-------|---------|
| D624 | COUNT | PERCENT |
| I don't trust anymore the management team/other members | 1 | 5.56 |
| because I depend on other members before getting another one | 14 | 77.78 |
| Others | 3 | 16.67 |

N= 18

Table A 93: Credit satisfaction: other reasons of no willingness to take it in a group

| D624OTHERS | COUNT | PERCENT |
|-----------------------|-------|---------|
| credit not sufficient | 2 | 66.67 |
| high costs for credit | 1 | 33.33 |

N=3

Table A 94: Purpose of the credit: multi-functions

| D63 | COUNT | PERCENT |
|--|-------|---------|
| purchase of fertilizer and purchase of seeds | 1 | 0.67 |
| purchase of fertilizer; purchase of seeds and purchase of pesticides | 53 | 35.57 |
| purchase of fertilizer; purchase of seeds; purchase of pesticides and purchase of garden equipment | 91 | 61.07 |
| purchase of fertilizer; purchase of seeds and purchase of garden equipment | 1 | 0.67 |
| purchase of seeds; purchase of pesticides and purchase of garden equipment | 2 | 1.34 |
| Na | 1 | 0.67 |

N= 149

Table A 95: Flexibility of the purpose

| D6.3.1 ARE YOU ALWAYS FOCUSED ON THE CREDIT PURPOSE? | | |
|--|-------|---------|
| D631 | COUNT | PERCENT |
| No | 43 | 22.99 |
| Yes | 124 | 66.31 |
| Na | 20 | 10.70 |

N= 187

Table A 96: Flexibility of the purpose: reasons of change in purpose

| D632 | COUNT | PERCENT |
|---|-------|---------|
| when unforeseen costs/distress situation appear at home | 40 | 93.02 |
| others | 3 | 6.98 |

N=43

Table A 97: Flexibility of the purpose: other reasons of change in purpose

| D632OTHERS | COUNT | PERCENT |
|------------|-------|---------|
| Na | 1 | 33.33 |
| own needs | 2 | 66.67 |

N=3

Table A 98: Frequency of the situation of change in purpose

| D6.3.3 HOW MANY TIMES DID THIS SITUATION HAPPEN DURING THE LAST YEAR? | | |
|---|-------|---------|
| D633 | COUNT | PERCENT |
| 1 | 12 | 27.91 |
| 2 | 18 | 41.86 |
| 3 | 8 | 18.60 |
| 4 | 1 | 2.33 |
| Many times | 1 | 2.33 |
| Na | 3 | 6.98 |

N=43

Table A 99: Impact of gardening on women empowerment

| E2. DO YOU THINK THAT GARDENING GIVES WOMEN AN ECONOMIC AND SOCIAL ADVANCEMENT? | | |
|---|-------|---------|
| E2 | COUNT | PERCENT |
| No | 2 | 0.77 |
| Yes | 259 | 99.23 |

N=261

Table A 100: Impact of gardening on women empowerment: in practice

| E2.1 HOW DOES THE ECONOMIC AND SOCIAL ADVANCEMENT HAPPEN? | | |
|--|-------|---------|
| REASONS OF ECONOMIC AND SOCIAL ADVANCEMENT | COUNT | PERCENT |
| Extra income enables women to meet their reproductive responsibilities | 255 | 98.46 |
| Extra income enhances a sense of independence and status among women both within the household and in the community | 249 | 96.14 |
| Extra income is a means to capital formation necessary for entering other income generating activities | 240 | 92.66 |
| Gardening is a means for building social capital by way of sharing their produce with friends and neighbors and meeting their obligations to social networks, including self-help groups and religious congregations | 198 | 76.45 |
| Gardening, in an important way, vaults women in the vanguard of decision-making at the household level, enabling them to exercise some control over patterns of household resource use and allocation. | 134 | 51.74 |

