ISSN: 2044 -3112
Volume 15, Number 2, 2023
International Journal of Research in Agricultural Science

ECOSYSTEM DISSERVICES OF URBAN FORESTRY IN YENAGOA, NIGER DELTA, NIGERIA

Jasper Ezenwaka, PhD
Department of Crop and Soil Science,
Faculty of Agriculture, Niger Delta University, Bayelsa State, Nigeria.

Email:jezenwaka2001@gmail.com; jasper.ezenwaka@ndu.edu.ng
ORCID: 0000-0002-6745-5427

ABSTRACT

People want to green their environments and practice urban forestry because of the associated ecosystem services, but with it comes some unwanted, unplanned, and unexpected negative impacts on their wellbeing. These unwanted negative impacts are now termed ecosystem disservices (EDS). This study aimed to find out the awareness of EDS among urban dwellers in Yenagoa, Nigeria. It also had the objectives of collating what the participants classify as an EDS, and to know if the EDS will sway people from practicing urban forestry. The semi-structured interviews involved 30 participants who were selected through a combination of convenience and purposive sampling methods. The result showed that although people experience the unanticipated negative impacts from the urban forest ecosystem, they were not aware of what to name them; they simply lived with it. Many EDS were mentioned, including costs of maintenance, leaf litters, damages to infrastructure and assets, health issues (harboring of disease vectors such as mosquitoes), harboring of criminals, harboring of venomous reptiles and dangerous wildlife, damages to lawns and landscapes, attraction of strange or unwanted persons, and death. Despite these EDS, they all will still want to keep their environment green. Environmental education in the aspect of safe practices, choice of species, and maintenance are recommended for practitioners of urban forestry.

Keywords: ecosystem disservices, conservation, urban greening, ecosystem services, urban forestry

INTRODUCTION

Ecosystem disservices (EDS) refers generally to any and all negative impacts or effects the ecosystem has on human wellbeing. These disservices may not have been envisaged by humans. This is more so because most often, people think more of the beneficial services of the environment especially as classified as ecosystem services (MEA, 2005). Ezenwaka (2023) in his work on urban forestry and urban greening in Yenagoa found many reasons why people would plant vegetations around their homesteads. And because people have paid less emphasis on the disservices, studies on EDS is at present very scanty (Shackleton et al, 2016) while studies on benefits which people derive from the environment have enjoyed so much attention in the past 20years (Constanza et al, 2017).

Interest is beginning to build in the aspect of ecosystem disservices. Ecosystems can affect humans negatively also (Guo et al, 2022).

EDS have been variously defined. Lyytimaki and Sipila (2009) explained that EDS refers to "ecosystem functions adverse to human wellbeing". It refers to the negative effects of nature on humans; it is a socio-ecological interaction which has the power to influence people's perception of nature (Shuyao et al, 2023). Because it has the potential of influencing people's perception of nature, if EDS is not reduced to a manageable minimum, it can sway people from adopting environmental friendly actions such as urban greening (Blanco et al, 2019). Shuyao et al (2023) found in China that EDS causes a considerable financial loss.

According to Shackleton et al (2016), EDS must have two features to qualify as EDS: the adverse effect must not be caused by human but from features or processes of the ecosystem, and that it impacts negatively on any dimensions of human wellbeing.

Seeing the importance of EDS, many organisations are now incorporating concepts of EDS valuation systems or conceptual frameworks and policies (Guo et al, 2022).

Efforts have been made to classify or value EDS. Shuyao et al (2023) listed the followings as qualifying as EDS: direct financial costs, loss of goods, loss of revenues, unpleasant feelings, diseases, injuries, spending on infrastructure repair or infrastructure damage and unsafe feeling. It can be as a result of biological invasions (Shackleton et al, 2016) and by other unwanted aspects of the plant ecosystem (Escobedo et al, 2011). Vaz et al (2017) posited that any negative ecosystem impact on health, material, security and safety, cultural and aesthetic, leisure and recreation, should qualify as EDS. Gomez and Barton (2013) included blockage of view, allergies, accidents, fear and stress, damages to infrastructure, and habitat competition with human in the list of EDS.

Guo et al (2022) made efforts and created an index system in the research of EDS in different ecosystems including agriculture (farmlands), urban, urban forests, urban birds, plant invasions, and environment. Their publication also mapped major types of ecosystems where researches have been focused and papers published, these included (ranked from the highest number downwards) urban ecosystem, forestry, agriculture, rural, wetland, and desert ecosystems.

What is the awareness of EDS by dwellers of the urban city of Yenagoa, Niger Delta, Nigeria? Or, what will they classify as EDS?

Guo et al (2022) compiled researches done on EDS. Among the top ten (10) countries in the field of EDS research in terms of published papers, only South Africa, with a total number of 42 publications, occupying the 6th position on the list, was the only African country. This publication is intended to add to the literatures as it paints a picture of what EDS constitutes in parts of Nigeria.

