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Understanding Coastal Residents' Perception on Urban Green Spaces in Benin, West Africa

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Abstract: Urban green spaces have several benefits for humans and environment as ecosystem services that are neglected and underestimated in developing countries. This study was undertaken to assess the importance of UGS to citizens' communities, evaluate threats to their viability, and identify participatory strategies locally applicable for urban green space viability in three cities (Ouidah, Cotonou and Porto-Novo) of Benin. Surveys were conducted with a questionnaire and 360 respondents were selected from three cities. Data were analyzed belonging to socioeconomic variables such as age, gender, and educational levels. Chi-square test, correlations through corrplot packages, and Principal Component Analysis were also performed under R software. Results reveal six services: shading, air pollutants absorption, aesthetics, recreation, medicinal uses, and economic benefit. However, communities also consider urban green spaces as dumping waste, mosquito lodges, and threats to roads and buildings cracking with roots. These benefits and disturbances differed significantly between the three cities ($\chi^2 = 110.65$; $p < 0.001$) and three categories of interviewees ($\chi^2 = 25.32$; $p = 0.004$). Urban green spaces are also illegally cut, debarked, pruned, topped, and rooted. Otherwise, communities' willingness to participate in urban green management varies belonging to gender. Therefore, urban green spaces play an important socioeconomic role for surrounding communities and it's urgent to ensure the viability of these ecosystems.

Keywords: Conservation, Citizens' Perception, Participatory Planning, Socioeconomic Effect, Urban Green Space, Urban Management Policy

1. Introduction

Urban Green Spaces (UGS) have several benefits for humans and environment as ecosystem services. Recent studies reveal multiple contributions of UGS to global warming mitigation and rapid world population growth [1, 2]. In addition to environmental services, such as air quality improvement [3-5], energy consumption and runoff volume reduction [6], urban forests contribute to enhancing the quality of life [7], ensure the physiological, sociological and economic well-being of urban communities [8, 9]. For Morris (2003), green space provides physical and psychological services [10]. They are playing important roles in mitigating the harmful effects and reducing domestic energy consumption [11-13] in this context of high vulnerability to climate change [14]. Despite these numerous benefits and important roles in the mitigation of climate change, UGS is often disregarded because their ecosystem services are underestimated and neglected in developing countries. Demographic pressure and insufficient integration of vegetation in the design of infrastructure and buildings are leading causes of urban heat island effects [15]. Other factors

such as geographical location, scale, city size, and the thermophysical properties of materials also contribute to these climatic variations in cities [16].

Benin, like other west African countries, has high urbanization and requires efficient planning of urban resources and facilities. The mean annual rate of urbanization is currently estimated at 2.7%, and about 44% of the national population is living in cities [17]. Projections estimated this urban population to reach 56.2% of the nation by 2025 [18]. The consequences of such rapid urbanization trends are environmental problems as well as the strengthening of climate change effects leading during the last decade to an increase in interest regarding the assessment of how UGS can contribute to mitigating global warming. The considerable relevance of green spaces, alignment trees, lawns, public gardens, amusement parks as well as isolated trees in human life, is no longer to be demonstrated.

At the same time when the population's demand for space for urbanization and development of facilities is increasing, the expansion of UGS remains urgent for mitigating of harmful effects of climate change through the sequestration of greenhouse gases. In fact, there has been an increase in temperature in the targeted cities of Ouidah, Cotonou, and Porto-Novo [19, 20]. The goal is to take efficient advantage of the cooling and other functions that green spaces can provide to the population in order to reduce the pressure on non-renewable energy sources. All this requires a better understanding of green spaces. Until now, only a few studies were carried out with regard to local perception of UGS services and disservices in Benin. In this country, there is a lack of knowledge on UGS threat identification and awareness of local communities, communal planers, and office bearers about the roles and benefits of urban green.

This study was undertaken to assess the importance of UGS to citizens' communities, evaluate threats to urban green spaces viability, and identify participatory strategies locally applicable for UGS viability in three cities of Benin.

In this context, it was hypothesized that sex, age, and educational level are crucial to their due commitment to participatory management and conservation of UGS in the coastal areas of Benin. The problematic of this research adheres to the Beninese government's action plan for the management and development of urban areas, which emphasized urban planning and nature conservation as real challenges for land use planners.

2. Materials and Methods

2.1. Study Area and Field Sites

The study was carried out in three cities (Ouidah Cotonou and Porto-Novo) in the coastal zone of Benin. These cities (Figure 1) are located in the Gulf of Guinea in West Africa between 1° 50' and 2° 40' East longitude and 6° 20' and 6° 40' North latitude. It measures 553 km^2, representing 0.5% of the total area of Benin.