N= 259

Table A 101: Combination between gardening and childcare responsibilities

| E3. DO YOU THINK THAT GARDENING BY WOMEN CAN BE COMBINED WITH PROPER PARENTAL CARE FOR THEIR CHILDREN? | | |
|--|-------|---------|
| E3 | COUNT | PERCENT |
| No | 14 | 5.36 |
| Yes | 247 | 94.64 |

N=261

Table A 102: Gardening contribution to economic development

| F2. DO YOU THINK THAT GARDENING CONTRIBUTES TO ECONOMIC DEVELOPMENT? | | |
|--|-------|---------|
| F2 | COUNT | PERCENT |
| No | 2 | 0.77 |
| Yes | 232 | 88.89 |
| Na | 27 | 10.34 |

N=261

Table A 103: Gardeners response if other opportunities emerge

| F3. THOUGH GARDENING REQUIRES TIME, SKILLS, AND EFFORT, WILL YOU STILL GARDEN IF OTHER OPPORTUNITIES (JOB, ETC.) EMERGE FOR YOU? | | |
|--|-------|---------|
| F3 | COUNT | PERCENT |
| No | 57 | 21.84 |
| Yes | 204 | 78.16 |

N=261

Table A 104: Gardening contribution to youth education, development, and employment

| F4. DO YOU THINK THAT GARDENING CONTRIBUTES TO YOUTH EDUCATION, DEVELOPMENT, AND EMPLOYMENT? | | |
|--|-------|---------|
| F4 | COUNT | PERCENT |
| No | 1 | 0.38 |
| Yes | 260 | 99.62 |

N=261

Table A 105: Gardening contribution to the use and preservation of urban open space

| F5. DO YOU THINK THAT GARDENING CONTRIBUTES TO THE USE AND PRESERVATION OF URBAN OPEN SPACE? | | |
|--|-------|---------|
| F5 | COUNT | PERCENT |
| Yes | 261 | 100.00 |

N=261

Table A 106: Gardening contribution to neighbourhood beautification

| F6. DO YOU THINK THAT GARDENING CONTRIBUTES TO NEIGHBORHOOD BEAUTIFICATION? | | |
|---|-------|---------|
| F6 | COUNT | PERCENT |
| No | 2 | 0.77 |
| Yes | 259 | 99.23 |

N=261

Table A 107: Gardening contribution to cultural preservation and expression

| F7. DO YOU THINK THAT GARDENING CONTRIBUTES TO CULTURAL PRESERVATION AND EXPRESSION? | | |
|--|-------|---------|
| F7 | COUNT | PERCENT |
| No | 10 | 3.83 |
| Yes | 251 | 96.17 |

N=261

Table A 108: Gardening contribution to social interactions/cultivation of relationships

| F8. DO YOU THINK THAT GARDENING CONTRIBUTES TO SOCIAL INTERACTIONS/CULTIVATION OF RELATIONSHIPS? | | |
|--|-------|---------|
| F8 | COUNT | PERCENT |
| No | 8 | 3.07 |
| Yes | 253 | 96.93 |

N=261

Table A 109: Gardening contribution to community organizing, empowerment, and mobilization

| F9. DO YOU THINK THAT GARDENING CONTRIBUTES TO COMMUNITY ORGANIZING, EMPOWERMENT, AND MOBILIZATION? | | |
|---|-------|---------|
| F9 | COUNT | PERCENT |
| No | 261 | 100.00 |

N=261

Table A 110: Constraint of land access and tenure insecurity: main reasons

| G1.1 WHAT IS THE MAIN REASON? | | |
|-------------------------------|-------|---------|
| G11 | COUNT | PERCENT |
| land unavailability | 119 | 47.22 |
| difficulty to lease land | 50 | 19.84 |
| lack of policy regulation | 75 | 29.76 |
| others | 8 | 3.17 |

