

# Evaluating Green Space Use and Management in Abidjan City, Cote d'Ivoire

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**Abstract-** Many African cities are lack of green spaces. The green spaces are plots or spaces in the city developed for recreational, scientific and aesthetic purpose. It participates in urban dwellers well-being and provides them with health, calm and peace. In Abidjan as in many African cities, the use and management of these spaces are insufficiently appreciated. This paper is aimed to measure the use and management of Abidjan city's green space by scrutinizing the behaviour of residents' vis-à-vis of gardens, and appreciate the management pattern by authorities in order to determine the importance of green space in their culture. The paper begins with the study area and data collection method, then, the landscaping method, and the measure of green space use, and finally, the discussion about green spaces development.

**Keywords-** Green Space; Utility; Management; Use; Unattractiveness

## I. INTRODUCTION

Green Space is a plot of undeveloped land separating or surrounding areas of intensive residential, industrial or commercial use that is maintained with trees, flowers, lawns, grasses for recreational enjoyment. It is considered as open space that has role to ameliorate ecological environment by providing oxygen source and breeze channels, conserving water sources, protecting bio-diversity, preventing dusts, fire, wind, flood, fight against draught through retaining rainfall via soil absorption and reducing noise. The green lands can effectively regulate and control the speed and the volume of ground-surface runoff (Lifang & Chen, 2008). About 25% of the health policies in Denmark mention the importance of increasing the use of green space, primarily because they expect that this will have a positive effect on the health and well being of a large part of the population (Aarestrup et al. 2007; Jasper S., 2010). Green spaces can be garden, parks, forest. Urban forest which is also green space can help to reduce storm water runoff, improve air quality, reduce noise pollution, sequester carbon, provide wildlife habitat and provide shade in the city and thereby saving on energy costs (Summit & Sommer 1998, Akbari 2002, De Sousa 2003, Kollin 2005, Shackleton 2006). People living near green spaces become calmer, more peaceful and get over certain disappointments and stress more easily than people who live in polluted areas. It is well known that there are Lower rate of anxiety/depression and poor health among people living near to green space (Thevivedge, 2010). Urban flood control can be accomplished through structural measures that modify the urban basin landscape such as infiltration structure and reforestation action (Marcelo G.M., 2009). The intensive fighting for spatial resources results in the continuous loss of green space and open space, which leads to the degradation of human settlements (Lifang & Chen, 2008). Urban areas generate environmental problem felt at all levels from the household to the global. These problems range from

impairment of human health, to economic and other welfare losses, to damage to the ecosystem. Air and water pollution and waste generation are among the key problems (Kuchelmeister 2000). This short review shows that ecological restoration will be an important challenge for humans in the 21<sup>st</sup> century (Dulias, 2010). According to M. Konan, former manager of parks and garden office of Abidjan city, during the conference held in 22th February 1973, "the green spaces constitute a very important psychological factor. We could undoubtedly say that they humanize the urban environment by providing their shade, fresh air, sometimes their perfume" (Koalla, 1995).

In the eco-city literature, examples from developing countries are few (Ellen, 2002). "Almost a cult, with its own gurus, New Urbanism suggests that by changing architectural styles, street layout and physical neighborhood characteristics, we can somehow change human behavior. We can solve all societal problems by changing the built environment" (Peter G. & Harry R., 2000, Ellen, 2002). Moreover, there is little literature on green spaces use and management in Abidjan, and they mention the lack of baseline data. According to a study carried out by BNETD<sup>1</sup>, in 2010, about the development of an urban centre at Attinguie Ebimpe (Abidjan), "there is an acute lack of aesthetic green spaces and promenade parks in Abidjan city, and they have recommended the development of wetland into recreation areas as well as plantation and gardens spaces".

Given the capital importance of green space on human being life, the main objective of the study is to evaluate the importance of green space for the urban residents and for the authorities by analyzing critically the current landscape planning and design method. It also aims to appreciate the state of green space and their management in Abidjan, and measure the use of these spaces in order to find out their utility for the residents.

## II. STUDY AREA

Abidjan is the main city of Cote d'Ivoire (West Africa) (Figure 1). Capital city from 1934 to 1983, it remains the most influent city in the country with 5 million of inhabitants. Abidjan comprises at present 10 communes (districts) with a total area of 57,735 ha, of which 8,991 ha are lagoons (AUA, 1989; Dubresson, 1997). The 10 communes are Adjame, Abobo, Plateau, Cocody, Attiecoubé, Yopougon, Treichville, Marcory, Koumassi, and Port-Bouet. Abidjan has long reputation to be the most beautiful city in West Africa and its landsite is the most picturesque of the country with 3 landforms: offshore bar, lagoon and site of plateau. Today, the