The coastal area of Benin falls in a sub-equatorial climate. The mean annual rainfall is from 820 to 1300 mm and the temperature ranges from 31.5 to 33°C. In the urban centers, there are natural vegetation islands, roadside trees, trees around residences, vegetation growing on vacant land, shrubs, and grass cover. These ecosystems are exploited by local communities for different purposes [21]. In the study area, only 4.24% of the population is over the age of 60 (Table 1). According to the census conducted by INSAE. (2013), the population density was 8595 inhabitants/km², 2403 inhabitants/km², and 252 inhabitants/km², relatively in Cotonou, Porto-Novo, and Ouidah [22]. In the urban centers, economic activities are trading, urban agriculture, fisheries, animal breeding, and processing of agricultural products.

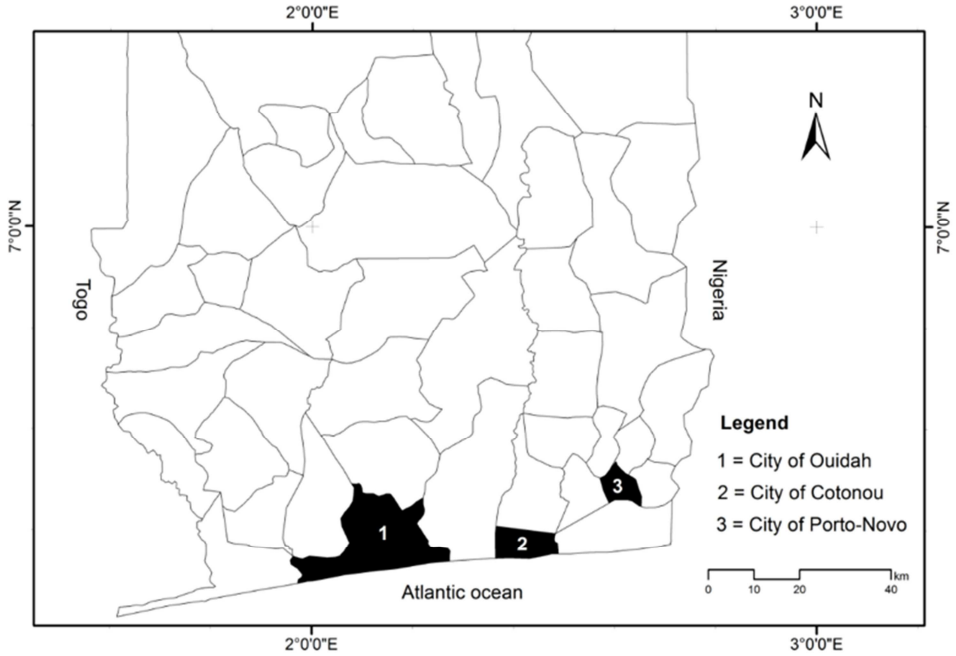

Figure 1. *Study area.*

Table 1. *Distribution of the population of the coastal by gender and age.*

	Men		Women		15–59 years old		+60 years old	
	N	%	N	%	N	%	N	%
Porto-Novo	126 016	47.68	138 304	52.32	144 009	54.48	13 784	5.21
Cotonou	325 872	47.99	353 140	52.01	397 916	58.60	26 986	3.97
Ouidah	78 596	48.51	83 438	51.49	83 054	51.26	7 297	4.50
Total of Benin	4 887 820	48.84	5 120 929	51.16	4 897 099	48.93	442 112	4.42

Source: INSAE (2013).

2.2. Data Collection

Data were collected from selected urban residents in the three targeted cities (Ouidah, Cotonou, and Porto-Novo) through individual interviews. Cotonou represents the economic capital of Benin, Porto Novo is the political capital, and Ouidah is a historic city. In these cities, green spaces have been implemented several years ago by the local municipality. Otherwise, three types of respondents were interviewed to evaluate the local perception of UGS as well as their relevance for local communities because they are most in the surrounding of green spaces and are able to give answers. Respondents' types were: (1) users inside or around the main public UGS of the cities (motorcycle taxi drivers, street sellers, and merchants); (2) households' persons with private green space inside, and (3) key informants from the public administration (foresters, local authorities, municipal and communal officials) and non-governmental organizations responsible for environmental conservation and UGS management. Non-random sampling was used based on three previous specific target groups of the population.

