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Dietary Patterns of Urban and Rural Inhabitants of the Kloto 1 Commune in Togo: Potential and Associated Nutritional, Health, and Environmental Risks

Mamy Eklou[1,*], Daphné Menthonnex[1], Yao Adjrah[1], Elom Assinou[3], Esseboè Koffitsè Sewu[2], Fifonsi A. Gbeasor-Komlanvi[4], Didier Koumavi Ekouevi[4], François Blachier[5], Jean-François Huneau[5], Yaovi Ameyapoh[1]

[1]Food microbiology and quality control laboratory (LAMICODA) – School of Biological and Food Techniques (ESTBA)- University of Lomé BP 1515, Lomé (Togo)
[2]African Centre for Research in Public Health and Epidemiology (CARESP) – Lomé (Togo)
[3]Social dynamics and Regional Integration Laboratory (LaDySIR), Sociology Department, Faculty of Human and Social Sciences, University of Lomé, Lomé, Togo.
[4]Department of Public Health, Faculty of Health Sciences - University of Lomé BP 1515, Lomé (Togo)
[5]Paris Institute of Technology for Life, Food and Environmental Sciences (AgroParisTech), Palaiseau (France)
*Corresponding author: eklouenyae@gmail.com

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Abstract This research examines the diets of urban and rural populations in the Kloto 1 commune of Togo, focusing on the localities of Agomé-Kpalimé, Hanyigba Duga, and Hanyigba Todji. The objective is to identify the food categories consumed, their nutritional contributions, and associated health risks. A mixed-methods cross-sectional survey was conducted with 202 heads of household. They were selected using stratified sampling, via a structured questionnaire administered through KoboCollect, supplemented by direct non-participant observation. The data were processed using Excel and then SPSS. The results reveal that the respondents are predominantly women (75,25%). They have low levels of education (84,7%) and are engaged in agricultural (25,25%), artisanal (23,27%), or commercial activities (32,18). The local diet is dominated by plant-based foods, including cereals, tubers, legumes, fruits, and vegetables (rate > 90%). Consumption of animal products (meat, milk, eggs) is very low in the three localities (rate < 10%). Fish remains the main source of protein (70,79%). Cereal-based flour dough is the most consumed carbohydrate-rich food (74,76%), followed by porridge (29.70%). Fats come primarily from fried foods. Disparities between rural and urban areas are evident in food supply methods: self-sufficiency is very high in rural areas (98%), while urban populations are more dependent on markets (from 96.08% to 97.03%). Finally, water quality often sourced from wells (43,07%), rivers (34,67%) is a major public health issue, particularly in rural areas. This study highlights the need to improve dietary diversity, nutrition education, and access to safe drinking water.

Keywords: *Diet, urban environment, rural environment, nutritional status, health*

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1. Introduction

Data on the state of food and nutrition security in the world and in West Africa are often limited to broad generalizations. As a result, information on diets and nutritional status is only partially known in Togo. The causes and manifestations of food and nutrition insecurity are recognized there. However, researchers, decision-makers, and other actors involved in the development of the agri-food sector in this country do not have clear and accurate information on the different local communities in Togo with regard to their levels of food and nutrition insecurity.

Indeed, it is reported that 8.2 percent of the world's population experienced hunger in 2024. Compared to 8.5 percent of people going hungry worldwide in 2023 and 8.7 percent in 2022, this figure has fallen in 2024 [1]. The prevalence of undernourishment has therefore fallen from 7.9 percent (2022) to 6.7 percent (323 million people) in 2024. However, due to food price inflation, several subregions in Africa and West Asia are experiencing the opposite trend. The prevalence of undernourishment

exceeded 20 percent in Africa in 2024.

In West Africa, between March and May 2025 (a period of abundance), approximately 34.5 million people (10.7 percent of the population analyzed) experienced high levels of acute food and nutrition insecurity. It is even estimated that, in the absence of appropriate measures, this figure could reach around 47.4 million people (11.8 percent of the population analyzed) during the lean season (June and August 2025). In the same subregion, the total number of people in food emergency between June and August 2025 increased from 2 million (2024) to 2.1 million (2025) [2].