<sup>1</sup> Bureau National d'Etudes Techniques et Développement (National Office of Technical and Development Studies)

city landscape is characterized by a dual structure with 5 distinct landscapes: 2 sections are well off districts very equipped for rich people, high standard living areas with private gardens. The other 3 sections are landscape characterized by sharp deterioration of buildings, real estate companies houses, and finally by shantytown landscape with high population densities and inadequate housing, absence of sanitation and water supply, and difficult to access because of the state of route. According to Professor Atta<sup>2</sup>, Abidjan is in crises and we can recognize that by total insanitary, unfinished landscape and structure, anarchic areas subdivision, anarchic occupation of public domain, street and sidewalk, and proliferation of precarious dwelling and slums. And apart from Cocody, Plateau, there is a severe lack of green and open spaces in others districts. Moreover, unimaginative local officials and the inability of the local population to articulate its needs have rendered the municipal structures incapable of providing adequate service for the growing population. In Abidjan, the poor live in a threatening and unhealthy environment (Attahi, 2001).



Figure 1 Abidjan in Cote d'Ivoire, from Google earth

### III. DATA COLLECTION METHODS

This research is a qualitative and quantitative study, which involves a combination of different data collection methods: secondary data such as books, articles, newspapers, reports and records searching and other publications. The primary data collection was done on fieldwork during the research through participation, dialogue and interviews of managers of greening and gardening bureau (D.P.J) of Abidjan District, and consultation of some human resources. The internet source has been also consulted.

We have carried out a survey on garden and park using 14 days from 1<sup>st</sup> to 14<sup>th</sup> October 2010, in the 10 districts through a questionnaire on indicators of well-being so as to better understand green space use and management. The survey thereby concerned the distance from the residents home to green space. The possible answer categories were: less than 300m, 300m-1km, 1km-5km, and more than 5km. They were

also asked about the frequency of green use, their reasons of visiting parks and gardens, the private residence with green space, the type of recreational space they visit or would like to visit, and the living standard. The income of respondents has been an item of appreciation.

We based our sample on statistical data issued from National Institute of Statistics (Institut National de la Statistique, INS). We have divided our sample (300 people) according to the city landscape and the rate of different social class (10% of riches, 69% of middle class, and 21% of poor). There are five different main landscapes in the city: two for the rich social class, two for the middle class, and one for the poor class. According to the structure of population, 43% of Abidjan population are between 0-15 years old, 53% are between 15-60 years and 4% more than 60%). We only registered people above 16 years old. We thus asked 153 women and 147 men whose 106 women and 101 male are middle class, 30 rich people and 63 poor people. The educational background, marital and social status, the income and health condition of respondents have been also recorded. The table below (Table I) shows the distribution of surveyed according to their residential area.

TABLE I THE SURVEYED ACCORDING TO THE DISTRICT AND THE GENDER

| Status<br>Districts        | Women | Men | R<br>i<br>c<br>h | Middl<br>e<br>Class | Poors |
|----------------------------|-------|-----|------------------|---------------------|-------|
| Cocody                     |       |     | 15               |                     |       |
| Plateau                    |       |     | 5                |                     |       |
| Abobo                      |       |     |                  | 5                   | 25    |
| Adjame                     |       |     |                  | 25                  | 5     |
| Treichvil<br>eKoumas<br>si |       |     |                  | 30                  |       |
| PortBouet                  |       |     |                  | 30                  |       |
| Marco<br>y<br>Koumassi     |       |     |                  | 32                  |       |
| Yopougon                   |       |     | 10               | 85                  | 26    |
| Total Abidjan              | 153   | 147 | 30               | 207                 | 63    |

### IV. HOW DOES ONE DEVELOP GREEN SPACES IN ABIDJAN

#### A. Institution, Concept and Legal Framework

Founded by decree No 10/DA/DGA/DRH of February 17, 2005 of Abidjan City Governorate, the "Direction des Parcs et Jardins" (D.P.J), *Direction of Parks and Garden* is responsible to create and manage green spaces in the district of Abidjan. Its main objectives are design; developing and maintaining parks and garden; planting trees to beautify the city; transforming vacant spaces and wetland into recreational green open space and meditation spaces; protection against inclement weather and dust by planting trees along the routes and avenues of the district. The D.P.J is divided into 3 sub-

<sup>2</sup> Prof ATTA Koffi is teacher at Institute of Tropical Geography (IGT)-University of Cocody, Abidjan-Cote d'Ivoire

directions, which are sub-direction of botanic and plants production, sub-direction of planning and planting, and sub-direction of maintenance. All sub-directions are engaged in gardens creation and renovation. The concept of landscape design for the D.P.J is to prevent flooding phenomenon endangering urban life and killing on average 10 people each year in Abidjan City. Furthermore, innovative scheme of green space can help to regenerate communities, provide leisure opportunity, improve health and also help to attract investment to an area, said the director of DPJ. There is however any real policy and regulation in Cote d'Ivoire about landscape design and open space planning. The DPJ has 339 agent workers; among them no one has landscape planning, design or architecture degree (Table II and III). In 2006, the budget of city district was 23.149495 billion Frs cfa<sup>3</sup> (or 35,342,741 euro) but only 0.427767 billion Frs cfa (1.84% of the whole budget) was belonging to the DPJ for salaries, operation and investment expenditure.