The sample size was determined using the following formula [23]:

$$n = P_i(1 - P_i)t^2_{1-\alpha/2}/d^2 \quad (1)$$

Pi (92%) was obtained from an exploratory survey carried out in the three cities on 50 people. It represents the proportion of people who know at least three (03) green spaces in the given city, $t_{1-\alpha/2}$ = 1.96, normal random variable value for a risk α of 0.05. The expected margin of error d for all sampling is 2%. The sample size (n) is approximately equal to 360 persons. However, without statistics on specific target groups of the population in the 3 districts, the number of residents interviewed was divided equally per district (120 respondents, 60 women and 60 men from six ethnic groups) and per type of respondents (40 users, 40 household persons, and 40 key informants).

A structured interview with a questionnaire was conducted to explore the perceptions of urban residents. Questions were about UGS uses, threats to their viability, prerequisites and desired participation forms in UGS management. For each benefit (use category), the respondents assign three modalities which were low, moderate, or high. The following information was reported on each respondent; gender, profession, educational levels, economic purchase power, and ethnic groups.

2.3. Data Analysis

The frequency of the citation of each service (positive) and disservice (negative) was calculated per city and type of interviewees (users, households and key informants). The disservices were used in this study to better understand how stakeholders perceive ecosystems [24]. Therefore, it is important to understand the disaffection of UGS and the arguments expressed by citizens. The statistical differences of perception between cities and interviewees were performed with a chi-square test. According to its importance, respondents assigned spontaneously three modalities (low, moderate and high) to each use category. Thus, the modalities ranged from 1 to 3 (1 = low importance of the use; 2 = moderate importance of the use, and 3 = high importance of the use).

The score values of urban green space services and disservices were analyzed according to each gender type, age class, and education level group following [25]:

$$UV_p = (1/n_c)\sum_{i=1}^{n_c} S_i \quad (2)$$

Where Si represents the score given by the informant for a given use category (p) of the urban green, n_c is the number of informants in each gender type, age class, and education level group.

The overall use value (OUV) of the urban green was computed with the following formula:

$$OUV = \sum_{p=1}^{j} UV_p \quad (3)$$

Where j represents the amount of urban green spaces services and disservices.

The statistical differences in the use values of the given services and disservices between the gender types, age classes, and education level groups were analyzed using non-parametric tests (Mann—Whitney and Kruskal—Wallis) because data didn't meet the normal distribution using software R3.4.2 [26].

In addition, a correlation test was performed between the threats to urban green spaces viability using the R corrplot package [27]. The endogenous strategies for urban green spaces viability, conservation/restoration, and participation forms were analyzed considering gender, age class, education level group, interviewee categories, and location. Groups were defined based on respondent's sex, men (M) and women (W), and age classes (1) young (age <30); (2) adults (30 ≤ age <60); and (3) elderly persons (age ≥ 60) [28] in each education level

group (none, primary, secondary and higher). Six groups were obtained per education level group: young men (M1); adult men (M2); old men (M3); younger women (W1); adult women (W2) and old women (W3) constituting 24 subgroups in total with the four education level groups. The subgroups are labeled by succeeding the education level groups prefix (N for none, P for primary, S for secondary, and H for higher) with the label of one of the six groups defined above. For example, while the adult man from the higher education level group is labeled M2H, young women from the primary education level group is labeled W1P. Therefore, for each subgroup, the relative frequency of respondents who mention each proposed lock management and endogenous participation forms for urban green spaces viability were estimated.

The obtained data matrix comprising the different relative frequencies of the endogenous participation forms according to the 24 subgroups was used in R3.4.2 (package FactoMineR: https://r-project.org) to perform a Principal Component Analysis (PCA) in which interviewee types and locations were simply used as illustrative variables. This statistical method was applied to find out possible links between the proposed endogenous participation forms with regard to the different socio-demographic characteristics of the respondents.

3. Results

3.1. Uses of the Urban Green Spaces by the Citizen Communities

The citizen residents of the coastal area of Benin have good knowledge on the Urban Green Spaces (UGS) and recognized the uses well (Figure 2).