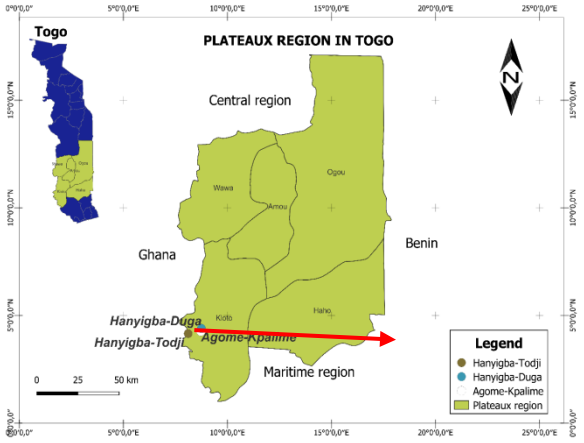
In Togo, between October and December 2024, 0.6 million people, or 10% of the population analyzed, faced high levels of acute food insecurity. According to the Food Security Information Network (FSIN) and the Global Network Against Food Crises (GNAFC), the food insecurity rate in this country has increased by 28%. In 2022, a SMART survey did collect data on malnutrition in the Savanes, Kara, and Maritime regions of Togo. But to date, the same has not been done for the Central or Plateaux regions. Specifically, in the western part of the Plateaux region, a significant lack of reliable data on diets and nutrition is observed in the cantons of Agome Kpalimé and Hanyigba in the Kloto 1 commune of the Kloto prefecture.

However, possessing such data can provide key indicators regarding the food categories that make up the diet of these populations. This can lead to the deduction of the nutritional and scientific composition of the local inhabitants' diet, informing the development of social programs and projects aimed at strengthening food and nutritional security. Given these challenges, this research aims to determine the food categories comprising the diet, the potential, and the nutritional quality of life of the inhabitants of Hanyigba and Agomé Kpalimé in the Kloto 1 commune of the Kloto prefecture (Plateau Region) in Togo. Indeed, this paper will highlight the potential nutrient intake of the targeted populations' diet in terms of carbohydrates, lipids, proteins, vitamins, and minerals. The same will be done to identify nutritional and health risks.

2. Materials and Methods

2.1. Physical Environment of the Research

This research focuses on two cantons within the Kloto 1 commune, a Togolese territorial collectivity in the Kloto prefecture, located in the Plateaux region of Togo. These cantons are Hanyigba (HNY) and Agome-Kpalime (KPA). The Agome-Kpalime canton is located between 6.90° North latitude and 0.63° East longitude. For the purposes of this research, the Hanyigba canton is subdivided into two zones: Hanyigba Todji (6.89° North latitude and 0.56° East longitude); and Hanyigba Duga (6.92° North latitude and 0.56° East longitude). The population of Agome-Kpalime is 87,478 inhabitants: 45,420 women and 42,058 men [3]. In Hanyigba, for both the urban and rural areas, INSEED estimated the population at 4,455 (2,253 women and 2,202 men) in 2022. These cantons, located in the southwest of the Plateau Region, were chosen for the research to compare dietary trends in terms of diets and food categories within the targeted statistical population. Map 1 shows the three localities.



Source: Map developed as part of the research (November 2025)

Figure 1. Map showing KPA and HNY in the Plateaux region of Togo

2.2. Research Techniques and Tools

The research employs a mixed-methods approach, combining a questionnaire survey with participant observation. The administered questionnaire comprised 29 items divided into two components. First, sociodemographic characteristics such as location, age, sex, head of household, ethnic group, education, employment status, and income; second, dietary and health behaviors, including: 1) food source (origin); 2) factors influencing food choices based on motivations; 3) daily food consumption (number); 4) meal times; 5) healthy eating habits; 6) spices used; 7) fats consumed; 8) protein sources (meat, eggs, fish, cheese consumed daily or weekly); and 9) alcohol consumption.