According to M. Bini R., assistant director in Ministry of construction, urban planning and development, "there is any regulation or instruction in Cote d'Ivoire on which green space creation and management are based". Only they recommend the real estate companies to provide 5% of development areas for green space, which is not respected by them because of their envy of making lot of profit. Contrary to Cote d'Ivoire, in the UK, Natural England recommends that everyone should have access to green space of at least 2 ha within 300m of their home (Harrison et al., 1995; Jasper, 2010). The European Environment Agency (EEA) recommends that people should have access to green space within 15 min walking distance, roughly 900-1000 m (Stanners and Bourdeau, 1995; Jasper, 2010). Denmark does not have national norms or recommendations in this field. However, the city of Copenhagen has recently adopted a new planning strategy that includes an aim of providing green space within 400 m for at least 90% of its population by 2015 (Public Health Office Copenhagen, 2006; Jasper, 2010). To alleviate the heat island effect, a study proved that when the green coverage rate of an area reaches 30%, the heat island intensity can be obviously reduced, when it is higher than 50%, the heat island effect will be alleviated to a considerable extent (Lifang et Chen, 2008). In China, this norm of 30% of land thereby should be planted and covered by grasses or others green features (TABLE IV).

TABLE II STAFF WORKERS OF D.P.J

|                                |     |
|--------------------------------|-----|
| <b>Administrative officers</b> | 21  |
| <b>Supervision Staff</b>       | 51  |
| <b>Field Workers</b>           | 256 |
| <b>Chauffeurs</b>              | 2   |
| <b>Tractor Drivers</b>         | 6   |
| <b>Total</b>                   | 335 |

TABLE III DIPLOMAS OF OFFICIAL MANAGERS OF PARKS AND GARDENS IN ABIDJAN DISTRICT

| Number | Degree   | Function                            | Work experience |
|--------|--|-------------------------------------|-----------------|
| 1      | Master Sanitary Engineering                          | Parks and Gardens Director          | 22              |
| 2      | Agricultural techniques engineer                     | Assistant Director-Training officer | 24-1            |
| 1      | Agricultural techniques certificate                  | Service head                        | 14              |
| 1      | Higher agricultural techniques certificate           | Service head                        | 6               |
| 1      | Academic diploma of general study in natural science | Service head                        | 5               |

TABLE IV GREEN SPACE NORMS OF SOME COUNTRIES, SOURCE: "LES PARCS ET JARDINS DANS L'URBANISME PARISIEN XIXE ET XXE SIECLE"

| Countries or Cities | Norms  |
|---------------------|--|
| France              | 10% of developed land for parks and garden or 5.5 m <sup>2</sup> /inhabitant |
| Rome                | 9 m <sup>2</sup> /inhabitant   |
| Berlin              | 10 m <sup>2</sup> /inhabitant  |
| Washington          | 50 m <sup>2</sup> /person  |

In May 2008, Paris with an area of 105.40 km<sup>2</sup> had 450 different green spaces representing 2394 ha shared between 2 woodlands (1841 ha), 16 parks (203 ha), 137 gardens (207 ha), 274 squares (120 ha), 12 promenades, 4 esplanades, 2 alleys, 1 playground, 1 enclosed space, 1 traffic circle (23 ha). (Wikipedia-Paris, 2012).

### B. Creation and monitoring

As a working principle in D.P.J, creation and renovation of garden or other green spaces are based on three main steps:

#### 1) Projects Design:

It consists to identify sites for development and propose a design concept. The study involves taking measurements of the site, selecting plants, shrubs, trees, lawns and clump shape. If the site is shaded, *Dieffenbachia*, *Philodendron*, *Scindapsus aureus* are selected as shade plants. For sunny site, the bedding plants can be *Breynia*, *Barleria lupulina* and *Crotons*, *Duranta*, and *Ixoras* (Figure II and III).

At the edge of garden and within, shrubs such as *Calliandra*, *Gardenia*, *Allamanda cathartica* are planted to provide a large and diverse audience to gardens lovers, children, families and tourists. These gardens should offer particularly intense aesthetic experience. The philosophy of the landscape design is to foster interaction between human and environment in view of protection of human health and welfare.

<sup>3</sup> 1euro=655 Frs cfa



Figure II Araceae Dieffenbachia



Figure III Scindapsus aureus

### 2) Implementation and Monitoring Process:

It is entrusted to service of new construction under sub-direction of planning and planting. The working procedure is defined following the different steps, land preparation for planting. A sense of mystery and excitement can be created simply by adding ornaments and providing a hidden area of the garden to be explored. After land preparation, the next step is reception of plants, shrubs, lawns and clay. The staking then will decide where the plants will be planted. This is the stage of implementation in site. After grassing and planting, a team is responsible for watering and monitoring the green space created. Concerning the plantation, species in general used are *Dolenix*, *Canaga odorata*, *Largestroemia*, *Iofos*, *regina* for trees; shrubs species used are *Usecassia biflora*, *Acalypha*, *Musaenda sp*, *Caliandra*, *Nerium oleander* and *Tecoma sp*.

