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Urban Vegetalization: The Attitude of Martinique's Population to This New Trend

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Abstract

The greening of cities has become an essential response to contemporary environmental challenges, notably climate change, the loss of biodiversity and the deterioration in the quality of urban life. This phenomenon translates into the introduction of nature into urban spaces in various forms (green roofs, green walls, parks, shared gardens, etc.). In Martinique, this approach has begun to be integrated into urban policies, although the local population may have varied perceptions and expectations on this subject. This article examines the attitude of the Martinican population towards urban greening, taking into account perceived benefits, identified challenges, as well as potential cultural or socio-economic constraints. The results reveal a high level of support, opening up the possibility of establishing a new social dynamic within neighborhoods. They constitute a valuable resource for better understanding how this trend is perceived and how it can be adapted to local specificities. This study refers to data collected in my Master 2 thesis in Environmental Management at the University of the West Indies in Martinique during the year 2023-2024.

Keywords

Martinique, Lesser Antilles, Urban Vegetalization, Community Engagement, Island Ecosystem

1. Introduction

Faced with global ecological challenges, cities around the world are striving to implement solutions to mitigate the adverse impacts of increasing urbanization [1]. Urban greening, which involves integrating more nature into urban spaces, has become a strategic response to combat heat islands, air pollution and biodiversity loss [2]. The integration of ecological concepts into society relies on the interac-

tion between science, public policy, social norms and individual behavior, in the knowledge that scientific knowledge, influenced by social, economic and cultural contexts, is not an absolute truth. Environmental science, while seeking to provide facts, is often shaped by ideological and political issues. Public policies, while integrating these ecological concepts, are often the result of compromises between scientific knowledge and economic or social interests, creating tensions between environmental protection and economic development needs [3].

On an international scale, cities such as Berlin, New York and Singapore, with their "garden city" project, have already initiated urban greening projects with promising results, promoting not only the environment, but also the well-being of residents [4] [5]. Urban vegetation helps to reduce stress and induce a sense of inner peace. Forest environments help restore directed attention, often exhausted by the demands of urban life [6] [7]. Attention Restoration Theory (ART) suggests that natural settings offer "gentle" stimuli that captivate without requiring intense cognitive effort, allowing the brain to rest and regenerate [8].

In Martinique, as in other islands of the Lesser Antilles, this trend is part of a broader drive to promote sustainable urban development [9]. Although revegetation is gaining momentum, it comes up against local specificities, such as the fragility of island biodiversity and the need for shared governance between local authorities and the population [10] [11].

Implementing revegetation projects requires a degree of community commitment and acceptance on the part of residents, who may have varying opinions on the benefits and costs associated with these initiatives [12]. Thus, understanding the population's attitude towards revegetation is essential to the success of these projects, particularly in island territories marked by rapid urbanization and tourist pressure [13]. Although the literature on citizens' attitudes to revegetation is constantly evolving, few studies have examined how Martinicans perceive the revegetation of their urban environment. As a reminder, citizens' perceptions and willingness to adopt greening projects vary according to cultural, social and economic factors. Acceptance of urban green spaces is closely linked to the benefits perceived by residents, such as aesthetic improvements, noise reduction or the creation of sociable spaces. It is therefore crucial to adapt public policies to encourage more inclusive and equitable participation in these greening projects [14].

Participatory management initiatives are mainly concentrated in neighborhoods with a medium to high standard of living, with a notable presence in the most affluent areas. Lower-income neighborhoods are less represented, suggesting the emergence of environmental inequalities. The administrative procedures imposed by the municipality can act as a social filter, excluding populations less familiar with these processes. Only the involvement of intermediary associations enables low-income groups to become involved in shared gardens. On the other hand, street gardening remains a practice concentrated in neighborhoods with a privileged socio-economic profile. In Martinique, socio-spatial inequalities in access to and participation in participatory urban greening schemes, as in Lyon, may

highlight the need to adapt public policies to encourage more inclusive participation [15].

This study focuses on the Martiniquan population's perception of this trend: how do residents perceive urban greening, and what are their expectations of these projects? The challenge is to identify the levers that can be used to encourage public support, while respecting local particularities.

In this article, we begin with a review of greening initiatives at scale in Martinique, before looking at the perceptions of the Martinican population through an empirical study. Finally, we will analyze the factors likely to reinforce the acceptance of these projects by the population and ensure their sustainability.

2. Hardware

2.1. Study Location

Figure 1 shows that Martinique is an island in the Caribbean, more precisely in the Lesser Antilles archipelago [16]. It boasts exceptional biodiversity, making it one of the world's hotspots [10]. This ecological paradise is renowned for its diversity of vegetation, and especially for its tropical forests, mangroves and botanical gardens [17].

Figure 1. Location of Martinique on the Lesser Antilles arc [18].

Martinique is administratively divided into 34 communes, spread across the entire territory of the island according to Figure 2.

The vegetation and bioclimates of Martinique are strongly influenced by altitude and proximity to the sea. The island is divided into several bioclimates, with each zone having its own particular characteristics depending on climatic and geographical conditions.

Figure 2. Map of Martinique: divided into 34 communes (Habran, 2024).

Martinique's bioclimates can be divided into four main zones:

Dry subhumid bioclimate: This refers to low-lying areas where rainfall is lower, particularly in certain regions of the south coast, where humidity is lower and soils drier.

Moderately humid bioclimate (humid subhumid): This zone is characterized by a warm, humid climate, with an average annual temperature of around 27˚C. It covers coastal areas and is ideal for tropical crops such as sugar cane and bananas.

Humid bioclimate (humid tropical mountain): This zone corresponds to the higher altitudes, with cooler temperatures and high rainfall (between 2500 and 4000 mm per year), favoring lush vegetation and unique ecosystems [10].

Hyper-humid bioclimate: Average annual rainfall is generally 4000 mm and above.

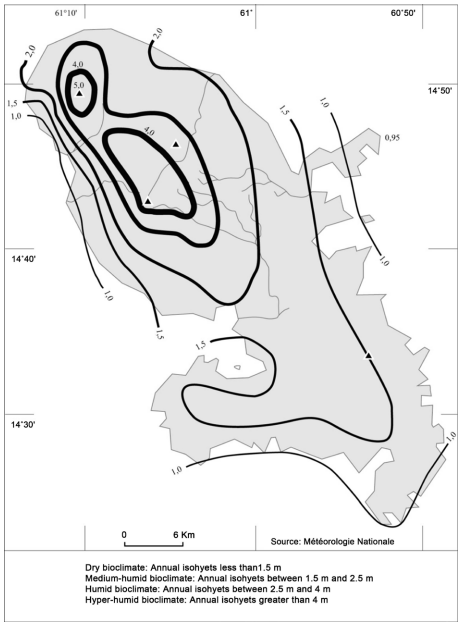

Figure 3. The different types of bioclimate in Martinique [19].

Topography determines rainfall, which in turn determines the emergence of bioclimates and phytocenoses as seen in **Figure 3**.

Altitude and climatic conditions determine the forest levels in Martinique. For example, winds blowing from northeast to east are wetter and affect the vegetation of coastal communities [20]. Several vegetation stages can be distinguished:

Coastal or lower vegetation zone (0 to 400 meters): Tropical seasonal evergreen forests of lower horizon and xeric facies and mangroves are found in coastal areas. These forests are made up of the first large plantations, resistant to drought and salinity.