2.3. Sampling

The cantons of Agome Kpalimé (KPA) and Hanyigba (HNY) are the localities targeted by the research. In HNY, the targeted neighborhoods are Hanyigba Duga (HDU) and Hanyigba Todji (HTO). KPA has 87,478 inhabitants; HDU and HTO, which together comprise HNY, have 4,455 inhabitants. This equates to 91,933 residents in targeted area. 202 heads of households were interviewed to determine the composition of their diets. These individuals were selected using a stratified sampling method. The first stratum is KPA and the second is HNY. HNY is composed of sub-strata HDU and HTO. The survey was conducted with a 95% confidence level and a margin of error of ± 6.9%. The following formula is used to calculate the sample size, considering that it is first a finite population.

$$n_0 = \frac{t^2 * p(1-p)}{m^2} = \frac{1,96^2 * 0,5 * 0,5}{0,069^2}$$

$$= \frac{3,8416 * 0,25}{0,069^2} = 201,7 \approx 202$$

t = 1.96 for 95 % confidence level
m=0.069 ^{2}
p=0.5

N=91933

Sample size correction (n) for the finite population N = 91,933

Second formula: $$n = \frac{n_0}{1+\frac{(n_0-1)}{N}} = \frac{202}{1+\frac{(202-1)}{91933}}$$

$$= \frac{202}{1+0,00219} = \frac{202}{1,00219} = 201,6 \approx 202$$

For stratified sampling, the sampling design effect (*def*) is ≤1.

Therefore, taking the maximum value of *deff, (1)*, n remains equal to 202. Given that there were no missing responses due to the questionnaire configuration, which consisted solely of mandatory questions, the number of respondents also did not vary according to the non-response rate. The 202 respondents are distributed between the two targeted districts as follows: 101 (50%) in the urban locality (KPA) and 50% (101) in the rural locality (HNY).

2.4. Data Collection and Processing

The data were collected by three strictly gender-balanced teams, each composed of two interviewers. Data collection took place over 21 days, including Saturdays and Sundays. The principles of anonymity and confidentiality were respected. All respondents completed the questionnaires with their consent. The tools are designed similarly to a Food Frequency Questionnaire (FFA). This questionnaire was administered via the KoboToolbox platform using the KoboCollect application. The collected data was downloaded and cleaned in Excel before being exported to SPSS software to extract the desired trends. Data collection was carried out in two stages. A preliminary survey was conducted to refine the questionnaire's quality. This was followed by the main data collection phase. A database was created, presenting food raw materials and recipes according to their commercial value. Food groups were classified into cereals, tubers and roots, legumes, nuts and seeds, vegetables and herbs, fruits, meat and eggs, fish and seafood, dairy products, fats and oils, processed foods, and beverages. Secondly, sociodemographic characteristics and food consumption frequency, focusing on practices over the past 30 days, were explored through a descriptive cross-sectional survey conducted with the communities involved.

3. Results

3.1. Sociodemographic Characteristics of the Participants

A total of 202 respondents from Kpalimé (KPA), Hanyigba Duga (HDU), and Hanyigba Todji (HTO) fully answered the questions posed to them. Complete sociodemographic details are presented in Table 1. This result explains the sociocultural attribution of the role of "food manager" to women within households in this area: Men comprise 24.75% of the sample, while women represent 75.25%. The respondents are largely Adja-Ewe (89.60%), indicating an environment where traditions, endogenous practices, and tendencies toward innovation may be weak. This interpretation is reinforced by the fact that the respondents have low levels of education: 42.08% have completed primary school, 41.09% secondary school, while 10.89% have no formal education. As for their professional activity, nearly a third (25.25%) mentioned agriculture/livestock farming, while 32.18% are engaged in commercial activities and 23.27% in crafts. This implies that 80.7% of respondents are employed. This is further demonstrated by the observed age groups. Indeed, 10.89% of respondents are retired (over 60 years old). It follows that of the 89.11% of respondents who should be employed (aged between 18 and 59), 9% are without income-generating activities. These figures are almost identical to the percentage of people who declared themselves unemployed at the time of data collection (19.31: 10.89% retirees and approximately 9% unemployed who could be considered employed).

The respondents are therefore a predominantly female population, largely of working age. This population is also young, but with low levels of education, and is involved in agriculture, crafts, and trade (Table 1). Given these profiles, what foodstuffs are produced, sold, and/or consumed in HTO, HDU, and KPA?