### 3) Renovation:

It concerns different actions to remake the old degraded garden according to a new development concept.

### C. Funding and Management of Green Spaces in Abidjan

The city governorate is the main provider of funds through his budget (Figure IV, V). At the scale of commune, the municipalities should create and maintain gardens and other green spaces. Some companies have funded green spaces creation in Abidjan. For instance, "Orange", a big cell phone company of the country has funded the creation of "Canal aux bois" at crossroads named "Carrefour Solibra" in intersection

point between Marcory and Treichville. Furthermore, some gardens were conceded to private gardening companies for maintenance, but all of these gardens were falling apart due to shortage of budget. These companies accuse city government not to respect the contract. The Under-Equipped Neighborhood Support Program (PASQUE) project, a component of PACOM (Programme d'Appui aux Communes, *Support Programme for Municipalities*), funded by the World Bank in Abidjan, was focused on upgrading and improving living condition of urban population through planting trees and creating public green spaces, installing drainage, building or rehabilitating roads, constructing market site, building public latrines, creating a water supply, rehabilitating public building and so on. This project, with a loan of US\$41.7 million, started in 1995 and closed in June 2001 (World Bank, 2002).

Concerning the management of green spaces, the mayors and city governor have proved their lack of interest in gardening and landscaping having regard to city landscape and the actuality (Figure VI). The municipal council of Koumassi Commune has sold one of three nurseries of Abidjan city to a real estate company for building a gated community. The mayor of Treichville Commune has dealt the garden "jardin du Velodrome" in 2004 with a Lebanese businessman, Aly Kafal, for construction of a business center. In Port-Bouet, the public garden close to the central market has been transformed into stores for business purpose. The town hall of Cocody Commune is built on one of big garden sites in Abidjan (Jardin du Lycée Classique). This garden with specific worldwide plants and flowers has been destroyed for building up the town hall. There are many other cases of transformation of green spaces into commercial or residential areas. Or, even if the gardens exit, no one takes care of it. According to M. Kra, assistant director in charge of maintenance and new works in D.P.J, "it remains only 4 or 5 well-kept public gardens in Abidjan". Some spaces in land subdivision reserved for garden or other public open spaces are declassified by mayors or ministry of construction and urban development for private purposes. For instance, a ministerial decree (No. 0018/MCUH/DU/SDAF) has declassified in September 2006 the garden "Le Triangle", 50 ha, in Cocody Commune and subdivided it for housing and place of cult.

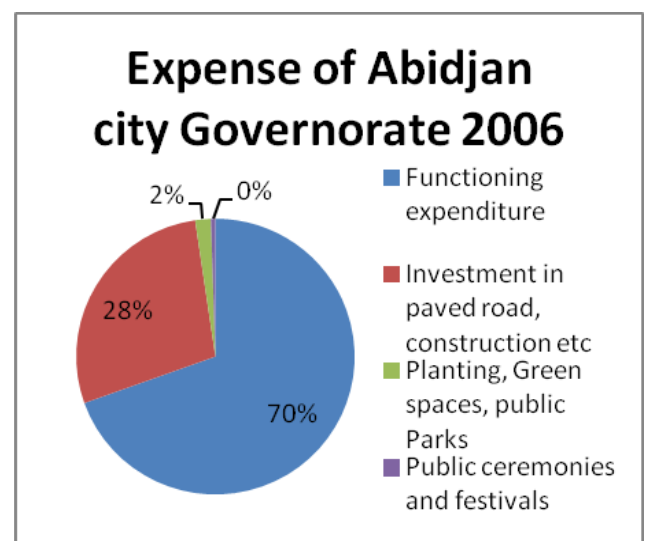


Figure IV Repartition of budget expenditure



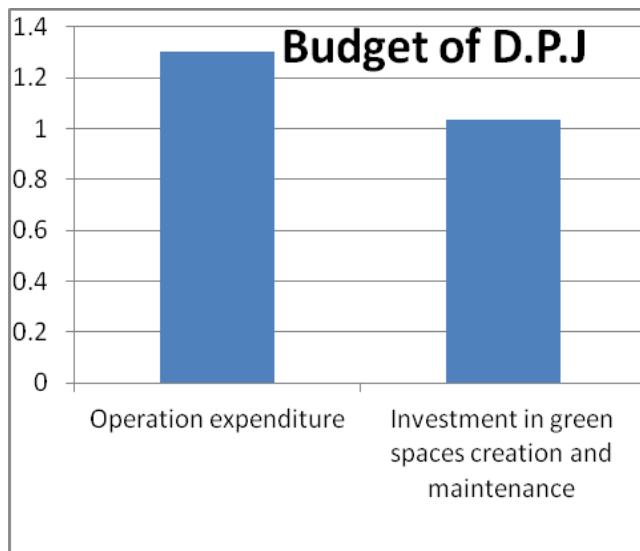


Figure V Budget of DPJ in (100 million)