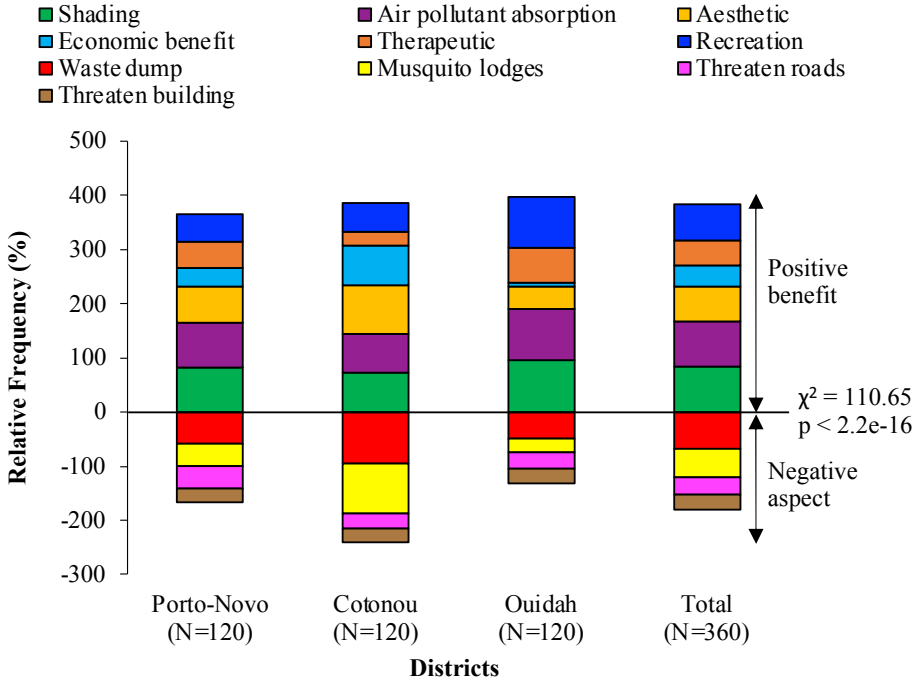

Figure 2. *Urban green services and disservices in the coastal area of Benin.*

The respondents reported that UGS provides especially six services (positive benefits) as shading (83.3%), air pollutants absorption (83.3%), aesthetics (65.5%), site of recreation (65.2%), medicinal uses or therapeutic (46.6%) and economic benefit (38.6%). Four disservices (negatives benefits) are identified and only 20% of respondents do not perceive the negative aspect of urban green. In fact, the UGS were used like waste dumps (67.7%), constituted mosquito lodges (53.3%), threatened/destroy roads (32.2%), and buildings (26.1%). Significant differences were reported between the cities ($\chi^2 = 110.65$; $p < 0.000$) (Figure 2). Most residents of the district of Ouidah reported shade of trees (95%), absorption of air pollutants (95%), recreational role (93.3%) and medicinal uses (65%). For Cotonou inhabitants, aesthetic (90%), economic benefit (72.5%), shading (72.5%), and air pollutant absorption (72.5%) were stated as the most important benefits. And Porto-Novo inhabitants declared mainly shading (82.5%) and air pollutants absorption (82.5%). At the same time in the three cities, the UGS was transformed into a waste dump (95% in Cotonou; 59.1% in Porto-Novo, and 49.1% in Ouidah) representing the most negative aspect identified by the local communities. In consequence, these sites become mosquito lodges (92.5% in Cotonou; 41.1% in Porto-Novo, and 25.8% in Ouidah).

Furthermore, the Chi-square test differed significantly difference was revealed on the use values of the UGS between interviewees ($\chi^2 = 25.32$. $p = 0.004$) (Figure 3).

Most of the users around public and private (household) urban green recognized shading value (respectively 90% and 85.8%), air pollutant absorption (75% and 93.3%), and recreational role (67.5% and 63.3%) like the best contribution of the UGS. According to them, UGS serves as a waste dump

(respectively 52.5% and 76.6%) and generates mosquito lodges (55% and 45.8%). However, key informants identified mainly almost all the services of the UGS.