Table 1. Sociodemographic characteristics of respondents

FEATURES	Frequency (percentage) [n (%)]	FEATURES	Frequency (percentage) [n (%)]
Locality		*Ethnicity*	
- Kpalimé	101 (50.00)	- Adja / Ewe	181 (89.60)
- Hanyigba Duga	51 (25.25)	- Kabye	12 (05.94)
- Hanyigba Todji	50 (24.75)	- Mina	4 (01.98)
		- Foreigners	5 (02.48)
Age range			
- [18 - 24]	23 (11.39)	*Education level (years)*	
- [25 - 39]	31 (15.35)	- Illiterate	22 (10.89)
- [40 - 49]	84 (41.58)	- 1 – 6	85 (42.08)
- [50 - 59]	42 (20.79)	- 7 – 10	83 (41.09)
- [60 - more than]	22 (10.89)	- > 10	12 (05.94)
Gender		*Employment status*	
- Male	50 (24.75)	- No work	39 (19.31)
- Female	152 (75.25)	- Trade	65 (32.18)
		- Agriculture/ reproduction	51 (25.25)
Housekeeping management		- Craftsmanship	47 (23.27)
- Male	99 (49.01)		
- Female	103 (50.99)		

Source: Data collected during the research (December 2022)

3.2. Kpalime and Hanyigba: a Reflection of a Food pyramid Without Meat, Milk and Eggs

The data collected showed that in the cantons of Hanyigba (HDU, DTO) and Kpalimé, the population relies more on food from agriculture than from livestock. The respondents' statements recorded in Table 2 show that, within the food pyramid, the following types of food are

most readily available (grown and/or purchased): cereals, starchy plants, legumes, vegetables, fruits, and aromatic spices. Meat products, milk, eggs, and fish are almost entirely absent. These findings depend on the categories and levels of food production in the different areas studied. They are further confirmed by the rates of food sources other than meat, fish, and eggs (cereals, starchy plants, legumes, fruits, and vegetables) in rural areas (HTO) and urban areas (HDU and KPA). The data in Table 3 allow for a comparison.

Table 2. Types of food consumed and their level of access through self-production and/or purchase in KPA, HDU and HTO

CEREALS	
Rice	*Oryza sativa* (Poaceae)
But	*Zea mays* (Poaceae)
Sorghum	*Bicolored sorghum* (Poaceae)
Mil	*Pennisetum glaucum* (Poaceae)
Fonio	*Digitaria exilis* (Poaceae)
wheat flour	*Triticum* (Poaceae)
ROOTS AND TUBERS	
sweet potato	*Dioscorea sp.* (Dioscoreaceae)
Potato	*Tuberous Solanum* (Solanaceae)
Sweet potato	*Ipomoea bats* (Cuscutaceae)
Cassava	*Manihot esculenta* (Euphorbiaceae)
Macabo	*Xanthosoma sagittifolium* (Araceae)
Taro	*Colocasia esculenta* (Araceae)
FRUITS	
Pineapple	*Ananas comosus* (Bromoliaceae)
Apple	*Malus domestica* (Rosaceae)
Banana	*Musa acuminata* (Musaceae)
Plantain	*Musa parasidiaca* (Musaceae)
Lemon	*Lemon citrus* (Rutaceae)
Grapefruit	*Citrus paradisi* (Rutaceae)
Orange	*Citrus sinensis L.* (Rutaceae)
Coconut	*Cocos nucifera L.* (Arecaceae)
Papaya	*Carica papaya* (Caricaceae)
mango	*Mangifera indica* (Anacardiaceae)
Yellow melon	*Canary Island melon* (Cucurbitaceae)