N=252

Table A 111: Constraint of land access and tenure insecurity: other main reasons

| G1 | COUNT | PERCENT |
|---|-------|---------|
| land unavailability; difficulty to lease land and lack of policy regulation | 1 | 12.50 |
| land unavailability and lack of policy regulation | 1 | 12.50 |
| difficulty to lease land and lack of policy regulation | 2 | 25.00 |
| No security with the landlord | 1 | 12.50 |
| space not sufficient | 3 | 37.50 |

N=8

**Table A 112: Constraint of land access and tenure insecurity:
willingness of municipality to solve the problem**

| G1.2 DO YOU THINK THAT THE MUNICIPALITY IS WILLING TO SOLVE THE PROBLEM? | | |
|--|-------|---------|
| G12 | COUNT | PERCENT |
| No | 157 | 62.30 |
| Yes | 93 | 36.90 |
| Na | 2 | 0.79 |

N=252

Table A 113: Constraint of land access and tenure insecurity: possible solutions

| G1.3 HOW DO YOU THINK THAT THE SITUATION CONCERNING LAND TENURE CAN BE IMPROVED? | | |
|--|-------|---------|
| G13 | COUNT | PERCENT |
| enhancement of urban planning mainstreaming zoning | 81 | 32.14 |
| negotiation with public and private institutions for leasing their open spaces for a long period | 51 | 20.24 |
| promotion of intercommunal partnership to avail the cities of big areas for urban agriculture | 98 | 38.89 |
| others | 15 | 5.95 |
| Na | 7 | 2.78 |

N=252

Table A 114: Constraint of land access and tenure insecurity: other possible solutions

| G1.3 HOW DO YOU THINK THAT THE SITUATION CONCERNING LAND TENURE CAN BE IMPROVED? | | |
|--|-------|---------|
| G13 | COUNT | PERCENT |
| enhancement of urban planning mainstreaming zoning, land access and tenure and negotiation with public and private institutions for leasing their open spaces for a long period | 1 | 6.67 |
| enhancement of urban planning mainstreaming zoning, land access and tenure and promotion of intercommunal partnership to avail the cities of big areas for urban agriculture | 7 | 46.67 |
| negotiation with public and private institutions for leasing their open spaces for a long period and promotion of intercommunal partnership to avail the cities of big areas for urban agriculture | 1 | 6.67 |
| Find a big space for gardeners | 6 | 40.00 |

N=15

Table A 115: Constraint of financial capital: main reasons

| G2.1 WHAT IS THE MAIN REASON? | | |
|--|-------|---------|
| G2 | COUNT | PERCENT |
| lack of credit for agricultural activities | 81 | 33.06 |
| lack of collateral to get credit from financial institutions | 59 | 24.08 |
| high interest rate of financial institutions | 70 | 28.57 |
| lack of differed period | 8 | 3.27 |
| Others | 25 | 10.20 |
| Na | 2 | 0.82 |

N=245

Table A 116: Constraint of financial capital: other main reasons

| G2.1 WHAT IS THE MAIN REASON? | | |
|---|-------|---------|
| G2 | COUNT | PERCENT |
| lack of credit for agricultural activities; lack of collateral to get credit from financial institutions and high interest rate of financial institutions | 1 | 4.00 |
| lack of credit for agricultural activities; lack of collateral to get credit from financial institutions and lack of differed period | 5 | 20.00 |
| lack of credit for agricultural activities; high interest rate of financial institutions and lack of differed period | 2 | 8.00 |
| high interest rate of financial institutions and lack of differed period | 1 | 4.00 |
| lack of credit for agricultural activities and lack of differed period | 13 | 52.00 |
| absence of agricultural bank | 1 | 4.00 |
| difficulty to obtain a credit | 2 | 8.00 |

N=25

Table A 117: Constraint of financial capital: possible solutions

| G2.2 HOW DO YOU THINK THAT THE SITUATION CONCERNING LACK OF MONEY CAN BE IMPROVED? | | |
|--|-------|---------|
| G22 | COUNT | PERCENT |
| encouragement of cooperative formation between gardeners to access loans | 56 | 22.86 |
| adaptation of loans access conditions (collaterals and differed period) to the agricultural sector | 103 | 42.04 |
| reduction of the interest rate of financial institutions | 69 | 28.16 |
| others | 16 | 6.53 |
| Na | 1 | 0.41 |