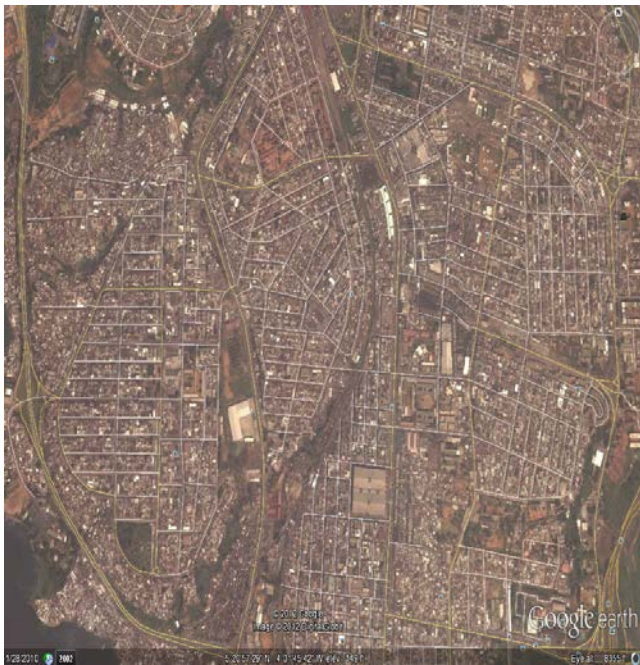


Figure VI Adjame neighborhood, district in lack of green space and open space, vacant areas inside the map are unbuildable and undeveloped with wild plants and grasses

Source: Google earth

#### D. Typology of green space in Abidjan

##### 1) National Parks:

A national park is a reserve of natural, semi-natural, or developed land that a sovereign state declares or owns (Wikipedia, 2012). It's a protected area that contributes to mitigate ecological disturbance and urban heat islands (UHIs). It moreover offers outdoor recreation and tourism opportunities though trek, sightseeing, etc... Despite their bad maintained state in Abidjan, the National Park of Banco (3474 ha)<sup>4</sup> and the Zoological park of Abidjan (20 ha) have played an important role in city oxygenation and for scholars because of its rare species.

<sup>4</sup> According to Captain Ahoulou Kouame, head of OIPR(Ivorian Parks and Reserves Office), Banco sector, the total area of Banco forest is 3474 hectares

##### 2) Botanical Garden:

It is a large public garden where many different types of flowers and plants are grown for scientific study (Longman, 2003). In this garden, it's displaying a wide range of plants labelled with their botanical names. Botanical gardens are often run by universities or other scientific research organization and often have associated herbaria and research programmes in plant taxonomy (Wikipedia, 2012).

The botanical garden of Bingerville Commune, 56 ha, is a space created in 1906 by decision of Governor Angoulvant under colonization time for conservation of various kinds of plants like *Epidendrum vanilla*, *Jasmine*, *Ixia*, *Opuntia*, *Bessabunga*, *Cochlearia*, *Dahlia*, *Datura*, *Hortensias*. We have also found in this garden Vetiver (family of graminacea) imported from India. Despite its importance in conservation of biodiversity, environmental education and scientific research, this garden fell into disrepair, becoming place for defecation, and a space for drug addicts and gangsters (Avenue 225, 2009). The Botanical garden of Cocody University has been partially destroyed for building a restaurant and bar.

##### 3) Squares and Public Gardens:

According to "Dictionnaire de l'urbanisme et de l'aménagement (Dictionary of urban planning and development)", the Public Garden is an urban green space, enclosed, with vegetative dominant, protected of general circulation, free access, designed as a public facility and managed as such. A square is a place of quadrangular shape with trees and lawns. It's a public garden generally not extended, surrounded by a grille in the middle of a place (CNRTL<sup>5</sup>, 2012). Otherwise, a square is also a garden formed in the middle of a place surrounded by facades and routes, and they have a twin function. One of the famous gardens in the world is Boston Public Garden, the first botanical garden in United States, established in 1837, located in the heart of Boston, Massachusetts, adjacent to Boston Common, another worldwide known garden created in 1634. This attractive garden with permanent flower plantings including numerous varieties of roses, bulbs and flowering shrubs serves as space of recreation, wedding, photography and tourism.

In Abidjan, the well-known squares are "Briand" and "Bressoles" in Plateau Commune. They are still existing located at avenue V.Vollanhoven, but in an unattractive state because these places have been transformed partially into restaurant, play station, so crowded and. Other public gardens have been remarked elsewhere in Abidjan. But, most of them have lost their interests and stand unattractive dirty (Tables V and VI) because assigned to other functions such as market, small businesses, and playground for young people, or these places become vacant space or defecation place. In Treichville, "Biafra" garden has been occupied by auto mechanics for more than 10 years. In the two green open spaces, the planning concept and design are the same, made of large shaded trees, benches (concrete) used to rest, stripped floor or partially covered with grass, and with public lighting (Koalla, 1995).