Submontane or medium vegetation zone (400 to 800 meters): This is the stage where typical tropical evergreen forests are found, characterized by high biodiversity, endemic species and a wide variety of plants.

Montane or higher vegetation stage (above 800 meters): High-altitude forests are subject to a cooler, wetter climate, with plants such as mahogany adapted to lower temperatures and strong winds. Biodiversity is highly specific [20].

Thirteen communes were selected for our study. The aim was to cover all the different stages of Martinique's vegetation. The location of the communes was also taken into account, to obtain communes located in the north, south, west and east of the island. They also vary in location: some are closer to the coast than others.

Table 1. Classification of selected communes by forest level.

Lower vegetation stage	Medium vegetation stage	Higher vegetation stage	Transition-mixed zone
Trois-Ilets	Ducos	Le Carbet	Le Lamentin
Anse d'Arlet	Schœlcher		Le Robert
Sainte Luce	Robert		La Trinité
Saint Joseph	Trinité		Les Trois-Ilets
Le Diamant	Le Carbet		
Fort-de-France			
Lamentin			
Sainte-Anne			

As shown in **Table 1**, it is important to point out that some communes, such as Fort-de-France, due to their topography (presence of ravines and high altitude spread), may harbor vegetation characteristic of the upper stages. Communes are therefore not limited to a single specific ecological level.

2.2. Urban Vegetalization

Revegetation in Martinique, as in the other islands of the Lesser Antilles, is essential both to improve the quality of urban life and to preserve the environment. In a tropical climate characterized by high temperatures and high humidity, planting

adapted tropical species, such as fruit trees and climbing plants, is particularly conducive [21]. This includes projects such as shared gardens, the creation of public parks, the revegetation of streets, as well as the management of hedges and embankments to reduce erosion and improve runoff water management [22]. They also play a key role in reducing urban heat islands and improving air quality, particularly in highly urbanized areas such as Fort-de-France, where transport-related pollution is a major problem [11] [23] [24]. Citizen mobilization and the involvement of local authorities are crucial to supporting these initiatives and building resilience to climate risks, while helping to reduce urban disparities [13].

However, several challenges complicate the implementation of these projects. Growing land pressure due to the expansion of residential and commercial infrastructures, as well as the impact of tourist activity, generates a high demand for space and complicates the management of revegetation [25]. In addition, air pollution, mainly linked to motorized vehicles, represents an obstacle to the sustainability of these developments and requires special attention to ensure their long-term effectiveness [26].

To overcome these challenges, several revegetation strategies can be considered in Martinique [27]:

Open-ground revegetation of vacant or underutilized spaces in urban neighborhoods;

Revegetation of roofs and walls, particularly in high-density areas where space is limited;

Planting in containers to enhance biodiversity and social cohesion;

Planting on facades to create aesthetically pleasing spaces.

These initiatives can improve quality of life, protect the environment and support a sustainable green economy in Martinique, while taking into account local specificities and challenges related to urbanization and tourism activity [28] (**Photo 1**).

Photo 1. Example of ground cover in Saint-Esprit [29].

3. Methods

3.1. Surveys

The questionnaire examines the local population's perception of decisions to im-

plement a revegetation policy, their support for an increase in vegetation in their urban environment, and their views on any constraints associated with such initiatives. It consists of closed (multiple choice) and open (paragraph answers) questions. The questions were formulated clearly and concisely to facilitate analysis. A simplified vocabulary was chosen to make the questionnaire accessible to a wide audience. The final, open-ended question gives respondents the opportunity to expand on a point not covered, or to add additional information. No justification was requested; the aim was to obtain spontaneous responses.

3.1.1. Study Location

A questionnaire (see **Appendix**) was submitted to the local population. They were selected on the basis of their origin and/or residence in one of the 10 study communes. Their point of view is an indication of the current dynamics within the communes. Physical factors such as age, gender and socio-professional category were not considered.

There are several methodological reasons for this choice. The aim is to obtain a global and representative view of the population's perceptions, without demographic biases that could distort the results. By excluding these variables, the survey becomes simpler to analyze and avoids unnecessary complications in data interpretation. It also enables the analysis to focus on the environmental and social issues raised by the project, which concern all residents, regardless of their personal characteristics.

The fact that socio-professional category (SPC) is not taken into account ensures equal access to information by avoiding biases linked to socio-economic differences, thus guaranteeing a voice for the entire population, regardless of professional status. What's more, environmental issues such as reducing heat islands and improving air quality are concerns shared by all segments of the population, making the SPC less relevant for understanding the general perception of the project.

3.1.2. Data Processing

Once the questionnaire has been completed, the information is collected, recorded and automatically transformed into diagrams of various types using Google Forms administration software. Results are expressed as percentage.

3.1.3. Methodological Limitations

Despite the interesting results of this study, there are a few limitations.

The sample comprises only 48 people, and the survey does not distinguish between people of different ages or genders, or between those living in urban and suburban areas.

The survey can also be confronted with the "politically correct" answers that may transpire, even if anonymity is set up to limit this tendency.

The following results do not distinguish between communes and include all respondents.

3.2. Semi-Structured Interviews

The semi-directive interview with Mr Mondesir and Ms Melinard Frantz (heads of the Anses-d'Arlet environmental department) enabled us to understand the local population's reaction to the commune's urban projects. This view of the population held by these development actors will serve as a basis for comparing the results of the survey. This interview will be referred to in the discussion as a personal communication.

4. Results

4.1. Introducing the Participants

The survey on urban vegetalization was carried out with a representative sample of residents from a number of pre-selected communes. The geographical distribution of participants is essential to assess whether perceptions and expectations of revegetation vary according to the commune of residence.

The survey was carried out among residents of the various pre-selected communes.

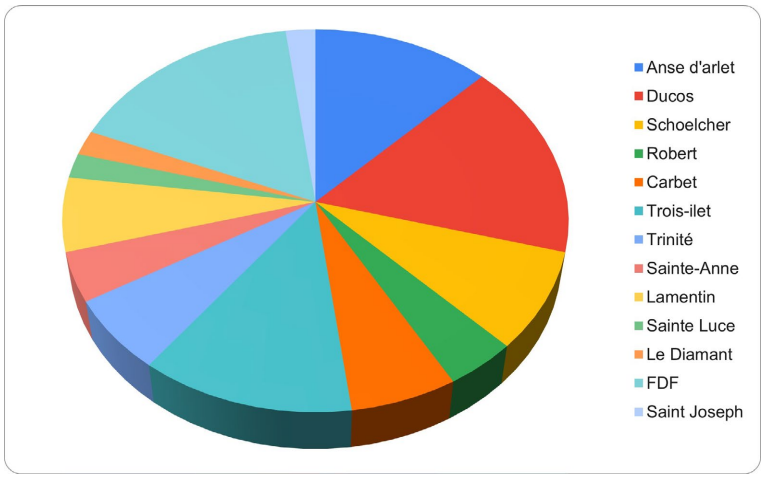

Figure 4. Breakdown of residents by commune.

