ISSN: 3064-9846
Research Article

Journal of Agricultural, Earth and Environmental Sciences

Urban Forestry and Urban Greening in Yenagoa, Bayelsa State, Nigeria: A Contribution to Climate Change Mitigation

Jasper Ezenwaka

Department of crop and soil science, faculty of agriculture, Niger delta university, Bayelsa state, Nigeria

***Corresponding author:** Jasper Ezenwaka, Phd, Department of crop and soil science, faculty of agriculture, niger delta university, Bayelsa state, Nigeria.

Submitted: 16 September 2023 **Accepted:** 21 September 2023 **Published:** 29 September 2023

https://doi.org/10.63620/MKJAEES.2023.1013

Citation: *Ezenwaka., J. (2023). Urban Forestry and Urban Greening in Yenagoa, Bayelsa State, Nigeria: A Contribution to Climate Change Mitigation. J of Agri Earth & Environ mental Sciences 2(3), 01-05.*

Abstract

This research was aimed at finding out the practices of urban forestry and urban greening in Yenagoa, Bayelsa State, Nigeria. Climate change issue has become a major topic of discussion among even the non-environmentalists because of its several effects on human and his environment. Types of plant species planted by homesteaders were appraised as well as reasons for the choices. Knowledge of climate change (causes, effects, and mitigations) were also appraised. Among the 30 participants that were involved in the Convenient sampling semi-structured survey, 43% had knowledge of climate change; 33% had knowledge of its causes; 40% were able to show some knowledge of role of vegetations in environmental purification, while all (100%) participants agreed that they would plant more vegetations if they had the knowledge of climate change and what role vegetations could play in curbing its effects. Various plant species were found around the homesteads including tree species, ornamental / horticultural, and agricultural species. The reasons for keeping the various species included economic, medicinal, and aesthetic values, in addition to others. More environmental education activities are recommended in order to increase people's awareness to roles that greening of the environment can play in curbing the effects of climate change.

Keywords: Urban Forestry, Urban Greening, Climate Change, Conservation, Ecosystem Services

Introduction

Climate change, which is defined by the United Nations as "long-term shifts in temperatures and weather patterns"; caused greatly, by human activities, is at present, global, in its impact [1]. The UN reports that the impact is felt in various ways in different regions, and ranges from health to droughts, with consequences of famine, and a possible future rise in "climate refugees". To reverse the trend, climate action is required of governments, corporate, and private individuals [1]. The redemption of financial commitment by the industrialized economies to help the developing economies achieve more environment-friendly approaches to development, will be a way forward as well.

What Contribution can Urban Forestry make in this Regard?

Urban forestry is an integrated concept, which includes the raising and management of trees around built-up areas for their present and potential contribution to the physiological, sociological, aesthetic, environmental, and economic wellbeing of the urban society [2- 4]. The urban forester is saddled with the technical management of urban forests [5].

A careful observation of the planted vegetation in urban areas will show that there are other types of vegetations, apart from trees. In cities around Bayelsa State of Nigeria, the urban vegetations include horticultural and other arable agricultural crops that are planted around the homesteads. For these homesteads, every little space at the outdoors is utilized to grow various plants with reasons which include contribution to the household economy, achieving sociological and or physiological purposes. All of these (be it trees, horticultural, or other agricultural arable crops), ultimately contributes to urban greening, achieving additional positive (though unplanned) purposes like environmental preservation and conservation; Ezenwaka and Graves had reported that people are less aware of the supporting and regulating ecosystem services of vegetations, than the provisioning and cultural services [6].

Among the various benefits of urban greening are erosion control, noise and air pollution abatement, improvement in air quality, watershed protection, carbon sequestration, phytoremediation of air pollutants and heat control [7-16].

This paper aimed to appraise urban forestry and urban greening in Bayelsa State, Nigeria, with the specific objective of finding out benefits derived, or reasons for the action.

Method Adopted

In addition to desk-top review of literatures, primary data were collected from participants in Yenagoa-City, Bayelsa State, Nigeria. The Convenience sampling method (Overton & Diermen, 2014) was adopted because the population size was not certain. And according to Overton & Diermen (2014), Summer & Tribe (2008), Bryman (2004), and Laws et al, this non-representative sampling method is very appropriate when qualitative (semi-structured interview) approach is being employed as mode of data generation [17]. The interviews were conducted to the extent that new sessions were not yielding fresh information (Stewart-Withers et al, 2014). Photography, observation, and transects were other methods used in collection of primary data.