##### 4) Green Spaces for Embellishment (Aestheticism):

These spaces are different from gardens and squares by their shape, size and functions. There are roadsides, Central Island, median strip and motorways interchange right of ways.

<sup>5</sup> CNRTL: Centre National de Ressources Textuelles et Lexicales (National Center for Textual and Lexical Resources), France

Their main function is to beautify the city landscape. The case of Qinghua East Road (清华东路) and Xueyuan Road (学院路) in Haidian district (海淀区) in Beijing (China) is one of strict example of city beautification through an alley of verdure and trees planted.

In the case of Abidjan, the sites for embellishment are dynamic because these places also receive people for rest and entertainment (Koalla, 1995). This fact also explains the lack of garden in Abidjan city. These spaces are also very few. In Cocody district, “le boulevard de l’université” is one example of roadside greening for embellishment, and in Plateau commune, “Avenue chardy” is beautified by small trees planted along streets.

##### 5) Trees Planted:

The trees planted along the roads, in parks and gardens, and in other green spaces have different functions. These functions are summed at producing shadow for people, esthetical function, oxygen production and carbon castration (Le Cornec, 1982; Koalla, 1995). The trees further the compensation of urban ecological function. The main types of trees planted in Abidjan are *Lagerstroemia flos-regina* visible on boulevard VGE, *Cananga odorata*, *Acacia magium* and *Niangon*, and shrubs along motorways interchange (Rosine, 2010). (Figure VII and VIII)



Figure VII Landscape roadside in Abidjan



Figure VIII Landscaped road

TABLE V WELL-KNOWN PUBLIC GARDENS IN ABIDJAN, SOURCE: STAFF SURVEY

| Designation        | Date of Creation | Localization           | Area (m <sup>2</sup> ) | Estimated Cost of Maintenance per Year (euro) |
|--------------------|------------------|------------------------|------------------------|---|
| Place des Martyrs  | 2001             | Cocody Lycée Technique | 10,000                 | 5100  |
| Jardin Paul Godeau | 2009             | Treichville            | 10,000                 | 5100  |
| Carrefour Chu      | 1966             | Treichville            | 5,000                  | 2580  |
| Perles des Lagunes |                  | Plateau                | 31,200                 | 16100   |
| Place du Gourou    | 2007             | Adjame                 | 10,000                 | 5100  |
| 1er Pont           | 2005             | Yopougon               | 8,000                  | 4130  |
| Banco I and II     | 2009             | Attécoubé              | 18,000                 | 9288  |

TABLE VI SOME DISAPPEARED GARDENS TRANSFORMED INTO MARKET, PARKING LOT, OR ABANDONED, SOURCE: STAFF SURVEY

| Designation          | Date of creation | Locali zation                         | Area (m <sup>2</sup> ) | Estima ted cost of create on (euro) |
|----------------------|------------------|---------------------------------------|------------------------|-------------------------------------|
| Biaffra              | 1969-70          | Treichville                           | 80,000                 | 26,000                              |
| Cocody chateau d'eau | 1978             | Cocody                                | 8,000                  | 19,180                              |
| Le velodrome         | 1964-65          | Treichville                           | 7,500                  | 2,962                               |
| Latrille II          | 1971             | Cocody face Lycée classique d'Abidjan | 13,000                 | 20,550                              |

## V. URBAN RESIDENTS AND THEIR INTERESTS FOR GREEN SPACE

### A. Green Space's State in Abidjan

In general, green spaces are badly maintained. This situation is the consequence of ignorance of green space importance. A mayor explained to us that creating garden in his municipality is not a priority because people are more in need of road, electricity, schools and clean water than garden. The city managers really have some means for landscaping. However it is not a priority for them and this behavior is the cause of decay of garden, parks and other green spaces. All gardens constructed during colonization time and after the independence fell into decay or had been transformed into market or housing. And the residents lack of environmental awareness and treat the green spaces as unimportant spaces. During the survey, people have been asked about the presence of garden in their home; 258 or 86% have negatively responds against 16% that have a private garden in their residence. Is the indifference towards green spaces related to poverty, or just a cultural issue? In Africa, there are specific gardens that are different form from European and Asian gardens. Although, the African gardens are trees and shrubs planted in the center of courtyard which deliver oxygen and fresh air to the residents, there is also this contempt of the population towards the green spaces. Most of the gardens are unattractive, badly designed. What explains the fact that the citizens use these places as the place of garbage, defecation and urinal is testified by the following figures (Figure IX and X). According to the D.P.J, they only “manage 88.1771 ha of



green space in Abidjan or 0.6% of the whole territory of Abidjan”.