VEGETABLES	
African eggplant	*Solanum aethiopicum* (Solanaceae)
Okra	*Abelmoschus esculentus* L. Moench) (Malvaceae)
Carrot	*Daucus carotta* L. subsp sativus (Hoffm.) Thell. (Umbelliferous)
Cabbage	*Brassica oleracea* (Brassicaceae)
Cucumber	*Cucumis sativus* (Cucurbitaceae)
Lettuce	*Lactuca sativa* L. (Asteraceae)
Tomato	*Lycopercicum esculentus* Mill. (Solanaceae)
Green pepper	*Capsicum annuum* (Solanaceae)
Bean	*Vina anguiculata* (Fabaceae)
Moringa	*Oil-bearing Moringa* (Moringaceae)
LEGUMES AND NUTS	
Crow	*Cornus officinalis* (Cornaceae)
Bambara peas	*Underground vine* (Fabaceae)
Soy	*Glycine max* (Fabaceae)
Carmel palm	*Eleis guineensis* (Araceae)
Peanut	*Hypogeous arachis* (Fabaceae)
SPICES AND AROMATICS	
Onion	*Allium cepa* L. var. Cepa (Liliaceae)
Garlic	*Allium sativumL.* (Amaryllidaceae)
Parsley	*Petroselinum crispum* (Apiaceae)
Leafy berry	*Laurus nobilis* (Lauraceae)
Mint	*Spearmint* (Lamiaceae)
Rosemary	*Rosmarinus officinalis L.* (Lamiaceae)
Thyme	*Common thyme* (Lamiaceae)
chili pepper	*Capsicum esculentus*; *pepper frutescens* L.; Scotch Bonnet *pepper chinense; Capsicum annuum*; *pepper annuum* L. cv
Clove	*Syzygium aromaticum* (Myrtaceae)
Nutmeg	*Myristica parfums* (Myristicaceae)
Green anise	*Pimpinella anisum L.* (Apiaceae)
Ginger	*Zingiber officinale Roscoe* (Zingiberaceae)

Source: Data collected during the research (December 2022)

Table 3 highlights the reality that Kpalimé (KPA) and Hanyigba Duga (HDU), the most urbanized targeted localities, are consumers rather than producers when compared to Hanyigba Todji (HTO), the most rural area. Table 3 shows that, aside from meat products, fish, eggs, and water, cereals, tubers, legumes, vegetables, and fruits are more frequently purchased at markets and shops. However, regarding purchasing methods, respondents from KPA (50.50%) and HDU (54.90%) purchase their food from shops more often than those from HTO (44%). The same is true for purchasing food at the market (KPA=97.03%; HDU=96.08%; HTO=84%). Conversely, the opposite trend is observed regarding self-production: residents of HTO consume 98% of the cereals, tubers, vegetables, and fruits they produce, while those of KPA and HDU do so only 40.59% and 62.75%, respectively. Thus, the closer one gets to the city, the lower the consumption of home-grown food becomes in households.

Regarding the purchase of eggs, fish, and meat, respondents in the targeted localities obtain their supplies at the same rates: between 98.00% and 99.01%. However, the presence of modern commercial infrastructure in the towns shows that in KPA, these products are significantly more accessible in shops (80.20%) than in HTO (38.00%). But in terms of self-production, even for meat, eggs, and fish, the rural locality (HTO=42%) still outperforms the urban ones (HDU=23.53% and KPA=30.69%). The availability of modern infrastructure adapted to needs, as well as the availability of public or private drinking water services, is another aspect of the results that highlights the disparities observed between the urbanized localities (HDU, KPA) and the rural one (HTO). Indeed, for drinking water, wells are the most frequently used source of supply in the targeted localities (43.07%). However, this traditional infrastructure is more accessible in urbanized areas (HDU=54.46% and KPA=58.52%) than

in rural areas (HTO=0.40%). Well water use is followed by the use of water supply facilities operated by the Togolese Water Company (TdE), accounting for 35.64% of the total for the research localities. This service is more readily available in the two most urbanized areas (KPA=64.36%; HDU=11.76%) than in rural areas. River water is the third most used water source in the three targeted localities, but it is used much less in KPA (0.99%) than in HDU (9.80%) and HTO (10.00%): the closer one gets to the city, the more modern water infrastructure is available, and the less people seek drinking water from the river. Boreholes are the fourth most accessible water source for the respondents, but these water structures are less common in urban areas (HDU=9.80; KPA=0.198) than in rural areas (HTO=28%). In short, tap and well water are consumed more in the two urbanized areas than in the rural area, while river and borehole water are consumed less. In light of the above, the next point in the presentation of results focuses on how the trends observed regarding food availability and accessibility in research settings relate to the diets of the targeted populations.