The Breakdown of residents by commune (**Figure 4**) above, shows of the 43 people surveyed, the vast majority live in Ducos and Fort-de-France (16.3% respectively). The people of Ile-de-France accounted for 14%, as did the people of Arles (14%). Residents of Le Diamant and Sainte Luce each accounted for just 2.3% of responses.

The results indicate a varied participation, with a significant concentration of respondents in certain communes such as Ducos and Fort-de-France (16.3% each), while others have a lower representation (Diamant and Sainte-Luce at 2.3% each). Communes with lower representation could have lower levels of engagement or interest, or practical and logistical barriers to participation.

Residents were grouped according to the forest floor associated with the commune, to achieve a more targeted and coherent approach. This makes it easier to

understand the results of the questionnaire and the trends that emerge.

Table 2. Distribution of inhabitants according to the forest floor associated with the commune.

Inhabitants of communes in the lower vegetation zone	Inhabitants of communes in the medium vegetation zone	Inhabitants of communes in the higher vegetation zone	Inhabitants of communes in the transition-mixed zone
69.7%	30.4%	7%	14%

Table 2 above, shows that of the respondents, 69.7% live in communes associated with the lower forest floor (0 - 400 m), 30.4% live in communes in the middle forest floor (400 - 800 m) and 7% live in communes in the upper forest floor (400 - 800 m). A further 14% come from communes in mixed transition zones (14%).

4.2. Knowledge of Current Community Dynamics

Vegetalization practices are already in place in municipalities. It's interesting to be able to get an overview of what residents perceive as urban vegetation in their city. This will help us to understand whether vegetation policies are visible enough, or wher there are gaps in the current design of urban green spaces.

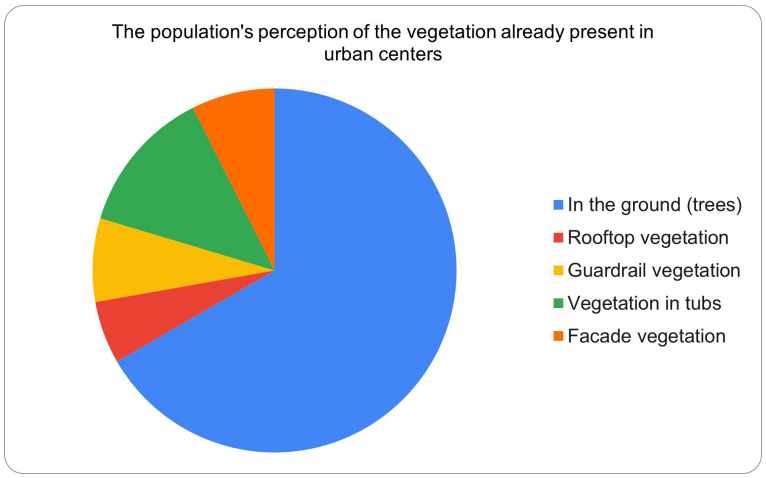

Figure 5. The population's perception of the vegetation already presents in urban centers.

Figure 5 above, shows that of those surveyed, 75% of residents identified open-ground vegetation as being the most present in the city. This includes wooded areas, parks and public gardens. On the other hand, 14.6% of respondents mentioned vegetation in tubs, which is commonly used to green restricted urban spaces, such as narrow streets, sidewalks or balconies. 8.3% of residents observed façade vegetation in urban centers, and 8.3% of responses referred to vegetation present on railings. Guardrail vegetation includes plants in hanging pots or vege-

tated trellises installed on balustrades or buildings. Finally, rooftop vegetation is still marginal, with only 6.3%. of responses.

Table 3. Opinion of the population on the different vegetated sites in the communes of Martinique.

Traffic circle	Parking lots/Roads/Schools/ Markets	Towns	Private/Public gardens	Beaches	Urbain parks (Health path)	Can't see	No opinion
12/43	5/43	6/43	3/43	4/43	14/43	1/43	11/43

Table 3 above, shows that respondents were then asked to cite examples of green spaces in their locality. 11.5% of respondents mentioned parking lots, roads, markets and schools. Some of the city's functional areas are also considered to include vegetation, although these spaces are not associated with the notion of green spaces. 6 people (14%) mentioned the towns (central areas of the commune), where vegetation is present in urban landscaping. 4 responses out of 43 (9.3%) mentioned beaches. Although this type of space is generally associated with natural environments, it can be vegetated for aesthetic or ecological reasons, for example with salt-resistant plants or those used to combat erosion. Examples such as the Savane in Fort de France and the Ducos health trail are well known to local residents. 14 out of 43 (32.5%) cited urban parks as green spaces. This response shows the importance of parks as major public green spaces in the commune, promoting relaxation and biodiversity. 1 response out of 43 (2.3%) indicated that the respondent did not perceive any specific vegetation in the commune. 11 responses out of 43 (25.5%) did not give a clear answer, perhaps due to a lack of knowledge or familiarity with vegetated areas in the commune.

4.3. Perception of Public Support for Revegetation

As part of an effort to understand people's feelings about increased greening of their communities, the respondents were asked about this topic, as they are the first to be concerned by the possible transformation of urban spaces.

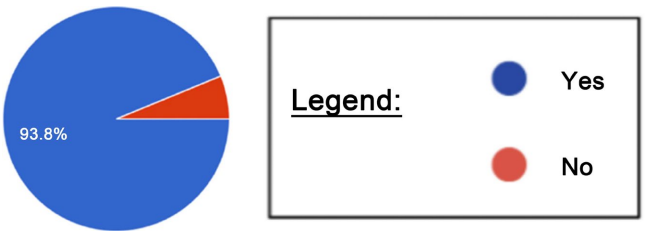

Figure 6. Public opinion on increasing vegetation in communes.

The Public opinion on increasing vegetation in communes (Figure 6) above, shows the vast majority of respondents (93.8%) support a policy of revegetation in their municipality. The diagram highlights a strong consensus among the population, underlining the importance of revegetation in improving the quality of life and well-being of residents. However, if the presence of greenery is encour-

aged, it is important to determine the preferred methods of revegetation for renovating urban spaces. Based on projects carried out around the world, it is possible to identify one or two preferred approaches, depending on the urban characteristics of each community.

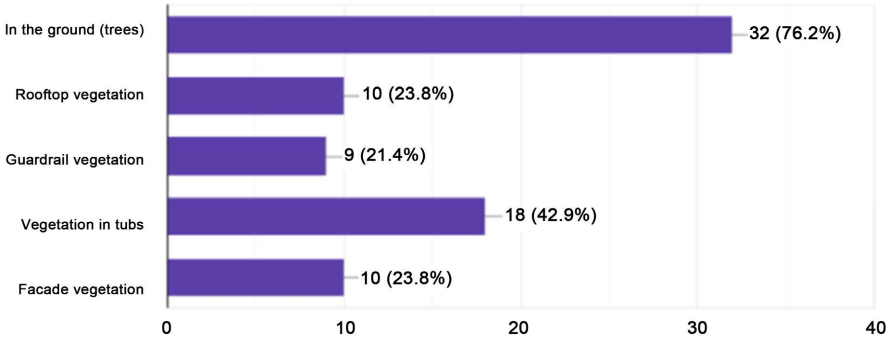

Figure 7. People's preferences for vegetation in their community.