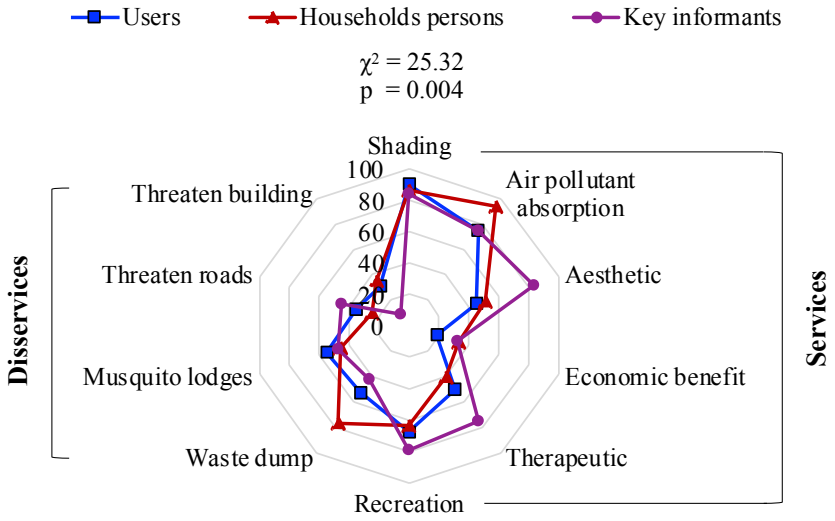

Figure 3. *Urban green services and disservices according to the interviewee.*

3.2. Urban Green Spaces Services and Disservices According to Gender, Age Classes, and Education Level

According to gender, urban green spaces use values differed significantly ($p < 0.05$) for seven services and disservices (Table 1). Among them, five positive benefits (shading, air pollutants absorption, aesthetics, site of recreation, economic benefit) and two negative aspects (waste dump and mosquito lodges) were identified. These services and disservices were strongly perceived by men except for economic benefit, waste dumps, and mosquito lodges which are more revealed by women. The vicinity of UGS is principally used by women for economic activities developing. Otherwise, it was observed that the three-age classes appreciate the UGS in a different ($p < 0.05$) way regarding the services (shading, air pollutants absorption, aesthetics, site of recreation) and disservices (waste dump, mosquito lodges, threatened roads and buildings). While the older people are assigned high importance for shading, air pollutants absorption, and waste dump, adult people opined high value for aesthetic and recreation services of UGS, and young people attribute the most value to recreation service and threaten roads and building disservices (Table 2). Regarding the education level, it was observed that there exist significant differences ($p < 0.05$) for the services and disservices of aesthetic, medicinal uses, recreation, waste dump and threaten building. While those with university degrees take more advantage of UGS for aesthetic and medicinal purposes, those with secondary levels accorded the most importance to the recreation use category. According to those with primary level, UGS is more transformed in waste dump and illiterates supported that UGS threaten building.

Table 2. *Urban green use value according to gender, age categories and education level.*

	Gender			**Age**				**Education level**				
	Men	**Women**	**p**	**Young**	**Adult**	**Elder**	**p**	**Higher**	**Secondary**	**Primary**	**None**	**p**
Services												
Shading	1.88	1.5	<0.000***	1.75	1.69	1.90	<0.000***	1.55	1.74	1.30	0.75	0.767
Air pollutant absorption	1.91	1.52	<0.000***	1.75	1.73	1.95	<0.000***	1.62	1.75	1.30	0.75	0.743
Aesthetic	1.22	1.09	0.000***	1.10	1.21	1.00	0.000***	1.41	1.04	0.57	0.28	0.000***
Economic benefit	0.53	0.63	0.016*	0.67	0.58	0.27	0.052	0.47	0.60	0.36	0.08	0.064
Therapeutic	1.18	0.86	0.130	0.76	1.16	1.00	0.130	1.30	0.82	0.42	0.36	0.000***
Recreation	1.55	1.11	0.001**	1.38	1.38	1.27	<0.000***	1.33	1.39	0.87	0.44	0.041*
OUV	8.27	6.71		7.41	7.75	7.39		7.68	7.34	4.82	2.66	
Disservices												
Waste dump	1.11	1.33	<0.000***	1.08	1.21	1.47	<0.000***	1.01	1.28	1.36	1.13	<0.000***
Mosquito lodges	0.72	1.03	<0.000***	0.95	0.84	0.53	0.003**	0.87	0.84	0.85	0.77	0.046*
Threat to roads	0.77	0.53	0.785	0.77	0.65	0.53	0.041*	0.85	0.52	0.64	0.67	0.271
Threat to buildings	0.54	0.51	0.301	0.68	0.48	0.53	0.021*	0.4	0.62	0.45	0.77	0.004**
OUV	3.14	3.4		3.48	3.18	3.06		3.13	3.26	3.3	3.34	

3.3. Threats to Urban Green Spaces' Viability

In this study, the main threats to the urban green spaces' viability in the coastal areas of Benin (Figure 4) mentioned by the local communities were illegal logging (69.5%), pruning (27.6%), topping (27.6%), debarking (20%), root harvesting (12.4%) and use as firewood (6.7%).

In addition, pruning and topping were negatively correlated with roots harvesting, firewood use and debarking (Figure 4). It means that mostly the local communities did not simultaneously mention these threats. However, pruning and topping were logically positively correlated with illegal logging. It was the same with debarking and root harvesting.

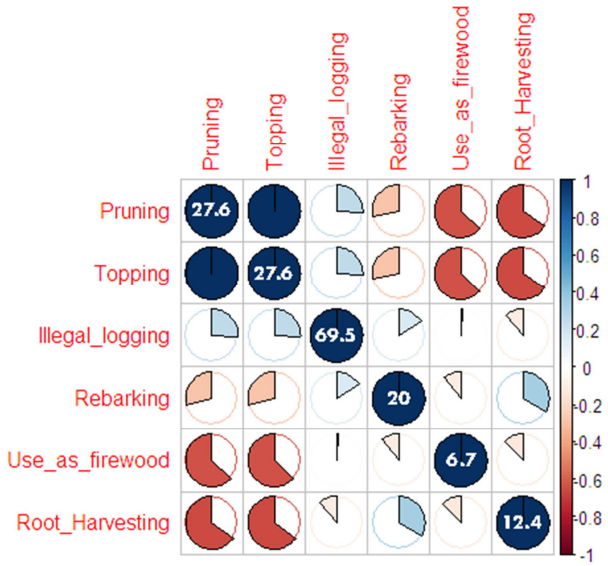

Figure 4. *Correlations between threats to urban green spaces viability in the coastal area of Benin. The percentages in the diagonal do not add to 100 because the same respondents reported sometimes several (various) threats and the percentages were calculated for each threat taking into account the proportion of respondents fitting out of others.*