The research was exploratory, descriptive and explanatory in its purpose (Robson, 2002; Neuman, 2003; Marshal and Rossman, 2006), while the strategy (Marshal and Rossman, 2006) for achieving the purpose was through a survey (Yin, 1994).

In total, 30 participants were interviewed during this research. These included 20 urban dwellers, 5 traders (of fresh fruits), and 5 horticulturists / floriculturists (cultivators and sellers of flowering and ornamental plants). Deliberately, the number of questions for discussion were kept few, considering the busy schedules of many urban dwellers. Notes were taken during the interviews. The results from the interviews were collated and sorted according to themes, bearing also in mind the categorizations of benefits derivable from forest ecosystems [18, 6].

Results and Discussion

1. **Type of Plant Species Planted**

   The objective for this theme was to find out what plant species are chosen to be planted around the urban city of Yenagoa. It involved a careful observation and identification of the various plant types found around the chosen premises. Within the urban city of Yenagoa, a wide range of plant types were found (see a few photographs shown in the Figures 1 – 4 below). It included trees of various kinds (but mostly those that cast shades, especially the Terminalia spp.). There were palms (ornamental). There were various types of arable agricultural plants too, including plantains and bananas (Musa spp.), bitterleaf (Vernonia amydgalina), and fluted pumpkin (Telfaria occidentalis). Some medicinal and aromatic plants such as aloe vera (Aloe barbadensis), scent leaves (Ocimum gratissimum), and lemon grass (Cymbopogon citratus) were also found. Mostly, the choice or the combination of plants planted were determined by the purpose of the premise's owner (see section on 'reasons for choice' below). A few other premises owners just wanted to have a 'green' environment.

Figure 1: Terminalia spp.

Figure 2: Vernonia amydgalina

Figure 3: Musa spp.

Figure 4: Ornamental palms

2. Reasons for the Choice of Plants

This theme seeks to find out reasons for the various choices of plant species. The participants gave various reasons for their choices; these have been categorized according to the sub-themes explained below. This paper did not aim to report statistics of 'how many persons said what' but rather to report 'various probable reasons' for which urban dwellers would want to green their environment. This knowledge will be useful in planning any environmental education activity aimed to make urban dwellers to green their environment.

a. Economic (Income Earning)

A few persons explained that they earn some income from keeping the plants. some explained that they save money because 'they do not need to spend money buying those plant species for which they have already planted around their homesteads'. This benefit relates more to the agricultural, aromatic, and medicinal plants around the homestead. Those that had pumpkins, aloe vera, scent leaves, and bitterleaf (and the likes) reported that they earn income from the sales of these plants; they confirmed that these plants contribute to the household income. They therefore would maintain the plants so as to continue to provide such benefits. The interviewer did not want to probe to know how much income they earn from keeping the plants; the focus was to know 'why they keep those species.

b. Health (Medicinal Benefits)

Some participants reported that they made the choices because of the medicinal benefits they derive from such plants. Of particular interest was a house owner that planted King of bitters (Andrographis paniculata); Never die (Bryophyllum pinnatum), Aloe vera, and lemon grass (Cymbopogon citratus). These plants are reputed to provide healing benefits. The owners are able to harvest and make use of the plant parts whenever the need arises. However, the knowledge of medicinal benefits derivable from plants is not so widespread but seems to be gaining momentum among the urban dwellers.

c. Beautification, Recreation and Aesthetics

For many homestead owners in the urban centers, the beauty that such vegetations give is very satisfying. They enjoy the shades and the colors. Some participants made their choices because of the shades and beauty (Figures 5 & 6) such plants provide. These categories were more for the trees and colorful ornamental plants such as the Terminalia spp and Ixora spp. The presence of these vegetations adds to the beauty of the premises. In many cases, it also increases the rental value of such premises.

Figures 5 & 6: Plants chosen for their beauty, recreation and aesthetic values

d. Others

Among other various reasons the participants mentioned included environmental protection and purification, tourism, education, and species preservation. These reasons are categorized as 'others' because they were seldom mentioned by majority of the participants but by just very few (see Figure 7 below) that were perceived to be more environmentally informed or inclined. This also implies that urban dwellers are aware to an extent, of nonprovisional ecosystem services of the urban vegetations.