N=245

Table A 118: Constraint of financial capital: other possible solutions

| G22 | COUNT | PERCENT |
|---|-------|---------|
| adaptation of loans access conditions (collaterals and differed period) to the agricultural sector and reduction of the interest rate of financial institutions | 9 | 56.25 |
| creation of an agricultural bank | 6 | 37.50 |
| group surety | 1 | 6.25 |

N=16

Table A 119: Constraint of access to clean and reliable water: main reasons

| G3.1 WHAT IS THE MAIN REASON? | | |
|--|-------|---------|
| G31 | COUNT | PERCENT |
| seasonality in rainfall patterns | 19 | 11.38 |
| wells with polluted shallow water | 25 | 14.97 |
| unavailability of equipment for irrigation | 117 | 70.06 |
| others | 6 | 3.59 |

N=167

Table A 120: Constraint of access to clean and reliable water: other main reasons

| G31 | COUNT | PERCENT |
|--|-------|---------|
| Floods | 1 | 16.67 |
| leaching in rainy season | 1 | 16.67 |
| no control of water | 3 | 50.00 |
| no control of water and leaching in rainy season | 1 | 16.67 |

N=6

Table A 121: Constraint of access to clean and reliable water: possible solutions

| G3.2 HOW DO YOU THINK THAT THE SITUATION CONCERNING LACK OF ACCESS TO CLEAN AND RELIABLE WATER CAN BE IMPROVED? | | |
|---|-------|---------|
| G32 | COUNT | PERCENT |
| support in securing land tenure so that gardeners can make investment in irrigation or water depollution | 1 | 28.74 |
| support in supporting farmers to access loans so that they can afford water equipment | 115 | 68.86 |
| Others | 4 | 2.40 |

N=167

Table A 122: Constraint of access to clean and reliable water: other possible solutions

| G32 OTHERS | COUNT | PERCENT |
|--|-------|---------|
| support in securing land tenure so that gardeners can make investment in irrigation or water depollution and support in supporting farmers to access loans so that they can afford water equipment | 1 | 25.00 |
| by preserving the nature | 3 | 75.00 |
| N=4 | | |

Table A 123: Constraint of high inputs costs: main reasons

| G4.1 WHAT IS THE MAIN REASON? | | |
|------------------------------------|-------|---------|
| G4 OTHERS | COUNT | PERCENT |
| few inputs providers on the market | 75 | 42.37 |
| frequent rupture of inputs | 92 | 51.98 |
| Others | 10 | 5.65 |

N=177

Table A 124: Constraint of high inputs costs: other main reasons

| G41 OTHERS | COUNT | PERCENT |
|---|-------|---------|
| market monopoly by Benin Semence | 1 | 10.00 |
| no governmental grant | 7 | 70.00 |
| not enough money | 1 | 10.00 |
| poor quality of inputs; no governmental grant; and frequent rupture of inputs | 1 | 10.00 |

N=10

Table A 125: Constraint of high inputs costs: possible solutions

| G4.2 HOW DO YOU THINK THAT THE SITUATION CONCERNING HIGH INPUTS COSTS CAN BE IMPROVED? | | |
|--|-------|---------|
| G41 OTHERS | COUNT | PERCENT |
| inputs costs regulation on the market through policy instruments such as customs reduction | 54 | 30.51 |
| enablement of more businesses to enter the industry to reduce the inputs price | 107 | 60.45 |
| Others | 12 | 6.78 |
| Na | 4 | 2.26 |

N=177

Table A 126: Constraint of high inputs costs: other possible solutions

| G42 OTHERS | COUNT | PERCENT |
|---|-------|---------|
| demonopolize the market and install a ginning unit in Benin | 1 | 8.33 |
| governmental grant | 5 | 41.67 |
| governmental grant and accompanying measures | 4 | 33.33 |
| install a ginning unit in Benin | 1 | 8.33 |
| Na | 1 | 8.33 |