Figure IX A garden user in an unattractive garden



Figure X Dirty green space in Cocody district

#### B. Distance to Green Space and Frequency of Use

TABLE VII DISTANCE TO GREEN SPACE AND FREQUENCY

| Distance to a Green Space | Number of Respondent | Frequency |
|---------------------------|----------------------|-----------|
| no response               | 26                   | 8.70%     |
| less than 300 m           | 28                   | 9.30%     |
| 300-1 km                  | 47                   | 15.70%    |
| 1-5 km                    | 41                   | 13.70%    |
| more than 5 km            | 158                  | 52.70%    |
| Total                     | 300                  | 100%      |

As can be seen in Table VII above, 9.30% of the respondents live within 300 m of any type of green open space, which is the most common green space to have nearest to one's home. For that, it takes less than 15 min by walking to reach it. Only 13.70% reside within 1 to 5 km of any recreational green space. 15.70% of respondents live between 300m and 1 km of any green space. About 52.70% or 158 of

respondents need to travel more than 5 km before reaching a park or garden.

TABLE VIII FREQUENCY FO GREEN SPACE USE

| Frequency of Green Space Use | Number of Users | Frequency of Use |
|------------------------------|-----------------|------------------|
| no response                  | 2               | 0.70%            |
| every day                    | 17              | 5.70%            |
| several times/week           | 11              | 3.70%            |
| once/week                    | 46              | 15.30%           |
| once/month                   | 45              | 15.00%           |
| Seldom or never              | 179             | 59.70%           |
| Total                        | 300             | 100%             |

The frequency of different green space's use (Table VIII) varies according to users: the daily users of green space represent 5.70% of respondents. Only 3.70% visit green space several times a week whereas 59.70% or 179 of them never or rarely have visited a garden. 15.30% of respondents visit green spaces a week and 15% once a month. 258 out of 300 persons or 86% have responded that they didn't have any private gardens in their home, and they had a strong desire to frequent a garden, but according to them, the distance to a garden and the unattractive aspect of green spaces are the discouraging factors. That is explaining the high rate of non-visitors of garden or others green spaces. The respondents were also asked about the type of recreational space they used to visit or would like to visit. 171 or 57% have announced preferring the water and beaches, 95 or 31.66% desire visit parks and gardens. 10% of respondents prefer go hiking in the forest.

#### C. The Reasons of Green Recreational Space Use for Respondents

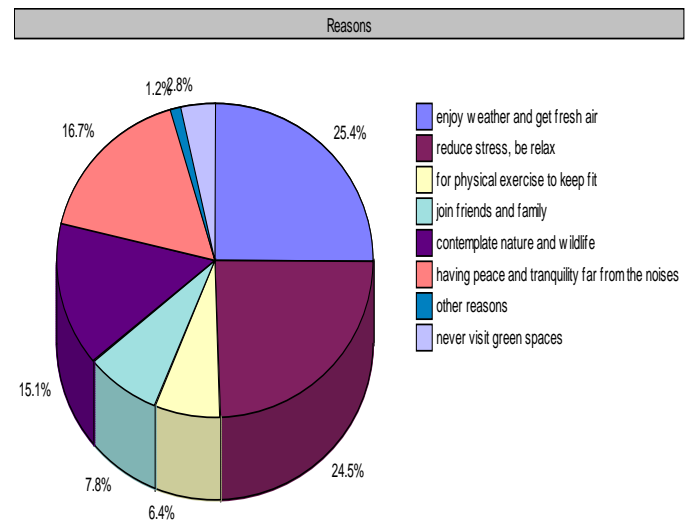


Figure XI Distribution of green space use's reasons

For Abidjan's dwellers surveyed, the main reason for them to visit a park, gardens or other green space is to enjoy weather and get fresh air (25.4%). That is explaining why asking about the recreational space they use, 57% of them prefer water and beaches, 31.66% desire visiting parks and gardens, and 10% want to go hiking in the forest to get fresh air and enjoy weather. A difference in gender can be observed especially among the young people mainly respondents: the mean of respondents' age is 29.95. The age group between 20

and 30 years is the most representative with 41.7% of respondents followed by the group age between 30 and 40 years representing 33.7% of surveyed. 23.86% of men and 27.58% of women state the reason of enjoying weather and getting fresh air as very important for them. 25.37% of the men and 23.27 of women affirmed that their main reason for using green space is to reduce stress and be relaxed. Any women has chosen other reasons and 3.87% of them use green space or parks for physical exercise to be fit. 1.81% of men have not visited gardens or other green space and 2.11% of them had other reasons of green use.

## VI. ANALYSIS AND DISCUSSION

### A. Urban Landscape Management

Comparing the creation and management of parks and other green spaces in Abidjan with other socio-economical facilities realization, it becomes clear that green space is not very important in point of view of city authorities. They therefore prefer invest more in market construction, school and hospital than gardens because they think city's residents like more these facilities than green space. And the primary impediments for them to acquire and maintain more public to open spaces are lack of effective leadership on the part of elected officials, lack of available funds for acquisition and ongoing maintenance, and the high cost of available land (Widdhon et al, 2003). Therefore, it has been remarked that any candidate at local election propose in his program green spaces promotion.