3. knowledge of Climate Change and Global Warming (Effects)

As important as the topic of global warming is, only 43% of the participants had a fair knowledge and were aware of the subject matter (see Figure 7 below). The source of their knowledge were mostly social media and mainstream news media. It shows that these media channels can be effective in driving the message of environmental preservation and conservation targeted at urban dwellers.

4. Knowledge of Causes of Climate Change

Only 33% of the participants (see Figure 7 below) had some knowledge of causes and contributors to climate change. They were able to mention deforestation, urbanization, human population growth, and fossil fuel as causes and contributors to climate change.

5. Knowledge of Role of Plants in Environmental Purification, and Curbing Climate Change Effects

For this discussion topic, 40% of the participants (see Figure 7 below) were able to show knowledge of the role vegetations play in curbing the effects of climate change and purification of the environment.

6. Will you Plant (and keep) More Vegetations if you knew the Additional Benefits of Keeping them?

This was more of a YES/NO question, and it was not surprising to see a 100% (see Figure 7 below) of the participants saying 'yes'. This result could be because the entire discussion session also yielded the unintended result of

awakening the consciousness of the participants to the extra roles that vegetations could play in making our environment more conducive. It also shows that more investment in environmental education or awareness creation will yield more positive results in conservation of environmental resources.

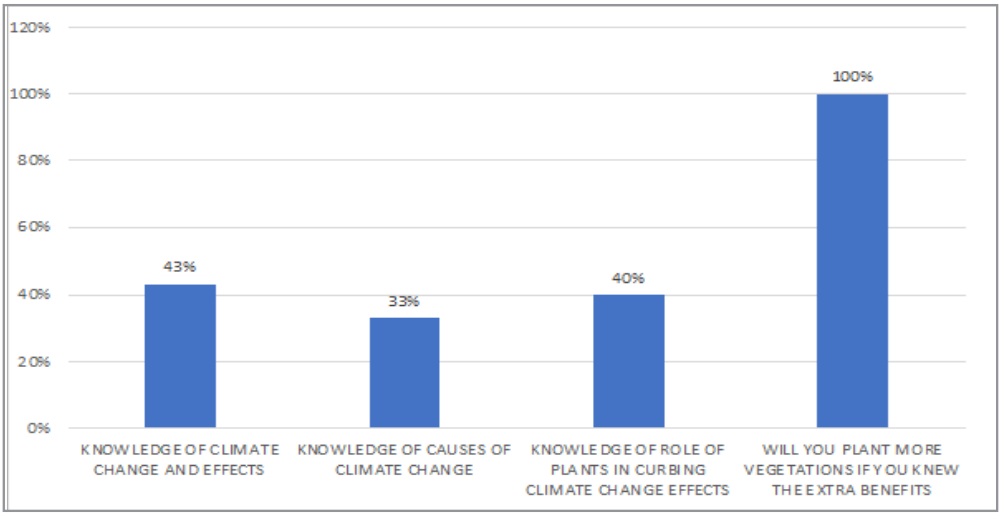

Figure 7: Various other Response

Conclusion and Recommendations

This paper has revealed that while rural dwellers are more focused on provisioning services of the forest ecosystem, the urban dwellers appreciates the other non-tangible ecosystem benefits hence, the various choices of plants grown around their homesteads [6].

In fighting forest ecosystem degradation and by extension curbing climate change effects, environmental education has to be intensified. Education is beneficial in influencing how people view benefits derivable from conservation of forest resources.

If urban dwellers are sensitized enough to understand the environmental benefits, especially in curbing effects of climate change, they may begin to participate by planting more vegetations around their homesteads [18, 19].

Declaration

Ethics Approval

Ethical standards relevant to the conduct of this field research were followed [20, 21, 17]. All necessary approvals were secured as the data collection involved third party individuals. Participants involved in the interviews were informed about the objectives of the research; what was expected from them, and securing their consent to participate in the research, and also explaining to them that they have the freedom to withdraw from the research at any point, and that all data would be anonymized and kept confidential.

Competing Interests

There are no competing interests to be declared.

Funding

No funds were received from external sources.