Analysis of the diagram showing people's preferences for vegetalization methods in their community reveals clear trends. **Figure 7** above, shows the majority of people surveyed (76.2%) prefer open-ground planting, particularly trees. This reflects a strong desire to develop sustainable, natural green spaces in public areas. Rooftop and facade greening, on the other hand, with 23.8% respectively, seem less popular, although they are interesting solutions for maximizing the use of urban space.

Containerized vegetation receives 42.9% support, suggesting a preference for modular solutions adapted to the constraints of urban space, while allowing a degree of flexibility in design. Finally, vegetated railings were chosen by 21.4% of participants, indicating a limited interest in this approach, no doubt due to its more specific and less widespread use in greening projects.

These results show a clear preference for natural vegetation solutions planted directly into the ground, while indicating a growing interest in other more innovative options, albeit to a lesser extent.

4.4. Public Perception of the Feasibility of Greening Projects

Three major island constraints have been identified that could potentially compromise development projects: tourism, transport (pollution and roads) and climate (Yang, 2006; Berkes, 2018). Economic issues may outweigh environmental ones, raising questions about the sustainability of the emerging urban vegetation. We asked the population the following questions:

Do you think that tourist activity could jeopardize a potential revegetation project?

Do you think that the means of transport used could jeopardize a potential revegetation project?

Do you think that the climate is not conducive to a potential revegetation project?

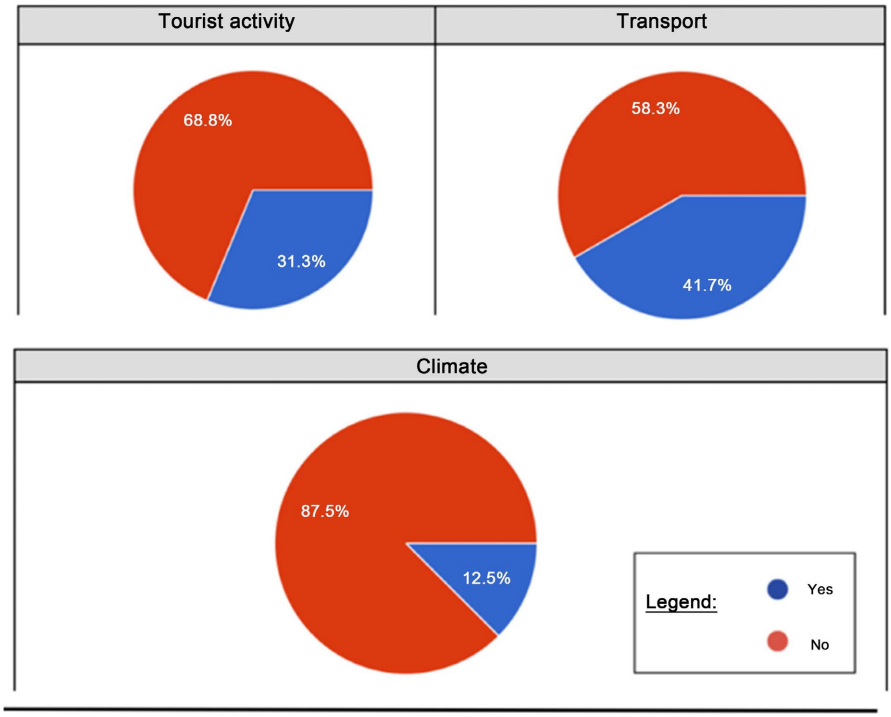

Figure 8. Public opinion on the possible impact of tourism, transport and climate on revegetation projects.

With regard to the impact of tourism, **Figure 8** above, shows 68.8% of respondents felt that it did not pose a threat to vegetalization projects, while 31.2% felt that it could be detrimental to these initiatives. The vast majority consider that vegetation can develop in parallel with this activity.

As for modes of transport, 58.3% of participants believe that they do not represent an obstacle to revegetation, compared with 41.7% who consider that transport (probably due to pollution or lack of suitable infrastructure) could jeopardize such projects.

With regard to the climate, 87.5% of those surveyed felt that weather conditions were not an obstacle to municipal greening, while 12.5% felt that the climate could make such projects difficult to implement. These results indicate that, although climate may be a limiting factor in some regions, a majority of the population remains confident that revegetation projects can be adapted to local conditions.

The majority remain optimistic about the feasibility of revegetation projects, but a proportion of the general public remain fairly sceptical about the negative impacts of these constraints.

4.5. Public Perception of Shared Management of Urban Vegetation

4.5.1. Knowledge of the Various Players Involved in Greening Projects

In order to assess the population's knowledge of urban development policies, respondents were asked to list the actors who deal with the commune's forest areas.

Table 4 shows that the town hall or municipality (41.9%) is perceived as the key player, reflecting a high level of confidence in the local authority to manage

Table 4. The public's opinion of the various players involved in vegetalization projects.

Mayor or Municipality	ONF	Lack of knowledge	Local players/ Municipal services (cleaners, etc.)	DEAL/CTM	People
18	6	6	8	3	4

communal forests. This potentially includes responsibilities linked to maintenance, urban planning and the preservation of local natural areas. The ONF (14.0%) is recognized by some respondents as a central player in the management of public forests. A significant proportion of respondents (14.0%) appear either not to know who looks after the forests (answers of the "I don't know" type), or to associate forest management with institutions that are not directly involved in this management (e.g. DAAF, local planning officer, public service). Responses indicating local services such as maintenance agents, the green spaces department or town planning services, as well as the PNRM, show that some respondents see forest management as a task shared between several actors, local or specialized (18%). The idea of the population (4 responses, or 9.3%) or the local community being responsible for forest management reflects a more participative vision, where citizens would be actively involved. DEAL and CTM were mentioned 3 times.

4.5.2. Awareness-Raising Activities and Active Participation in Local Communities

We study the cohabitation of local residents and the local community on ecological issues. The local population's perception of a planning policy can be linked to their education in environmental issues. In order to change mentalities, this work must be rigorously undertaken at municipal level, and the time devoted to it must be substantial. This is an important factor when considering the current level of public involvement. The aim of awareness campaigns is to mobilize public opinion on a specific subject. The real aim is to bring about a change in behavior or attitude towards nature in the city. Direct actions and/or campaigns that go unnoticed by the public reflect civilians' lack of awareness of the ecological emergency, and a lack of understanding of the need to green up. Yet active participation by the population is expected.

Figure 9 below, shows as far as the protection of forest areas is concerned, the majority of respondents (60.4%) felt that no awareness-raising campaigns were being run in their commune. Only 39.6% believe that such campaigns do exist. This first question reveals that the majority of the population (54.2%) considers that no direct action is taken in schools to raise young people's awareness of environmental issues. On the other hand, a proportion (45.8%) believe that such actions do exist. This distribution indicates a possible gap in the implementation of awareness-raising initiatives in schools, or a lack of visibility of such actions in the eyes of those surveyed.