The citizens really don't have habit to green space use. 86% of them have responded that they don't have any private garden in their home and 59.7% of them never or rarely have visited a garden. This fact is linked to the social living standard. According to McConnachie and Shackleton (2010), attributes considered in green space use, include wealth, education and race although recognizing that there is frequently a strong correlation between the first two. Within Europe and North America, a number of studies have shown that both private and public green space is significantly influenced by education and wealth (Barbosa et al., 2007, Martin et al., 2004, Troy et al., 2007, Zhang et al., 2008, McConnachie and Shackleton, 2010). Otherwise, more people are wealthy, educated, more they like green space and spend money for getting it. In Abidjan, according to the survey we have carried out, 37.3% of citizens have any income and 46.0% have their income between 46 and 229 euro per month.

It's moreover very complex to define the nature of green spaces in Abidjan because, in the parks and gardens office, they used to term "Gardens" everything green in the city. There is not a net classification of different green spaces. This confusion should be related to the absence of landscape architect in all the process of creation and management. The distance, connectivity and attractive effect of the green spaces are reasons of under-use. The problems linked to the management and creation lay at the level of work organization, funding, absence of specialist, jurisdiction (law and competence). During the conference of African ministers of Housing and Urban Development (encompassing the 5<sup>th</sup> Assembly of the African Population Commission constituted in experts group for the ministerial segment) about the Funding of Housing and Urban Development more particularly in Africa held in Durban (South Africa) from 31<sup>st</sup> January to 4<sup>th</sup> February, the participants have argued that the paradox of urban underdevelopment is explained by the weakness or absence of competent institutions for governance and urban development. For Cheema (1987), the impacts of

programs aiming to provide housing, services and infrastructures in cities depends on the quality of institutions in charge of projects planning and achievement, therefore, the institutions constitute the most decisive factor in promoting urban sustainable development. Speaking about the quality of institutions, it means to set up empowered structures framed by the constitutional unambiguously laws, with real power of decision. Therefore, these institutions must be leaded by people chosen because of their competency, integrity and serious. Being known that the urban disorder is sometimes bound to the incompetency, corruption and cupidity of urban development officers, it then appears very important to redesign the strategies of urban development and beautification. Talking about the causes of frequent building collapse in Nigeria, Oloyede et al, have cited Falobi (2009); "the greed, incompetence, corruption, poor planning, poor enforcement of building code, inadequate public awareness and education, and limited financial and technical resources".

### B. Parks and Green Space Use

In South Africa, poor towns had less than 7% of their area as public green space whereas wealthier ones had 10-15% (McConnachie et al., 2010). This is below the international norms and common with others developing countries where the inequality in terms of public green space availability is mirrored economically by an increasing gap between rich and households. For example, in Bangkok (Thailand) the mean area of green space per person is only 11.8 m<sup>2</sup> and for parks only 1.8 m<sup>2</sup> (Thaiutsa, Puangchit, Kjelgren, & Arunpraparut, 2008; McConnachie et al., 2010). In Cote D'Ivoire and in Abidjan, any norms exist for that according to the assistant director of urban planning in the ministry of construction and urban planning. Given that 20% of Abidjan's citizens are poor and live without 1 USD per day (DSRP, 2009)<sup>6</sup>, and the use of green space linked to the financial condition of the individual coupled to the absence and unattractiveness of Abidjan city's gardens, it's therefore clear that the rate of green space use would be low. In South Africa, also a developing country like Cote d'Ivoire, generally, most of the garden and park's visitors are middle- to old-aged well-educated professionals with medium to high incomes (Catherine et al, 2010).

## VII. CONCLUSION

With the trends of urbanization in Cote d'Ivoire, the cities will continue to grow with appearance of new phenomenon. Some planners argue that modern lifestyle pollutes or destroys the ecosystems, and create urban heat island, causing climate change if the cities are poorly endowed with public green space. The gardens provide numerous benefits in terms of conservation, education and recreation, and contribute to urban ecology and physical and psychological well-being of city dwellers.

This study has shown the scarcity, the lack of interest and the unattractiveness of green space in Abidjan city. These facts are linked to the management system, which is approximately achieved. There are a real lack of fund to implement on ground some projects designed by the direction of Parks and Gardens.

<sup>6</sup> DSRP: Strategic Document for Poverty Reduction (Document Stratégique pour la Reduction de la Pauvreté)



The gardens and other green spaces are under-use because of the state of these spaces or the distance to the residents.

The city government should design laws, regulations and policies for greening development and sanitation, and let the direction of Parks and Gardens implement it. For that, they should provide fund, recruit landscape architects and planners for better design and monitoring green system development. Otherwise, the negative effects of insufficient green space will become apparent in the future (Louv, 2006; McConnachie et al., 2010).

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