Table 3. Sources of food supply at KPA, HDU and HTO

ANALYSIS VARIABLES	COMMUNITIES			
	Frequency and percentage [n (%)]			
	Kpalimé (n=101)	Hanyigba Duga (n=51)	Hanyigba Todji (n=50)	All (n=202)
Sources of food supply other than meat, fish and eggs				
Walk	98 (97.03)	49 (96.08)	42 (84.00)	189 (93.56)
Shop	51 (50.50)	28 (54.90)	22 (44.00)	101 (50.00)
Self-production	41 (40.59)	32 (62.75)	49 (98.00)	122 (60.40)
Others	03 (02.97)	05 (09.80)	00 (00,00)	08 (03.96)
Sources of supply for meat, fish and eggs				
Walk	100 (99.01)	50 (98.04)	49 (98.00)	199 (98.51)
Shop	81 (80.20)	31 (6.78)	19 (38.00)	131 (64.85)
Self-production	31 (30.69)	12 (23.53)	21 (42.00)	64 (31.68)
Others	01 (00.99)	03 (05.88)	04 (08.00)	08 (03.96)
Sources of drinking water supply				
Water tap	65 (64.36)	06 (11.76)	01 (02.00)	72 (35.64)
Drilling	02 (01.98)	05 (09.80)	14 (28.00)	21 (10.40)
Bottle/sachet	07 (06.93)	06 (11.76)	00 (00,00)	13 (06.44)
Well	55 (54.46)	30 (58.82)	02 (04.00)	87 (43.07)
River	01 (00.99)	27 (52.94)	42 (84.00)	70 (34.65)
Rainwater,	00 (00,00)	05 (09.80)	05 (10.00)	10 (04.95)

Source: Data collected during the research (December 2022)

3.3. Food groups Consumed and Nutrient Intake

While differences in food sources are observed between rural (HTO), urban (KPA) and semi-urban (HDU) areas, similar differences exist regarding the respondents' diets. Table 4 shows that, dinner (Din) is generally the most important meal consumed by 96.53% of respondents, while breakfast (PD) is eaten by 90.10% and lunch (Dej) by 74.75%. This dietary preference, although common to all three locations, is more pronounced in rural (HTO) areas, where PD is consumed by 100% of respondents, compared to 90.20% in HDU and 85.15% in KPA. This implies that as one flees and approaches urban areas (KPA and HDU) while moving away from the village of HTO, the PD's hold weakens.

Based on Table 4, by examining the overall dietary composition of these three meals and their nutritional potential, we can also observe general trends with differences depending on the type of food. The presentation categorizes foods according to their propensity to contribute more nutrients, either carbohydrates, lipids, or proteins. The consumption of different types of beverages, including water, was also taken into account.

The most carbohydrate-rich food consumed by respondents is dough made from unfermented corn flour (62.38%) or other cereals very high in starch, a complex carbohydrate. However, it is consumed more in rural areas (HTO=78.00%) than in urban areas (KPA=59.41; HDU=52.94). Dough is followed by porridge, consumed by 29.70% of respondents. Porridge is consumed more in KPA (30.69%) and HDU (31.37%) than in HTO (26.00%), the rural area. Porridge is known to be eaten as a breakfast food. If it is consumed as a breakfast food by only 29.70% of respondents, while breakfast food is consumed by 90.10%, this implies that in all targeted locations, some respondents eat dough for breakfast to start their workday. The most consumed carbohydrate-rich foods after porridge are fruits (16.34%). This fruit consumption rate is significantly lower than the average (50%). However, it appears that those living in rural areas (HTO=22.00%) eat more fruit than those living in KPA (12.87%) and HTO (17.65%). Okra, a vegetable very rich in complex carbohydrates (fiber), is the next most consumed food. Okra is often made with a sauce to accompany the porridge made from cereal flours. Fritters and fermented dough are consumed at the same rate (12.38%), but in smaller quantities. It should be noted that bread is often eaten with porridge. This implies that even though 29.70% of respondents eat porridge, fritters consumed by only 12.38%, are not always eaten as a side dish. The same applies to bread, which is consumed at only 8.91%.

The most consumed fatty foods in the three localities are French fries (24.26%): the trend being almost the same, the difference in consumption rate between rural and urban areas is small, varying between 2.24% and 2.47%. Oils are used in only 13.86% of cases across the three localities.