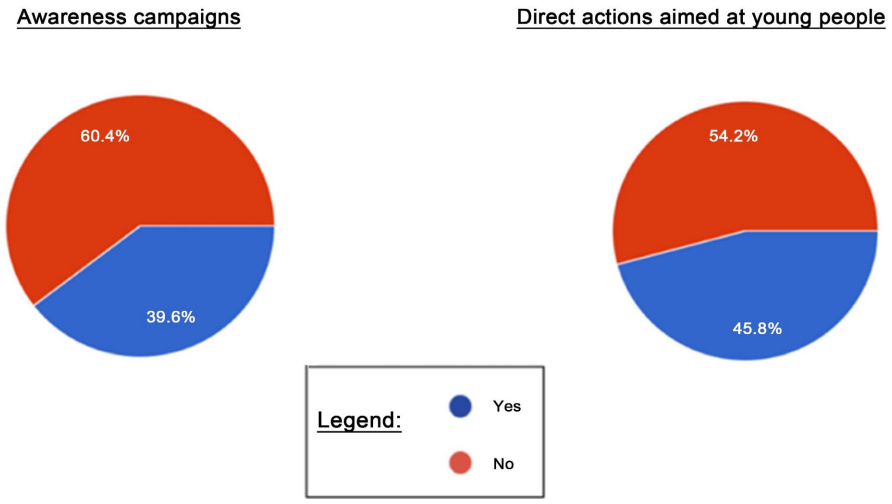

Figure 9. Public perception of awareness-raising activities in schools and municipalities.

4.5.3. Public Participation in Decision-Making

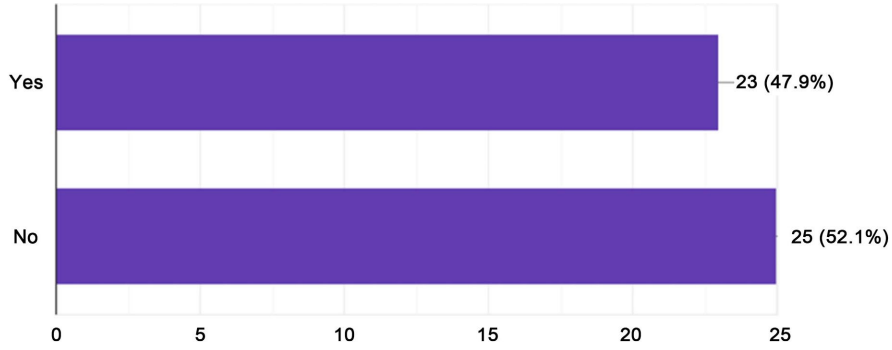

Figure 10. People's perception of the impact of their opinion.

The question asked was "Do you feel your opinion counts? Figure 10 above, shows as far as the protection of forest areas is concerned. Just over half of respondents (51.2%) felt that their opinion counted. By contrast, 48.8% of respondents did not feel that their opinion was taken into account. The results show a balanced distribution, and the difference between the two shares is small (2.2 percentage points).

4.5.4. Public Expectations

In order to identify levers for better understanding people's expectations regarding the revegetation of urban spaces in Martinique, respondents were asked to indicate an aspect of forest management that they felt was important to highlight.

Table 5 shows that the people who answered this question, 4 stressed the importance of the community aspect, with awareness campaigns being stepped up and publicized. They felt that the organization of planting workshops would reinforce this dimension. 3 people asked about biodiversity and ecology. 2 people suggested making urban green spaces more accessible, in particular by creating picnic areas or urban agricultural parks. Finally, 1 person mentioned plant maintenance,

considering it an essential aspect not to be neglected in development projects.

Table 5. Public expectations of new urban vegetalization projects.

Main themes	Example of expectations	Numbers of responses
Care and maintenance	Plant maintenance	1
Accessibility and layout	Picnic areas, forest park and urban agricultural park with fallow area	2
Biodiversity and ecology	Use of medicinal plants, reduced use of artificial soils Increased conservation	3
Community activities	Awareness campaigns (increase, media coverage and posters on the well-being of these spaces) More planting workshops	4

5. Discussion

5.1. Why This Survey?

By perceiving ecological urgency not as an inevitability, but as a warning, it is assumed that the implementation of concrete actions can mitigate the environmental impacts already observed [30]. With this in mind, surveying the population becomes a crucial step, not only to secure their support, but also to adapt projects to their expectations, while ensuring inclusive management [31]. This also enables us to gather sufficient information to consider empowering citizens in initiatives such as community gardens

5.2. Current Dynamics of Urban Vegetation in Martinique

5.2.1. Planting Methods Used in Martinique

In Martinique, the majority of green spaces are planted in the ground. This method of vegetation can be explained by the accessibility and durability of these facilities. Open-ground vegetation enables better plant growth due to the availability of natural resources (such as nutrients and soil moisture), and also offers important ecological benefits, such as reducing heat islands and regulating the water cycle [32]. Open green spaces are also recognized for their ability to promote biodiversity, by attracting a greater variety of plant and animal species [33]. Moreover, this form of vegetation is often perceived as more aesthetically pleasing and more in harmony with the natural environment [34]. However, the dominance of open-ground vegetation can lead to a certain limitation in the diversification of vegetation types.

Containerized vegetation is also used and represents an intermediate solution that meets the needs of smaller, more constrained areas [35]. As availability is limited, this vegetation is a common solution on streets or public squares. This could be a starting point for encouraging greater greening in urban areas where

space is limited. The benefits of planters are manifold: they control soil quality, mitigate the impact of urban pollutants and reduce thermal nuisance while adding greenery [35]. However, unlike full-ground planting, planting in tubs can require more frequent maintenance and irrigation management to maintain plant health. This type of vegetation is also more expensive to implement, which could limit its wider deployment [36].

Vertical forms of vegetation, such as facade and railing vegetation, are becoming increasingly popular in dense cities, but their adoption remains limited in Martinique due to several factors. For one, façade vegetation, while beneficial for managing heat and improving air quality [37], is hampered by high installation and maintenance costs, as well as moisture issues exacerbated by the tropical climate, which can lead to infiltration and mold [38]. In addition, the island's urban density, particularly in coastal areas such as Anses d'arlet, limits the space available for this type of development without requiring costly infrastructure redevelopment (personal communication). As for rail-mounted vegetation, although it is a more affordable solution and suitable for restricted spaces [39], its implementation remains low, largely due to its restriction to private property and its difficult integration into predominantly residential areas [33]. Adapting existing buildings also represents a technical and economic hurdle, particularly in a context where planning priorities are focused on urgent housing and transport needs (personal communication). In addition, common challenges such as excessive humidity, irrigation management and the lack of incentive-based public policies further limit the adoption of these solutions [39]. Finally, the lack of awareness and knowledge about the benefits of vertical vegetation and techniques adapted to local conditions is another obstacle.

Finally, roof greening remains marginal, indicating an untapped potential for green roofs that could be a considerable answer to thermal insulation and stormwater management. The cost and complexity of installation mean that it is not very widespread [40]. Despite these constraints, it represents a promising solution for improving the climatic resilience of cities and the sustainable management of water resources [41].