METHOD

This exploratory research (Robson, 2002; Neuman, 2003; Marshal and Rossman, 2006) was conducted in the urban city of Yenagoa; Yenagoa is the Capital of Bayelsa State, in the heart of the Niger Delta in Nigeria. The city has several other towns within it including Ekeki, Okaka, Amarata, Kpansia and Zarama, where the participants were interviewed and all of the photography taken.

A social survey (Yin, 1994) involving thirty (30) participants was conducted. The participants were chosen through a combination of convenience and purposive sampling methods (Overton & Diermen, 2014). Convenience and purposive sampling methods were chosen because the study wanted individuals with vegetations around their premises to be the focus of the semi-structured discussions. The index system created by Guo et al (2022) was followed.

The session's discussions were centered around (i) awareness of ecosystem disservices, (ii) what in their personal experience, constitute an EDS (iii) if the EDS will make them not to green their environment.

Notes were taken during the discussion sessions. Data collection also involved transect walks, observations, and photography. The transcribed notes were later analyzed through a thematic content analysis.

RESULTS AND DISCUSSION

The results are presented and discussed under three themes (i) awareness of ecosystem disservices (ii) what constitutes an EDS or examples of EDS, and (iii) if the EDS will sway people from greening their environment.

Awareness of ecosystem disservices:

The term, ecosystem disservice was not known to any of the participants. But with further probing, using phrases such as 'negative impacts of vegetations and trees around the homestead', 'unpleasant experiences as a result of vegetations and trees around the homestead', 'what they do not like about the vegetation and trees around their homestead', they all (100%) were able to relate with the theme and began to give various examples. This outcome shows that people are not so much aware that those negative impacts are actually disservices from the environment. They live with it. They have accepted it as an integral part of greening their environment.

Examples of EDS in Yenagoa, Bayelsa State, Nigeria

Under this theme, the interest of the analysis was not in knowing how many participants said 'what', but in collating what negative impacts the participants mentioned as an EDS. The various disservices that were mentioned include the followings:

1. Associated cost of maintenance:
   Shuyao et al (2023) mentioned costs as part of EDS. The participants enjoy the benefits (ecosystem services) provided by the surrounding vegetation but frowned at the cost of maintenance of the vegetation. A participant said 'the vegetation will grow out of shape if not maintained regularly'; another said 'it becomes bushy and looses its beauty'; another said 'it costs me a budget to engage a gardener that does it for me'.

   This implies that disservices provides employment for others. So EDS could be a source of income to service providers in areas of
   (a) tree-crown pruning (Figure 1),
   (b) having to professionally bring down a tree that's no longer needed (Figure 3),
   (c) Clearing of leaf litters (Figure 5)
   (d) Lawn and garden maintenance
   (e) Roof and building repairs (Figures 7 & 8)

2. Leaf litters:
   Of special note was a participant whose entire compound was littered with leaves (Figures 4, 5 & 6). This, according to this participant, gives the family a huge burden in always trying to clear the leaf debris.

3. Damages to infrastructure and assets:
   This example were in instances where:

   (a) the buttress roots of the trees had caused damages to the foundation of the building, also causing cracks in the walls of the building (Figures 2 & 3).
   (b) another cited example was the lodging (falling over) of old (aged) trees, becoming a hazard to both infrastructure, assets such as parked vehicles, and human.
   (c) snapping of tree branches causes damage to infrastructure as well; this happens during wild winds.

4. Health issues:
   The participants mentioned that the vegetation harbors and encourages the multiplication of disease vectors such as mosquitoes.

5. Harboring of criminals:
   The participants listed this *safety and security* concern as an EDS; this conforms to the list given by Vaz et al (2017). A participant explained that 'criminal elements could take refuge or hide within the shade of the vegetation at night to unleash an attack'. Another participant mentioned that 'it blocks the view, preventing someone from correctly assessing what's ahead'. Gomez and Barton (2013) listed blockage of view as an EDS.

6. Harboring of harmful wildlife:
   All the participants gave instances of sighting venomous reptiles (snakes) at least once, in their gardens. A participant said 'this is one of the greatest dangers of keeping vegetation around the homestead'. This, according to another participant 'costs me money in carrying out fumigation against these reptiles especially'.

7. Damages to landscapes:
   A participant showed an area within the premises that used to be covered with beautiful lawn but the lawn is now eradicated because of the constant leaf litters on them. See figures 4 and 6.

8. Attraction of unwanted or strange persons:
   A participant mentioned the attraction of strange persons coming around for photography around the premises; the aesthetics seem to attract persons and passersby who then wants to pose for a photograph. This participant stated the fears that some of these persons may nurse criminal intentions afterwards.

9. Death:
   A participant recounted a fatal incidence due to lodging of trees and snapping of tree branches due to wind. Yenagoa is in the humid tropics, with stormy rainfall pattern. The presence of trees could pose such fatal risks during such storms. This may not only be around homesteads, but along the motorways as well, especially motorways which has trees lined up on its sides.

Will the EDS sway you from greening your environment?