N= 12

Table A 127: Constraint of market functioning: main reasons

| G5.1 WHAT IS THE MAIN REASON? | | |
|----------------------------------|-------|---------|
| G51 | COUNT | PERCENT |
| Distance | 7 | 4.02 |
| low prices in general | 128 | 73.56 |
| unreliable relation with brokers | 2 | 1.15 |
| unreliable relation with traders | 15 | 8.62 |
| Others | 21 | 12.07 |
| Na | 1 | 0.57 |

N=174

Table A 128: Constraint of market functioning: other main reasons

| G5.1 WHAT IS THE MAIN REASON? | | |
|---|-------|---------|
| G51 | COUNT | PERCENT |
| lack of clients | 13 | 61.90 |
| lack of contract with hotels, restaurants and consumers | 1 | 4.76 |
| no control of vegetables import | 3 | 14.29 |
| no preference of local produce by clients | 1 | 4.76 |
| price instability | 3 | 14.29 |

N=21

Table A 129: Constraint of market functioning: possible solutions

| G5.2 HOW DO YOU THINK THAT THE FUNCTIONING OF THE MARKET CAN BE IMPROVED MOST EFFICIENTLY? | | |
|--|-------|---------|
| G52 | COUNT | PERCENT |
| avoid fixed arrangements | 40 | 22.99 |
| direct contact with traders | 24 | 13.79 |
| access to markets in other cities | 54 | 31.03 |
| access to export markets | 11 | 6.32 |
| Others | 41 | 23.56 |
| Na | 4 | 2.30 |

N=174

Table A 130: Constraint of market functioning: other possible solutions

| G52 | COUNT | PERCENT |
|---|-------|---------|
| avoid fixed arrangements and access to markets in other cities | 1 | 2.44 |
| direct contact with traders and access to markets in other cities | 1 | 2.44 |
| access to markets in other cities and access to export markets | 3 | 7.32 |
| Avoid vegetables import | 1 | 2.44 |
| direct contract with hotels, restaurants and consumers | 8 | 19.51 |
| Na | 1 | 2.44 |
| price regulation | 12 | 29.27 |
| promoting local consumption | 14 | 34.15 |

N= 41

Table A 131: Constraint of conflict with neighbours: neighbour identification

| G.6.1 WITH WHICH NEIGHBOR DO YOU HAVE CONFLICT? | | |
|---|-------|---------|
| G61 | COUNT | PERCENT |
| neighbors' gardeners | 10 | 76.92 |
| people in immediate outside | 3 | 23.08 |

N=13

Table A 132: Constraint of conflict with neighbours: possible solutions

| G.6.2 HOW DO YOU THINK THAT THE RELATIONSHIP WITH NEIGHBORS COULD BE IMPROVED MOST EFFICIENTLY? | | |
|---|-------|---------|
| G61 | COUNT | PERCENT |
| negotiations | 9 | 69.23 |
| better agreements on use of land/water | 4 | 30.77 |

N=13

Table A 133: Constraint of conflict with neighbours: social organisation level for conflict resolution

| G.6.3 AT WHAT LEVEL OF THE SOCIAL ORGANISATION SHOULD THE IMPROVEMENT OF THE CONFLICT RESOLUTION BE ORGANIZED? | | |
|--|-------|---------|
| G63 | COUNT | PERCENT |
| Management committee board | 9 | 69.23 |
| local authorities | 3 | 23.08 |
| amicably | 1 | 7.69 |

N=13

Table A 134: Constraint of theft and robbery

| G7. DO YOU CONSIDER THEFT AND ROBBERY AS A CONSTRAINT FOR GARDENING? | | |
|--|-------|---------|
| G7 | COUNT | PERCENT |
| No | 168 | 64.37 |
| Yes | 93 | 35.63 |