5.2.2. Green Traffic Circles and Urban Parks: Key Elements of Urban Vegetalization

The most visible and frequently cited green spaces are traffic circles and urban parks. Vegetated traffic circles play an important aesthetic and functional role, helping to reduce air pollution, improve thermal comfort and mitigate the effects of urban heat islands [42]. What's more, they can promote urban biodiversity while being relatively easy to maintain compared with other types of vegetalization. Indeed, traffic circles are often strategic spaces for increasing vegetalization in dense urban areas without requiring extensive transformations of existing infrastructure [43].

As for urban parks, they are perceived by residents as essential places for relaxation and recreation. The greening of these spaces is a central element of public

policies aimed at improving the quality of life of city dwellers. Indeed, urban parks offer numerous ecological benefits, such as improved air quality, noise reduction and the creation of social spaces [33]. They are also recognized for their ability to reduce stress and promote the mental well-being of urban residents [44].

5.2.3. Under-Use of Functional Areas in Terms of Vegetalization

However, there are functional areas such as parking lots, schools and markets that remain under-exploited in terms of revegetation. These types of spaces, which are often perceived as mainly utilitarian, are considered by politicians as suitable places for revegetation. And yet, several studies indicate that revegetation in these spaces could offer numerous benefits, such as reducing heat islands and regulating stormwater [45]. For example, the revegetation of parking lots, which are often overgrown or poorly used, could increase green space while improving stormwater management [46].

In the case of schools, greening projects could contribute to the creation of healthier learning environments by reducing pollution levels and providing outdoor learning spaces. In addition, markets can benefit from revegetation to improve their attractiveness while reducing thermal impacts on visitors and traders [47].

5.2.4. Role of Towns Center, Beaches and Public Gardens

The market town and beaches were mentioned less frequently. This may reflect a perception among residents that these spaces are not as vegetated as urban parks or traffic circles. However, in market towns, which are often characterized by densely built-up areas and few green spaces, revegetation could play an important role in revitalizing urban centers and creating meeting places [43]. Vegetation in these areas could also contribute to urban biodiversity by encouraging the establishment of species adapted to the local context [22].

Beaches, meanwhile, although generally associated with natural spaces, are often poorly perceived as vegetated areas by residents, perhaps due to the specific ecological constraints associated with their development, such as soil erosion and the conservation requirements of coastal ecosystems [48].

Public gardens, on the other hand, are relatively little mentioned, which could reflect either a lack of visibility or attractiveness of these spaces, or a certain disconnection of residents from these public spaces. However, the greening of public gardens can play a crucial role in creating spaces for relaxation and promoting biodiversity [49].

5.3. Perceived Support for New Greening Projects

5.3.1. Support for Revegetation: A Growing Environmental Consensus

One of the study's conclusions is the strong support Martiniquais have for the greening of urban spaces. Public support for urban greening refers to the acceptance, support or commitment of urban dwellers to initiatives aimed at introducing more nature into urban spaces [33]. Moreover, this support is explained

by an awareness of the ecological and health benefits of vegetation, including the reduction of air pollutants and the improvement of inhabitants' psychological well-being [2]. This support is part of a broader trend observed in many tropical islands, where revegetation is seen as a crucial lever for improving air quality, reducing urban heat islands, and restoring biodiversity in often degraded urban environments [27] [28] [50]. In similar studies carried out in tropical urban areas, such as Puerto Rico or Reunion Island, citizens perceive revegetation as a key factor in improving their daily environment and combating the negative effects of climate change [21]. Martinique is no exception to this general trend observed in island and tropical regions, where urban vegetation is increasingly valued [9]. In addition, the issue of air pollution linked to modes of transport and urbanization is a persistent challenge. Green spaces can help reduce the effects of this pollution, but it is essential to implement genuine public policies aimed at integrating green spaces into urban management and transport policy

5.3.2. Optimism about the Sustainability of Greening Projects

One of the major challenges that emerges from the study is the tension between revegetation and the island's increasing urbanization. Martinique is experiencing accelerated urbanization, particularly in its capital, Fort-de-France, where the expansion of residential and commercial infrastructures is limiting the space available for revegetation projects. Road networks are at the root of this feeling. In addition, tourism, which generates large population flows, puts additional pressure on natural areas and development projects.

However, the context of the island does not seem to be a major concern for the population, who generally remain confident in the feasibility of these projects. For the vast majority, urban vegetation can be developed in parallel with tourist activities.

The point here was to analyze the population's optimism about the sustainability of revegetation projects in the face of transport modes and climate. This may reveal a real determination to believe in the projects and potentially participate in the actions that will be launched.

5.4. Awareness-Raising and Active Participation in the Community

5.4.1. Public Opinion on the Various Players Involved in Greening Projects

The study reveals that the majority of respondents recognize the fundamental importance of the town hall as a key player in the implementation of revegetation projects. This awareness reflects a general knowledge of institutional roles within the municipality. The mention of local maintenance workers by some participants also underlines a direct and concrete perception of the actions carried out, based on daily observations of the local environment.

However, a significant proportion of the population seems unaware of who is responsible for managing communal forest areas. This lack of knowledge may reflect several factors, including a lack of interest in forest management issues and

a lack of effective communication on the part of local authorities. Indeed, according to several social science studies, environmental perception and citizen participation in management projects are often influenced by the quality of the information disseminated [51]. When insufficient or unclear information is provided on the issues related to the management of natural areas, residents are less inclined to develop an ecological conscience or to engage in awareness-raising initiatives [52].

5.4.2. Public Perception of Awareness-Raising Initiatives in Schools and Local Authorities

The need to increase awareness and citizen involvement in revegetation projects is becoming paramount. The people of Martinique seem to feel that local authorities do not carry out enough awareness-raising activities, both in schools and among the general population. The literature on participatory governance and ecological planning supports this idea: citizen engagement is essential to the success of revegetation projects, as it ensures greater ownership of green spaces and ensures their sustainability [12] [13].

Awareness campaigns are also essential to inform the population about the benefits of revegetation, but also about how to maintain and protect these spaces [51]. Examples of successful projects in cities such as Singapore or Sydney show that when citizens are actively involved in the design and maintenance of green spaces, these projects are more likely to succeed and last over time [5].

5.4.3. Public Perception of the Impact of Their Opinions

The population seems to have mixed views on the influence of their opinions on decisions regarding greening initiatives. This divergence of perceptions is mainly a function of the municipality and the level of participation it wishes to grant its residents. In cases where citizens feel they are not sufficiently listened to, there is a risk of disengagement from environmental issues. Indeed, failure to take local aspirations into account can lead to a feeling of disconnect between the population and public policy, weakening popular support for future projects. This growing disinterest could make these initiatives more vulnerable, reducing their long-term effectiveness.

The perceived legitimacy of decision-making processes plays a decisive role in the success of sustainable development projects. In its citizen participation matrix, governance initiatives need to enable citizens to play an active role in decision-making, to strengthen buy-in and sustainability [53]. When participation is reduced to a mere advisory role, or worse, non-existent, citizen involvement in monitoring and supporting projects becomes more fragile.

So, to encourage the commitment and support of local residents, it's imperative to directly gather their expectations and concerns regarding these initiatives. A co-design approach, involving citizens at every stage of the process, is not only a means of legitimizing projects, but also a lever for strengthening social ties and attachment to public space [35]. The involvement of citizens in environmental

decisions contributes to a better appropriation of ecological issues and increased mobilization in favor of the environment [54].

