



Avifauna Loss Driven by Habitat Degradation in Ethiopia

Kuma T* and Fikadu W

Department of Biology, Ambo University, College of Natural and Computational Sciences, Ethiopia

***Corresponding author:** Tolera Kuma, Ambo University, College of Natural and Computational Sciences, Department of Biology, Ethiopia, Email: tolerakuma@gmail.com

Review Article

Volume 6 Issue 1

Received Date: December 27, 2022

Published Date: January 11, 2023

DOI: 10.23880/izab-16000435

Abstract

Biodiversity refers to varieties of taxa in ecosystems. Futile land use could deteriorate environmental quality, and loss of prime agricultural lands, and this, in turn, cause loss of wildlife habitat. Anthropogenic impacts have been bringing a dramatic change to nature due to the growing trends of the human population of the present time which give rise to an increase in the use of natural resources. Ethiopia faces serious environmental challenges including climate change and aspects of ecosystem degradation such as deforestation, loss of biodiversity, and soil fertility decline. Land degradation costs Ethiopia about 4.3 billion dollars per year and deforestation is the main cause of biodiversity loss. Henceforth, this work aimed at reviewing on effects of human-induced factors on biodiversity and conservation challenges in selected National Parks of Ethiopia. The major causes of bird extinction are direct hunting for food and traditional uses and indirect using habitat destruction and climate changes. This work analyzed that there were anthropogenic-induced threats entailing the loss of species and environmental degradation and depletion occur mainly due to anthropogenic impacts as human numbers increase. In a conclusive, effects-driven human involvement was seen as the major factor impairing the diversity of avifauna in Ethiopia. Research-driven policies fostering the lasting conservation of avifauna are highly needed. The attempts of conserving and maintaining a healthy bird population and their habitats would preserve diverse ecosystem services by benefiting many different living species and finally human well-being.

Keywords: Anthropogenic effects; Avifauna; Biodiversity; Habitat degradation; Threats

Background and Research Aims

Biodiversity is vital to human well-being because it underpins the functioning of ecosystems upon which human life depends. Short for 'biological diversity, the term describes the genetic pool, extent, and variety of species and ecosystems [1]. Human activity over the last century, and particularly since 1950 coinciding with unprecedented levels of human population growth, has placed ecosystems under considerable changes and stress [2]. Important habitats are being lost and degraded, ecosystems are being destabilized through pollution, climate change, and direct

human impacts, and many species are declining to critical population levels [3]. Human-induced factors can have a major subside on ecosystem functioning and stability which are often reflected in changes to biodiversity [4]. Birds have been more susceptible to and affected by environmental changes such as land-use changes among wildlife [5]. Particularly, alteration of the environment of freshwater lakes by land-use changes is known to harm bird community structure [4,6].

Patterns of abundance and distribution of birds are strongly related to environmental factors [7]. The astonishing

avian richness can be attributed to its rich and diverse climatic zones, topography, and habitats. Thus, the various lush and green forests, woodlands, moist and arid savannah, lakes, rugged terrain, and wetlands are home to Ethiopian birds [8]. Diversity of avifauna represents one of the most important ecological indicators to evaluate the quality of habitats and it has been decreasing due to the destruction of natural habitats and human disturbances while area occupancy by bird species in disturbed or strongly seasonal habitat types tends to be larger [9].

Ineffective land use could deteriorate environmental quality, and loss of prime agricultural lands, and this, in turn, causes loss of wildlife habitat [4]. Low- and middle-income countries would hasten a dietary transition towards higher consumption of meat, fruits, and vegetables, relative to that of cereals, requiring commensurate shifts in output and adding pressure on natural resources [10].

To review on effects of human-induced factors on biodiversity and conservation challenges in selected National Parks of Ethiopia. This review paper can provide a research gap for the concerned body to take necessary action and awaken the managers and policymakers to give attention. It could also help to recommend better solutions how to overcome conservation challenges. Anthropogenic impacts have been bringing a dramatic change to nature: this is due to the growing trends of the human population of the present time which give rise to an increase in the use of natural resources. This leads to the depletion and degradation of natural resources [11]. The degradation of natural resources is discussed given global trends concerning the achievement of the millennium development goals [12]. Now a day's natural resource degradation is critically affecting the social, economic, and environmental needs of the current generation and is feared to risk future life all over the globe, moreover, its impact is stronger in developing countries [13]. Africa is well capable of land and natural resources, including farmland, rangelands, forests, wildlife, minerals, and others, yet its people remain among the poorest in the world because most African natural resource-related policies failed to integrate environmental and social concerns, thereby exacerbating inequalities, poverty, and environmental degradation.

Though Africa has been a ground for experimentation on land reforms since the colonial period, the changes in land-use patterns have, in turn, resulted from increased soil erosion, land degradation, overgrazing, deteriorating rangelands, deforestation, as well as land and resource-related conflicts [14]. There is a combination of increasing population growth and consumption levels that are changing the planet's ecosystems at an unprecedented rate and scale, resulting in rates of biodiversity loss that pose a major threat to human well-being. Hence, this review aimed at analyzing avifauna

diversity loss driven by habitat degradation in Ethiopia: a review on biodiversity and environmental changes.

Analysis of Related Work

Habitat Degradation and Fragmentation

According to FAO [10], satisfying increased demands on agriculture with existing farming practices is likely to lead to more intense competition for natural resources and high-input, resource-intensive farming systems, which have caused massive deforestation, water scarcities, soil depletion, and high levels of greenhouse gas emissions, cannot deliver sustainable food and agricultural production.