3.4. Management Strategies of Urban Green Spaces

The Principal Component Analysis (PCA) performed on the citation frequencies per subgroup of the local participative management of urban green spaces showed that the first two axes explained 82.46% (66.59% for axis 1 and 15.87% for axis 2) of the total variation. To describe the relationship between the socio-demographic characteristics of the respondents and the UGS management strategies, only these axes were chosen (Figure 5). The first axis is positively correlated with all lock management and the local participation form in the UGS management except financial involvement which is correlated with the second axis. While the users along the streets of Cotonou identified the environmental issues as the main impact on UGS viability, public authorities of Ouidah mentioned weak financial investment and UGS unprotecting. However, households provided with private green space in Porto-Novo just indicated that UGS management is the role of the Mayors' office. Regarding the proposed local participation actions, public authorities of Ouidah agreed with physical involvement and household persons of Porto-Novo's responsible Mayor's office. As result, the lack of management and the local participation form in the UGS management varied according to coastal residents' statute.

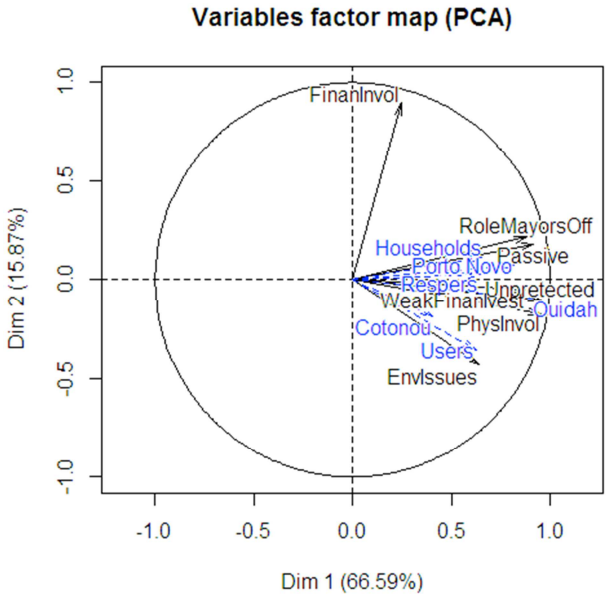

Figure 5. *Correlation between proposed participation strategies, lock management, and PCA axes. FinanInvol: financial involvement; PhysInvol: physical involvement; RoleMayorsOff: role of mayor's office; WeakFinanInvest: weak financial investment; EnvIssues: Environmental issues.*

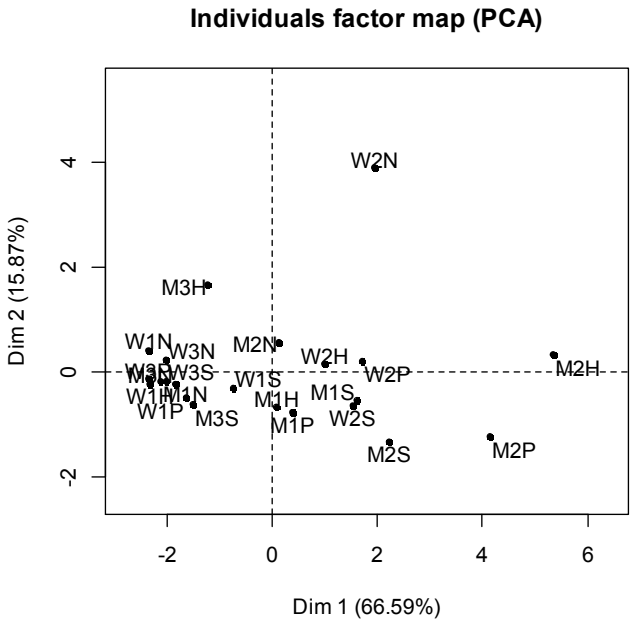

Figure 6. *Projection of subgroups in the factorial plan of PCA.*

The projection of the different subgroups in the PCA plot (Figure 6) showed that subgroups identified different lock management and proposed various local participation actions for the UGS management. In general, the subgroups of adult men with a university degree and adult men with a primary

level perceived most of the management strategies. Illiterate adult women are the subgroups that mostly suggested financial support. In consequence, gender type and age of urban residents influenced the proposed participation strategies clearly in the UGS management. However, education levels did not play a role in the proposed strategies for urban green viability and restoration/conservation.