Planting workshops are another expectation frequently expressed by citizens. In addition to raising awareness of biodiversity and ecological practices, these workshops help strengthen social ties between residents, while encouraging active participation in the greening of public spaces. Research into citizen involvement in community greening projects has shown that participation in activities such as community planting creates a sense of belonging and collective responsibility towards the environment, while fostering the creation of more inclusive and sustainable spaces [49].

The key point is to foster genuine shared governance.

5.4.4. More Inclusive Management

What's important now for politicians is not to reduce this membership to a mere statistic, as it represents a real opportunity to create a dynamic at local level by making citizens actors in the project. Indeed, the current problem is the existing cohesion between the commune and its citizens. For example, the Anses d'Arlet mayor's office feels that the community is involved mainly through public consultations and a few participatory initiatives, but the projects are managed by governmental or private entities (Personal communication).

We need to step up communication on forestry issues and promote appropriate information strategies. Initiatives could then be more robust and structured, with adequate resources for maintenance and long-term sustainability.

This can be achieved through greater involvement of local residents through landscaping workshops in the design and maintenance of shared gardens, and community planting that reinforces a sense of collective ownership and shared responsibility [49]. Such a dynamic would not only generate greater interest in revegetation projects, but also encourage more transparent and inclusive management of communal forest areas.

5.5. Other Public Expectations of Urban Vegetalization Projects

5.5.1. People's Preferences for Revegetation in Their Community

The study also highlights the planting methods preferred by Martinique's population. The appeal of solutions such as open-ground vegetation (trees) is particularly marked. These results are in line with the literature on urban revegetation in tropical climates, which reveals that open-ground solutions are not only easier to implement, but also better meet the needs of local communities in terms of quality of life and accessibility [55] [56].

This preference can be explained by several factors: the local tree and garden culture or the lack of familiarity with green roofs and walls. Although more innovative, these greening options seem less popular, due to their cost, more complex maintenance or unfamiliarity with these solutions. However, green roofs can offer many benefits in densely populated urban areas, including reducing energy costs by improving the thermal insulation of buildings [57].

It's interesting to note that planting in containers, which can be perceived as simpler and more accessible, also resonates with respondents. These approaches are perhaps considered easier to implement in densely populated urban areas, such as Fort-de-France, where space is limited.

In addition, it would appear crucial to step up communication on existing green spaces, in order to increase their visibility and enhancement. Local authorities could then use these results to guide their planning policies and better meet residents' expectations in terms of urban greening.

5.5.2. Levers to Encourage Public Support

Greening projects, which aim to increase the presence of plants in urban spaces, are generating a wide range of expectations on the part of citizens. These expectations reflect a desire to combine the environment, quality of life and sustainable development. The main expectations identified fall into several areas: upkeep and maintenance of green spaces, accessibility and development, preservation of biodiversity and ecology, and community activities. These elements highlight a holistic approach to urban greening, which goes beyond simple planting and aims to transform cities into more sustainable, inclusive and resilient spaces.

1) Conservation and biodiversity

One of the most frequently expressed expectations is the preservation of biodiversity, notably through the use of medicinal plants and the reduction of artificial soil use. Citizens are becoming increasingly sensitive to environmental issues and are looking for greening projects that respect ecological principles. Urban pollution and the heat island amplify the need for green solutions (medicinal plants, natural soils, conservation). This enhancement of medicinal flora in urban spaces can strengthen the ecological resilience of neighborhoods by increasing biodiversity while meeting social needs (access to plants for therapeutic uses) [43]. At the same time, the reduction of artificialized soil in revegetation projects is seen as a lever for limiting soil sealing and improving water management, thereby reducing the risks of runoff and flooding in urban areas [33]. There is a deep-seated desire to reconcile urban development with its natural ecosystem, with the aim of improving citizens' quality of life.

2) Accessibility and landscaping: functional integration of green spaces

The accessibility and development of green spaces is a major public expectation. Many residents would like to see adapted infrastructures, such as picnic areas, forest parks or urban agricultural zones, which even integrate spaces left fallow. Evolving urban lifestyles are driving a growing need for accessible green public spaces for relaxation, sport and leisure. These expectations underline the importance of diversified development, capable of meeting both recreational needs and offering a multiplicity of uses to different categories of the population (families, young people, the elderly). This demand is supported by urban planning research, which highlights the role of multifunctional public spaces in improving urban well-being [58]. Urban densification is leading to a scarcity of green spaces, which may increase the demand for their reintroduction. In particular, accessibil-

ity to urban farm parks has contributed to the revitalization of urban areas and the reduction of inequalities in access to nature [55]. What's more, fallow areas are often perceived as places conducive to biodiversity and experimentation with new urban agricultural practices, which can respond to this desire to reconnect the city with nature and enable citizens to reclaim their environment.

3) Plante care and maintenance: a secondary but essential concern

The upkeep and maintenance of planted areas is a key concern for the general public. The first explanation could be a lack of awareness of maintenance needs. The maintenance of green spaces is also perceived as a municipal responsibility. Citizens may expect local authorities to take care of it, hence the low number of responses on this subject. However, the fear that new developments will become neglected spaces may influence interest in maintenance. Once installed, plants need to be properly maintained to ensure their longevity and visual quality.

This requirement echoes the literature on the management of urban green spaces, which emphasizes that regular plant maintenance contributes not only to the beauty of public spaces, but also to the ecological functionality of vegetated areas. Inadequate maintenance can lead to rapid degradation of green spaces and, consequently, a loss of interest on the part of residents [59]. Aesthetics are often seen as an essential factor in maintaining residents' attachment to these spaces [60]. In addition, careful maintenance can increase the attractiveness of vegetated spaces and encourage frequentation, thus contributing to the consolidation of social ties [44].

6. Conclusions

Urban greening offers undeniable advantages. It can be seen as a viable solution for significantly reducing certain urban ecological challenges such as heat islands, air pollution and biodiversity loss. However, it is essential that Martinique's population becomes fully aware of these benefits, as their support is a prerequisite for the sustainability of urban development projects. Political actors play a facilitating role in the implementation of these initiatives, contributing to their dissemination across the territory [61].