Availability of Data and Material

Field notes were written during the field interviews; photographs were also taken. These serves as the raw dataset and are available with the researcher.

References

1. Hassan, A. M., & Tawfeeq, S. N. (2023). the Role of the United Nations in Mitigating Global Climate Change. Russian Law Journal, 11(9S), 521-536. https://www.un.org/en/climatechange/what-is-climate-change
2. Jorgensen, E. (1974). Towards an urban forestry concept. Environment Canada.
3. Konijnendijk, C. C., & Randrup, T. B. (2004). Urban forestry. In J. Burley, J. Evans, & J. A. Youngquist (Eds.), Encyclopedia of forest sciences pp. 471–478. Elsevier.
4. Vogt, J. (2020). Urban forests: Biophysical features and benefits. In Encyclopedia of the World's Biomes Vol. 5, pp. 48–57.
5. Bettinger, P., Boston, K., Siry, J., & Grebner, D. L. (2016). Forest management and planning. Academic Press.
6. Ezenwaka, J., & Graves, A. (2014). Ecosystem services of the Niger Delta forests, Nigeria. Journal of Agriculture and Social Research, 14, 37–56.
7. Chambers, K. (1987). Urban forestry in the London borough of tower hamlets—An account of the European urban forestry project sponsored by the EEC. Arboricultural Journal, 11(1), 1-14.
8. Nowak, D. J., Crane, D. E., & Stevens, J. C. (2006). Air pollution removal by urban trees and shrubs in the United States. Urban Forestry & Urban Greening, 4, 115–123.
9. Fang, C. F., & Ling, D. L. (2005). Guidance for noise reduction provided by tree belts. Landscape and Urban Planning, 71, 29–34.
10. Fan, Y., Zhiyi, B., Zhujun, Z., & Jiani, L. (2010). The investigation of noise attenuation by plants and the corresponding noise-reducing spectrum. Journal of Environmental Health, 72, 8–15.
11. Escobedo, F. J., Kroeger, T., & Wagner, J. E. (2011). Urban forests and pollution mitigation: Analyzing ecosystem services and disservices. Environmental pollution, 159(8-9), 2078-2087.
12. mitigation: Analyzing ecosystem services and disservices. Environmental Pollution, 159, 2078–2087.
13. Stoffberg, G. H., Van Rooyen, M. W., Van Der Linde, M. J., & Groeneveld, H. T. (2010). Carbon sequestration estimates

of indigenous street trees in the City of Tshwane, South Africa. Urban Forestry & Urban Greening, 9, 9–14.
14. Haase, D., Schwarz, N., Strohbach, M., Kroll, F., & Seppelt, R. (2012). Synergies, trade-offs, and losses of ecosystem services in urban regions: An integrated multiscale framework applied to the Leipzig-Halle Region, Germany. Ecology and Society, 17(3), 22.
15. Agarwal, P., Sarkar, M., Chakraborty, B., & Banerjee, T. (2019). Phytoremediation of air pollutants: Prospects and challenges. In Phytomanagement of Polluted Sites (pp. 221–241).
16. Nowak, D. J., Hirabayashi, S., Bodine, A., & Greenfield, E. (2014). Tree and forest effects on air quality and human health in the United States. Environmental Pollution, 193, 119–129.
17. Artiola, J. F., Reynolds, K. A., & Brusseau, M. L. (2019). Urban and household pollution. In Environmental and Pollution Science (pp. 311–326).
18. Laws, S., Harper, C., Jones, N., & Marcus, R. (2013). Research for development: A practical guide (2nd ed.). Sage.
19. Ezenwaka, J. (2018). Rural community participation in sustainable management of the Niger Delta forests, Nigeria (Doctoral dissertation).
20. Ezenwaka, J. (2018). Stakeholder analysis and participation: Key to sustainable renewable natural resources management. In NIWARD 2018 Conference Proceedings (pp. 74–92). https://niwardconference.blogspot.com/
21. Borovnik, M., Leslie, H., & Storey, D. (2014). Practical issues. In R. Scheyvens (Ed.), Development fieldwork: A practical guide (2nd ed.). Sage.
22. Banks, G., & Scheyvens, R. (2014). Ethical issues. In Development field work: A practical guide (pp. 160-187). SAGE Publications, Ltd.