N=261

Table A 135: Constraint of lack of farming skills: possible solutions

| G8.1 HOW DO YOU THINK THAT THE ACCESS TO EXTENSION SERVICES OR TECHNICAL SUPPORT COULD BE IMPROVED? | | |
|---|-------|---------|
| G81 | COUNT | PERCENT |
| customization of extension services to the needs and comprehension levels of gardeners | 68 | 36.17 |
| development of capacity building programs | 110 | 58.51 |
| Both | 2 | 1.06 |
| Na | 8 | 4.26 |

N=188

Table A 136: Constraint of lack of public authorities' commitment: possible solutions

| G9.1 HOW DO YOU THINK THAT THE PUBLIC AUTHORITIES' COMMITMENT COULD BE IMPROVED? | | |
|--|-------|---------|
| G91 | COUNT | PERCENT |
| legitimation of urban agriculture | 53 | 21.12 |
| financial support for urban agriculture | 180 | 71.71 |
| others | 11 | 4.38 |
| Na | 7 | 2.79 |

N=251

Table A 137: Constraint of lack of public authorities' commitment: other possible solutions

| G91OTHERS | COUNT | PERCENT |
|---|-------|---------|
| legitimation of urban agriculture and financial support for urban agriculture | 9 | 81.82 |
| no intermediary between the government and gardeners | 2 | 18.18 |

N=11

Table A 138: Constraint of labour shortage: possible solutions

| G10.1 HOW DO YOU THINK THAT THE LABOUR SHORTAGE COULD BE ADDRESSED? | | |
|---|-------|---------|
| G101 | COUNT | PERCENT |
| No | 117 | 93.60 |
| Yes | 6 | 4.80 |
| Na | 2 | 1.60 |

N=125

Table A 139: Constraint of labour shortage: other possible solutions

| G101OTHERS | COUNT | PERCENT |
|---|-------|---------|
| autonomation through technical capacity building | 1 | 16.67 |
| raise awareness of youth on benefits of gardening | 5 | 83.33 |

N=6

Table A 140: Constraint of diseases

| G11. DO YOU CONSIDER DISEASES (MALARIA, DIARRHEA, ETC.) AS A CONSTRAINT FOR GARDENING? | | |
|--|-------|---------|
| G9.1 | COUNT | PERCENT |
| No | 101 | 38.70 |
| Yes | 157 | 60.15 |
| Na | 3 | 1.15 |

N=261

Table A 141: Constraints ranking

| G12. COULD YOU RANK THE CONSTRAINTS FOR GARDENING (FROM 1 (MOST IMPORTANT) TO 5 (LEAST IMPORTANT)A)? | | | | | |
|--|-------|-------|-------|-------|-------|
| CONSTRAINT / RANK | 1 | 2 | 3 | 4 | 5 |
| Land access and tenure insecurity | 60.15 | 21.46 | 06.51 | 03.45 | 04.60 |
| Lack of financial capital | 61.69 | 24.90 | 06.13 | 00.77 | 00.38 |
| Lack of access to clean and reliable water | 19.92 | 18.01 | 09.58 | 08.05 | 04.21 |
| High input costs | 11.88 | 21.84 | 16.48 | 09.58 | 04.98 |
| Market functioning | 06.51 | 20.31 | 24.14 | 04.98 | 03.45 |
| Relations with neighbors | 02.68 | 01.92 | 03.07 | 02.30 | 04.60 |
| Theft and robbery | 07.28 | 07.28 | 06.90 | 03.83 | 04.98 |
| lack of farming skills | 13.79 | 15.71 | 20.69 | 12.64 | 06.90 |
| Lack of public authorities' commitment | 24.52 | 21.07 | 25.67 | 14.18 | 03.83 |
| Labour shortage | 08.43 | 11.11 | 08.81 | 08.05 | 08.81 |
| Diseases | 11.49 | 12.64 | 13.79 | 11.11 | 10.73 |

N=261

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