Awareness, as well as the perception of personal and collective benefits linked to the creation and management of green spaces, are key elements in creating cohesion with the local population. This study offered an excellent opportunity to gather opinions from the general public, in order to assess perceptions and better understand residents' expectations and ambitions on this subject. As a result, Martinique's communes now have a number of avenues for improvement to refine their environmental policies and maximize public support.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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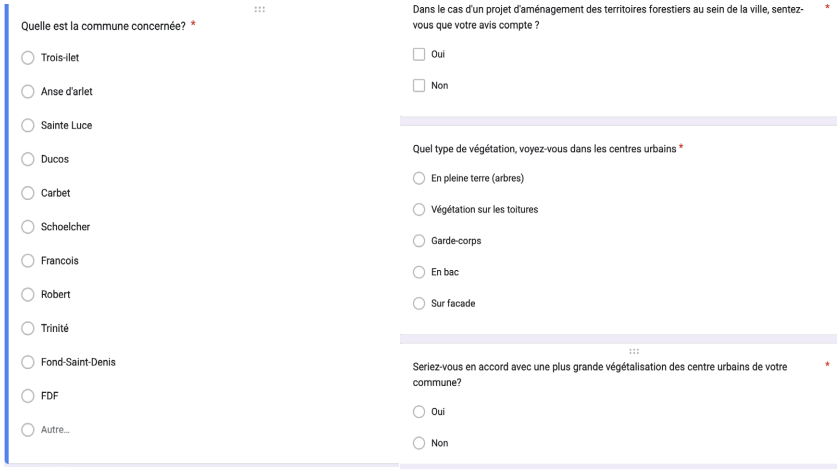
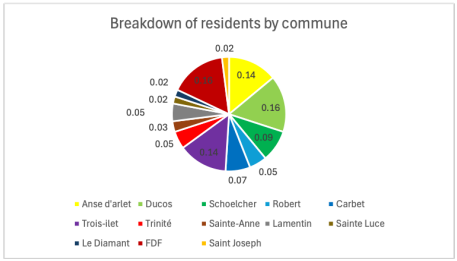
Appendix

Questionnaire:



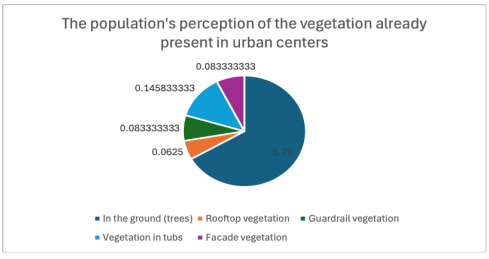
Source document **Figure 4**:

Municipalities	Number of people	Percentage
Anse d'arlet	6	0.14
Ducos	8	0.16
Schoelcher	4	0.09
Robert	2	0.05
Carbet	3	0.07
Trois-ilet	6	0.14
Trinité	3	0.05
Sainte-Anne	2	0.03
Lamentin	3	0.05
Sainte Luce	1	0.02
Le Diamant	1	0.02
FDF	8	0.16
Saint Joseph	1	0.02



Source document **Figure 5**:

Type of vegetation	Number of people	Percentage
In the ground (trees)	36	0.75
Rooftop vegetation	3	0.0625
Guardrail vegetation	4	0.0833333
Vegetation in tubs	7	0.1458333
Facade vegetation	4	0.0833333



Source document Figure 6:
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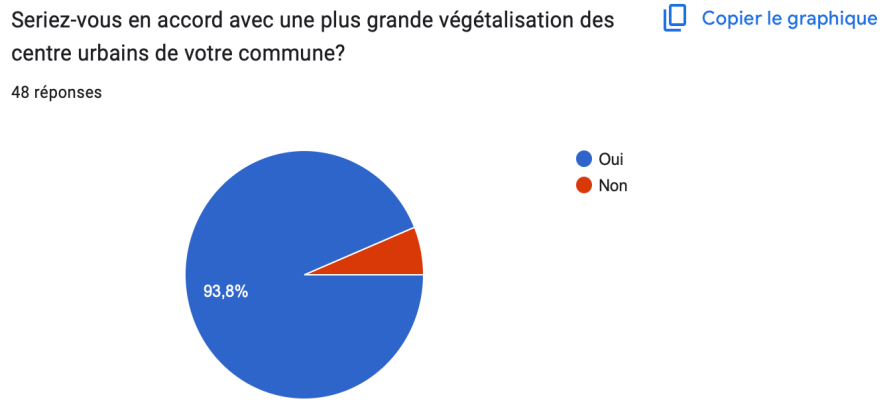

Source document Figure 8:
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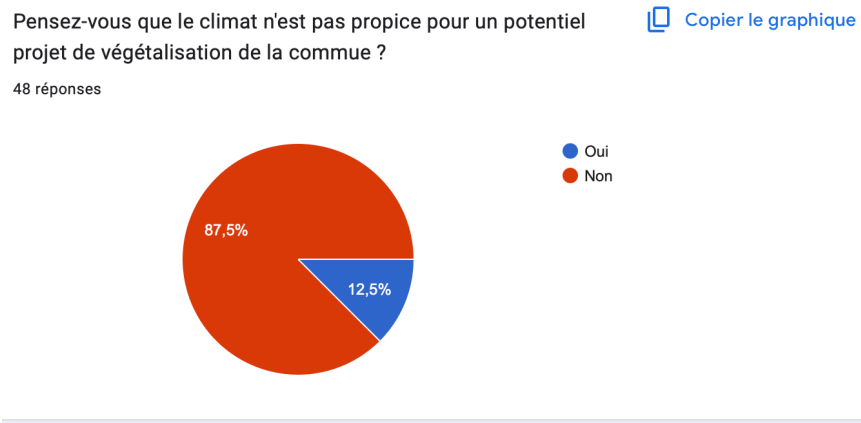

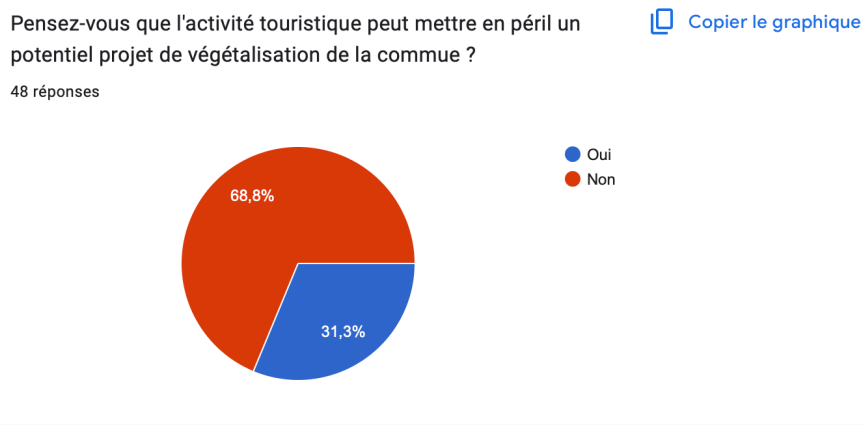

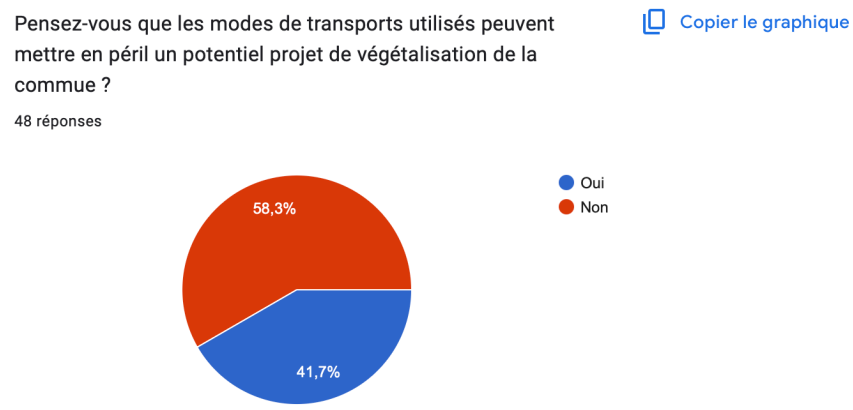

Source document Figure 9:
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