It was a mixed feeling for the participants, but they all (100%) confirmed that because of the numerous benefits derivable from greening their environment (Ezenwaka, 2023), they will continue to green their environment. To these participants, the listed ecosystem disservices can be managed because there are solutions around each of them.

CONCLUSION AND RECOMMENDATIONS:

This research work has found that people may not be aware of what exactly to call or name the discomforts they experience as a result of greening their environment or practicing urban forestry, but they sure feel some discomfort. These sources of discomfort, can become a source of employment or income earning for other service providers who are able to help alleviate these ecosystem disservices.

Despite the ecosystem disservices, people will still want to practice urban forestry because they appreciate the benefits accruable from practicing urban forestry or greening their environment. This conforms to the conclusion of Shuyao et al (2023) in their work which evaluated and compared costs of the ecosystem disservices as against the benefits from ecosystems in Beijing, China.

It is noteworthy to recommend environmental education to practitioners of urban forestry especially in the aspect of safe practices, choice of species, and maintenance.

Figure 1: Trees in urban areas growing under a powerline constitutes an hazard

Figure 2: Buttress root system causes huge damages to infrastructures

Figure 3: This tree with buttress root have been cut down because of the damages being caused to the foundation of the nearby building

Figure 4: Leaf litters from the tree

Figure 5: Labour, for clearing the leaf litters and attendant financial cost implications

Figure 6: The constant leaf litter has smoldered and eliminated the beautiful lawn

Figure 7: Leaf litters on the roofing sheet

Figure 8: The leaf litters also affects the roofing sheet

DECLARATION:

Ethics approval:

The consent of the participants were sought, and their rights under this field study was told them. Issue of confidentiality of their personal information was also agreed.

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

Blanco, J., Dendoncker, N., Barnaud, C. and Sirami, C., 2019. Ecosystem disservices matter: Towards their systematic integration within ecosystem service research and policy. *Ecosystem Services*, *36*, p.100913.

Costanza, R., De Groot, R., Braat, L., Kubiszewski, I., Fioramonti, L., Sutton, P., Farber, S. and Grasso, M., 2017. Twenty years of ecosystem services: how far have we come and how far do we still need to go?. *Ecosystem services*, *28*, pp.1-16.

Escobedo, F.J., Kroeger, T. and Wagner, J.E., 2011. Urban forests and pollution mitigation: Analyzing ecosystem services and disservices. *Environmental pollution*, *159*(8-9), pp.2078-2087.

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*, *5*.

Gómez-Baggethun, E. and Barton, D.N., 2013. Classifying and valuing ecosystem services for urban planning. *Ecological economics*, *86*, pp.235-245.

Guo, R.Z., Song, Y.B. and Dong, M., 2022. Progress and prospects of ecosystem disservices: an updated literature review. *Sustainability*, *14*(16), p.10396.

Lyytimäki, J. and Sipilä, M., 2009. Hopping on one leg–The challenge of ecosystem disservices for urban green management. *Urban Forestry & Urban Greening*, *8*(4), pp.309-315.

Marshall, C. & Rossman, G.B. (2006): *Designing Qualitative Research*. Fourth ed. Thousand Oaks, SAGE Publications.

Millennium ecosystem assessment, M.E.A., 2005. *Ecosystems and human well-being* (Vol. 5, p. 563). Washington, DC: Island press.

Neuman, W.L. (2003): *Social Research Methods*. 5th ed. USA: Allyn and Bacon.

Overton John & Diermen Peter Van (2014): "Quantitative Research" In: *Development Field Work: A Practical Guide (2nd Edition); Regina Scheyvens (eds)*. Sage.

Robson, C. (2002): *Real World Research: A Resource for Social Scientists and Practitioner-Researchers.* 2nd ed. Oxford: Blackwell.

Shuyao Wu, Jiao Huang, and Shuangcheng Li, 2023. Classifying ecosystem disservices and comparing their effects with ecosystem services in Beijing, China https://arxiv.org/pdf/2001.01605.pdf#:~:text=Final%20ecosystem%20disservices%20can%20be,revenue%2C%20unpleasant%20feelings%2C%20etc. assessed 27 October 2023.

Shackleton, C.M., Ruwanza, S., Sinasson Sanni, G.K., Bennett, S., De Lacy, P., Modipa, R., Mtati, N., Sachikonye, M. and Thondhlana, G., 2016. Unpacking Pandora's box: understanding and categorising ecosystem disservices for environmental management and human wellbeing. *Ecosystems*, *19*, pp.587-600.

Vaz, A.S., Kueffer, C., Kull, C.A., Richardson, D.M., Vicente, J.R., Kühn, I., Schröter, M., Hauck, J., Bonn, A. and Honrado, J.P., 2017. Integrating ecosystem services and disservices: insights from plant invasions. *Ecosystem services*, *23*, pp.94-107.

Yin, K. R. (1994): *Case Study Research*. 2nd ed. Thousand Oaks: Sage Publications.