Fish is the most consumed protein source by the respondents, with an overall rate of 70.79% and a significant difference between 14.67% and 15.33%, favoring rural areas (HTO = 82%) and urban areas (HDU = 66.67% and KPA = 67.33%). Vegetables are the second most common source of protein for residents of the research areas, consuming 30.20% of their food. However, urban residents of KPA (33.66%) and HDU (33.33%) consume more vegetables than rural residents of HTO (20.00%). Livestock meat (primarily poultry), hunting

meat and eggs are consumed in very small quantities: they appear in the diets of the targeted population at 8.42%, 3.47%, and 2.48%, respectively. Dairy products, such as wangash made from cow's milk, are rarely consumed in the three localities (0.99%). The insignificant consumption of hot beverages, often associated with commercially produced milk, confirms the near absence of dairy products in the diets of the respondents. However, wine is found to be consumed very rarely (1.49%). Drinking water is reported by all individuals surveyed in the three localities (100%), but the frequency and daily quantity consumed remain difficult to determine. It is important to note, however, that well and river water, which is consumed much more frequently in rural than urban areas, as shown in Table 3, can be a source of various microorganisms that can contaminate food handling and be toxic to the population. The rural areas studied are not exempt from this challenge, as the inhabitants drink more well water than tap water from the TDE (Togolaise des Eaux).

Table 4. Diet and nutrient intake

	COMMUNITIES			
FEATURES	**Frequency and percentage [n (%)]**			
	Kpalimé (n=101)	**Hanyigba Duga (n=51)**	**Hanyigba Todji (n=50)**	**All (n=202)**
Respondents' food intake during the four weeks preceding data collection				
Breakfast	86 (85.15)	46 (90.20)	50 (100.00)	182 (90.10)
Lunch	74 (73.27)	39 (76,47)	38 (76.00)	151 (74.75)
Dinner	97 (96.04)	48 (94.12)	50 (100.00)	195 (96.53)
The foods that make up the diet are classified according to their nutrient content.				
Foods that are sources of carbohydrates				
Semolina	6 (5.94)	2 (3.92)	2 (4.00)	10 (4.95)
Fermented dough (fermented cereal flours)	14 (13.86)	9 (17.65)	2 (4.00)	25 (12.38)
Simple dough (cereal flours)	60 (59.41)	27 (52.94)	39 (78.00)	126 (62.38)
Pasta (Spaghetti)	5 (4.95)	5 (9.80)	2 (4.00)	12 (5.94)
Porridge	31 (30.69)	16 (31,37)	13 (26.00)	60 (29.70)
Bread	11 (10.89)	2 (3.92)	5 (10.00)	18 (8.91)
Doughnut	12 (11.88)	5 (9.80)	8 (16.00)	25 (12.38)
Cakes	2 (1.98)	1 (1.96)	0 (0.00)	3 (1.49)
Fruit	13 (12.87)	9 (17.65)	11 (22.00)	33 (16,34)
Okra	14 (13.86)	4 (7.84)	9 (18.00)	27 (13,37)
Juice	11 (10.89)	3 (5.88)	2 (4.00)	16 (7.92)
Fatty foods				
Peanuts	2 (1.98)	0 (0.00)	1 (2.00)	3 (1.49)
French Fries	24 (23.76)	12 (23.53)	13 (26.00)	49 (24,26)
Oil	14 (13.86)	6 (11.76)	8 (16.00)	28 (13.86)
Foods that are sources of protein				
Farmed meats	12 (11.88)	2 (3.92)	3 (6.00)	17 (8.42)
Eggs	2 (1.98)	2 (3.92)	1 (2.00)	5 (2.48)
Wangache	2 (1.98)	0 (0.00)	0 (0.00)	2 (0.99)
Hunting meat	3 (2.97)	2 (3.92)	2 (4.00)	7 (3.47)
Fish	68 (67.33)	34 (66,67)	41 (82.00)	143 (70.79)
Crustaceans	0 (0.00)	0 (0.00)	1 (2.00)	1 (0.50)
Other fish	2 (1.98)	1 (1.96)	1 (2.00)	4 (1.98)
Leaves (vegetables)	34 (33.66)	17 (33,33)	10 (20.00)	61 (30,20)
Beverage consumption				
Hot drinks	3(5,9)	6 (11.80)	5 (05.00)	14 (06.93)
Wine	0 (00,00)	0 (00,00)	3 (03.00)	3 (01.49)
Strong drink	4 (07.80)	51 (100.00)	4 (04.00)	59 (29,21)
Water	50 (98.00)	51 (100.00)	101 (100.00)	202 (100.00)
Alcohol consumption				
Number of consumers	58 (57.43)	30 (58.82)	35 (70.00)	123 (60.89)

Source: Data collected during the research (December 2022)

4. Discussion

This study on the diets of urban and rural inhabitants of the Kloto 1 commune highlights nutritional dynamics closely linked to geographical, socioeconomic, and cultural inequalities. Overall, the results show that supply patterns, types of food consumed, and nutritional intake differ markedly between urban (KPA, HDU) and rural (HTO) areas. This discussion puts these trends into perspective and explores their nutritional, health, and environmental implications.