4. Discussion

4.1. Urban Green Space Services and Disadvantages

4.1.1. UGS Services and Socioeconomic Parameters

Several studies conducted on urban centers have shown that green spaces provide multiple benefits for the city's residents. In fact, trees in urban areas were associated with a better quality of life [29], enhanced human well-being and thermal comfort [30, 31], improve the quality of the living environment, and ensure ecological and landscape benefits. They also provide soothing virtues. Beauty, shade, and freshness in the surrounding environment remove CO_2 from the atmosphere through the process of photosynthesis, renew the oxygen of the air [4, 5] and regulate the hygrometry [13]. However, few studies have focused on the extent to which urban citizens understand and appreciate such benefits [32].

In this study, it was observed that six urban green services (shading [83.3%], air pollutants absorption [83.3%], aesthetics [65.5%], site of recreation [65.2%], medicinal or therapeutic uses [46.6%] and economic benefit [38.6%]) identified by citizens' communities of Benin have major significance on their perceptions and differ significantly between the cities and the interviewees' types. Most of the residents in the cities of Ouidah and Porto-Novo benefit more from the shade of trees and absorption of air pollutants because UGS in these areas are mainly characterized by street trees and natural forests which are limited to tiny patches, so-called sacred forests. However, in the city of Szeged, microclimate regulation and air purification services supplied by the urban green spaces seemed to have only minor significance on visitors' perceptions [33]. Cotonou is provided with landscaped spaces where only aesthetic value is most appreciated. Furthermore, the economic benefit identified in Cotonou is explained by the extent of economic activities that are developing in the vicinity of green spaces. For that same reason, most of the users along the streets and household persons recognized shading and air pollutant absorption as the best contribution of the UGS. In other cities, UGS plays further roles. For instance, green spaces were widely perceived as an intrinsic element of people's lives in the East Midlands, and the UK [34]. In Amsterdam, various positive feelings (freedom, happiness, and unity with nature) were associated with UGS [35]. Contact with nature reduces stress, restores vision, and eases tensions related to life in urban centers [36, 37].

According to gender, age, and education level, urban green spaces use values differed significantly for services. Five services (shading, air pollutants absorption, aesthetics, site of recreation, and economic benefit) were strongly perceived by men except for economic benefit which is more revealed by women. It makes sense because, in the vicinity of UGS, women develop their economic activities. While the older people assigned high importance to ecological benefits (shading and air pollutants absorption), adults and young people associated with secondary level opined high value for sociological benefits (aesthetic and recreation). In fact, in Benin, adults and young people used UGS as a place of relaxation and rest [8, 9].

4.1.2. UGS Disservices

On the other hand, independent of age and location, women users along the streets and households with primary levels have shown that UGS serves as a waste dump and generates mosquito lodges. Most of the users along the streets were merchants and motorcycle taxi drivers who, through acts of incivility, generate waste dumps which subsequently become mosquito lodges. In addition, the lack of an effective waste collection system has caused some stores and households that generate a lot of waste through their activities to dump this waste in public places. As a result, there has been an increase in the prevalence of malaria in surrounding communities, particularly among children under five years of age and pregnant women. Malaria remains endemic and becomes perennial throughout the year in most areas, especially in urban centers [38-41]. A recent study in Benin indicated that 20.8% of women have at least 1 microscopic malaria infection during the first trimester of pregnancy [42]. This problem deserves special attention to ensure the well-being of the citizen's communities.

According to the citizen's communities, UGS threat buildings and streets. This would be justified by the proximity of trees to buildings. In the urban centers of the three cities, some species selected for alignment plantings have a large root system that causes cracks in the asphalt and paved streets. Likewise, in other cities, several kinds of research showed significant differences in the attitude toward negative UGS impacts. In Finland, Tyrvaïnen (2001) showed that many residents expressed no negative effects (66% in Salo and 46% in Joensuu) [43]. But in Guangzhou, only 14.8% of the residents stated no negative impacts [44]. In this study, 20% of respondents revealed no negative effects. It could imply that, in comparison with the urban centers of Benin. In coastal West Africa, urban green spaces were more misunderstood than in Finland but more appreciated than in Guangzhou. In Finland, the attraction of antisocial people, security, maintenance costs, shading, organic litter, and falling branches were the main negative impacts [43, 45]. The links between the perception of negative concerns and the socioeconomic parameters of respondents were statistically not significant.