Sociocultural disparities and nutritional implications

The high proportion of women among respondents (75.25%) confirms their central role in the preparation, management, and transmission of food practices. The low

level of education observed, especially in rural areas, is a limiting factor in the adoption of optimal nutritional behaviors. This educational deficit can hinder the introduction of diverse foods and reinforce habits that are sometimes detrimental to a balanced diet [4]. The predominantly agricultural or artisanal nature of rural occupations reinforces dependence on local production. Conversely, in urbanized areas, increased market reliance exposes households to price fluctuations, limiting access to certain products, particularly animal-based proteins.

Differentiated sourcing: a major determinant of diet

Residents of HTO produce up to 98% of their own plant-based food, while urban populations significantly reduce this self-production. This increased dependence on the urban market makes urban households more vulnerable to supply and price fluctuations. The near absence of meat, milk, and eggs in the three areas raises significant nutritional concerns, particularly regarding the intake of high-biological-value proteins and key micronutrients [5]. These concerns include nutritional deficiencies related to iron, zinc, calcium, and vitamins A and B [6,7].

Water quality and health risks

Wells are the primary source of water, but HTO residents rely more heavily on river and borehole water, both potentially contaminated sources. Since water is used to prepare the majority of food, poor microbiological quality can promote diarrheal and parasitic diseases, directly impacting food safety [8]. Similar research on this issue was recently conducted in China [9].

Food consumption: nutritional intake and limits

Carbohydrates constitute the bulk of the diet, primarily in the form of cornmeal porridge, porridge, and fruit. This predominance offers energy benefits but becomes problematic in the absence of varied animal proteins. Fish is the main source of protein (70.79%). The low consumption of meat, eggs, and dairy products limits nutritional diversity and exposes individuals to the risk of micronutrient deficiencies [10,11]. Lipid intake remains low, which could limit the intake of essential fatty acids.

Environmental implications and sustainability

The observed diets rely heavily on local plant production, which reduces the ecological footprint. However, the limited diversity of animal protein sources indicates a lack of sustainable livestock infrastructure. Urban areas generate a larger ecological footprint related to the transport and processing of products, while rural areas are subject to seasonal variations that impact the availability of fruits and vegetables.

5. Conclusion

This study of diets in Kloto prefecture highlights complex nutritional dynamics influenced by cultural habits, socio-economic constraints, and food availability. The findings show that, despite apparent dietary diversity, imbalances persist, particularly regarding the intake of essential micronutrients. These nutritional deficiencies, when prolonged, can have significant health consequences, especially for vulnerable groups such as children, pregnant women, and the elderly. The analysis of the diets of the studied population underscores the need for concerted actions to improve overall nutritional quality. This includes interventions focused on dietary diversification, promoting the consumption of nutrient-rich foods, and strengthening nutrition education within communities. Furthermore, the results emphasize the importance of local strategies to enhance the availability and accessibility of nutritious foods, particularly through agricultural development, the promotion of local products, and reduced reliance on imported processed foods. Ultimately, this work contributes to a better understanding of nutritional determinants in the Kloto region and provides a solid foundation for guiding public policies, community health programs, and future research. A multidimensional approach, integrating nutrition, economics, agriculture, and sociology, appears essential to ensure a sustainable improvement in the nutritional well-being of the population. The research offers a clear picture of local dietary practices but remains limited by the lack of precise quantitative data on consumption levels. However, it paves the way for interventions such as: dietary diversification; improved water quality; the promotion of sustainable family livestock farming; the enhancement of local products.

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Conflict of Interest

The authors of this document declare that it is not the subject of any disagreement related to differences in personal or collective benefits.

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