4.2. Urban Green Spaces Threats to Viability

Urban green spaces in developing countries of West Africa like Benin include natural areas, street trees, the trees around residences, vegetation growing on vacant land, shrubs, and ground cover. Urban centers have grown apart from nature

and urban green is disregarded. As result, there is an erosion of vegetation cover caused by urban sprawl, soil waterproofing, and mismanagement of urban spaces [46]. Previous research revealed that per capita vegetation cover was estimated at about 1m² [47]. This value is very low and represents one-tenth of FAO's recommendation (between 10 and 15 m²) [48]. Normally, an urban green cover of fewer than 10 m^2 per capita can reinforce the harmful effects of climate change and increase cardiovascular diseases for urban inhabitants [8, 49]. Beninese urban inhabitants suffer from heart diseases, and lack of psychological and economic well-being resulting from low levels of vegetation cover. In addition, no study has been carried out in Benin to estimate the urban vegetation cover based on aerial images. Consequently, no statistical data about urban land occupation is available.

Urban green in the cities of Benin is highly subject to pruning and debarking by local people for various purposes [13]. Likewise, this study identified illegal logging (69.5%), topping (29.6%), root harvesting (12.4%), and trees exploited like firewood (6.6%). Due to this unsustainable use, urban trees were frail and sickly, and die from myriad causes including disease, insect attack, drought, uprooting, and catastrophic stem failure due to strong winds or from combinations of factors working together. In the coastal areas of Benin, the main species which is subject to exploitation (pruning, debarking, and root harvesting) is Khaya senegalensis as a remedy for about 40 diseases. For this purpose, *K. senegalensis* is harvested by surrounding citizens to cure their diseases. In fact, it's demonstrated that the bark of this plant is a healing gynecological affection [50, 51]. It is also facing a high pressure of pruning exerted on the species to feed for home livestock through the leaves. However, this harvest pattern could compromise the viability and regeneration of this species. Therefore, a trade-off should be seriously envisioned between the functions of tree species, the social status of neighborhood communities, and their knowledge regarding the virtues the species carries. This approach should help design and implement an effective management plan for urban centers.

4.3. Participatory and Sustainable Management of Urban Green Spaces in Benin

Over the years, endogenous communities around the world have developed a uniquely close connection with the environment—lands and waters in their vicinity for their livelihoods [52]. These connections have established various ways of exploiting resources, particularly from urban green spaces. As a result of the pressure exerted, urban green space ecosystems are currently disregarded and require long-term and participatory suitable protection strategy. To ensure the viability of these ecosystems, residents held different views according to their socio-demographic characteristics and locations. In this study area, public authorities in charge of the environmental management of Ouidah have proposed physical involvement through taking care of green spaces and vacant buildings. Financial support was also mentioned as a relevant approach by residents but is not directly linked with the types of interviewees or locations. Recent research has shown that basically local participation of residents is also required to manage their surrounding environment [53, 54]. Until now, the participation of the local community in environmental issues has been highlighted because of the realization of the necessity to involve all of the stakeholders in the conception of a suitable approach to solving environmental and human problems [52]. Because human activities intended to improve the socioeconomic well-being of communities continue to induce environmental degradation [55].

5. Conclusion

This study explores residents' perceptions of urban green spaces with reference to key socioeconomic variables such as sex, age, and educational level in the urban centers of Benin. It came out, with six positive (shading, air pollutants absorption, aesthetics, recreation, medicinal uses, or therapeutic and economic benefits) and four incivilities or negative uses (waste dump, mosquito lodges, threatened roads, and buildings). These benefits and disturbances differed significantly between the three cities and types of interviewees. Urban green spaces were also subject to unsustainable exploitation which consisted of illegal logging, debarking, pruning, topping, and root harvesting of *K. Senegalensis*. The latter was the most pruned and debarked because local communities use it as a remedy for a large number of human diseases and affections. This indicated the lack of care and effort from local authorities to manage green spaces which jeopardizes the viability of urban green in the coastal areas of Benin. This study also allowed concluding that urban green plays important socioeconomic roles for surrounding communities. Therefore, it will be very important to set up a management policy to reduce threats to the viability and sustainability of urban green spaces. For this purpose, citizens proposed their physical and economic involvement in urban green protection and conservation. This study outcome could be a prerequisite for the development of an adequate, user-oriented, and socially inclusive program that is responsive to citizen expectations and could fulfill sustainable urban centers greening needs. Future work on this topic could assess the many other benefits of green space in urban areas, especially the contribution of private and public green spaces to the reduction of domestic energy consumption in the main cities of Benin.

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