Ethiopia faces some serious environmental challenges including climate change and aspects of ecosystem degradation such as deforestation, loss of biodiversity, and soil fertility decline [15,16]. Degradation related to land use and cover change costs Ethiopia about 4.3 billion dollars per year and deforestation is the main cause of biodiversity loss [17]. These environmental challenges coupled with a fast-growing human population have contributed to persistent food insecurity and malnourishment [18].

Overview of Biodiversity Loss

The importance of biodiversity management has acquired recognition only recently. Humankind has been using natural resources since it emerged as *Homo sapiens*. Throughout the millennia, human knowledge and technology have grown in leaps and bounds. Such growth, although slow initially (e.g. Change from Stone Age to the (Iron Age), had as time passed, the gaps in technological change (revolution) became shorter and shorter, and the rate of knowledge and skills acquisition growing faster and faster, respectively. Despite this vast accumulation of knowledge and skills, it is only recently that truth has become obvious, and that is unless natural resources [4]. In dealing with the environment, there is a need to focus activities at the local, national and regional levels, so that a global perspective could emerge in a more realistic manner. As the problems of developing countries, particularly the least developed countries, of which the majority are in Africa on which Ethiopia is included, became a subject of deliberation and Study, the vicious circle of poverty biodiversity degradation poverty became recognized. In other words, in developing countries, people are more dependent on natural resources, particularly renewable resources, than people in developed countries, and this dependence leads to resource depletion natural and degradation.

Environmental degradation and depletion occur mainly due to anthropogenic impacts as human numbers increased,

however, there were fewer and fewer natural resources to be utilized on a sustainable basis, and overexploitation and mining of resources had to occur to satisfy more and more people with less and fewer resources. The causes for this state of affairs are many and complex [18].

Forest ecosystems are important sources of ecosystem services (ES) and goods for millions of people. Despite their importance, forest ecosystems and covers have been changing across the world over the past decades due to both direct and indirect drivers, such as agricultural expansion (both commercial and subsistence agriculture), demographic pressure, timber extraction, and logging, fuelwood collection, and charcoal production, uncontrolled fires, livestock grazing, mining, urbanization, and infrastructural development. In forest ecosystems, alteration of vegetation structure and habitat fragmentation through deforestation and forest degradation due to settlement and cultivation land expansion, and livestock overgrazing are among the main threats affecting biodiversity. Forest birds are particularly susceptible to alterations in vegetation structure and forest extent because of their dependence on vertical vegetation structure [7]. However, many studies of forest birds have found variable responses of different species to disturbance, depending on certain species-specific ecological traits and the nature and severity of disturbance. Nonetheless, many forest specialist species are known to be negatively affected by forest disturbance. In contrast, habitat generalist species that are better adapted to a wider range of habitats, such as woodland, open, and/or shrub habitats can positively exploit habitat changes.

Habitat Degradation and its Effect in Ethiopia

Habitat destruction is the process in which natural habitat is rendered functionally unable to support the species present. In this process, the organisms that previously used the site are displaced or destroyed, reducing biodiversity. Habitat destruction by human activity is mainly for harvesting natural resources for industry production and urbanization. Causes of habitat clearing habitats for agriculture are the principal cause of habitat destruction. Other important include mining, logging, trawling, and urban sprawl. Ethiopia faces some serious environmental challenges including climate change and aspects of ecosystem degradation such as deforestation, loss of biodiversity, and soil fertility decline [15]. Degradation related to land use and cover change costs Ethiopia about 4.3 billion dollars per year. Deforestation is the root cause of biodiversity loss [17]. These environmental challenges coupled with a fast-growing human population have contributed to persistent food insecurity and malnourishment. Increased demands on agriculture cause intense competition for natural resources and high-input, resource-intensive farming systems [18]. This factor causes

massive deforestation, water scarcities, soil depletion, and high levels of greenhouse gas emissions, and cannot deliver sustainable food and agricultural production [19].

Avifauna Diversity Loss by Habitat Degradation in Ethiopia

The major causes of bird extinction are direct (e.g., hunting for food and traditional uses) and indirect (habitat destruction and climate change) anthropogenic-induced threats. Such species-specific local or global extinction entails not only loss of species, but also loss of the ecosystem services associated with the species. Therefore, effective conservation of birds and their ecosystem services in countries including Ethiopia where bird diversity and endemism are high, but a change in their habitat occurs at an overwhelming rate should be seen as a priority management action. That requires updated and reliable ornithological data on how birds respond to habitat changes. Information from ornithological studies could help decision-makers understand the conservation importance and status of sites to prioritize conservation and develop appropriate conservation measures needed. One major cause of global biodiversity decline is habitat degradation and destruction due to anthropogenic actions. Understanding the responses of biodiversity components, such as birds, to human disturbances is important to enabling informed conservation decision-making [20].

Removal of timber, twigs, and leaves, which are used for fuel and grazing land for the livestock leads to erosion. Most who enter the biomass fuel business are poor and vulnerable members of the society such as women household heads, landless farmers, widowed/divorced poor women, and orphaned children lacking other opportunities to secure their livelihood, who are highly dependent on forests for income generation. The deforestation of watersheds has resulted in loss of genetic resources, flooding and wood scarcity. Illegal settlements in the parks enable the people to have free access to entry and collect fuelwood [21]. They recommended that protection of the area is mandatory for wildlife conservation especially for birds to enrich their diversity, and abundance and to maintain the natural ecological balance of the area.

Biodiversity Conservation Challenges

Tropical deforestation has become a global concern, with an annual total forest loss of 9.4 million. The total forested area of Ethiopia has decreased substantially during the past half-century or so. Recent figures show that the country's forest cover has shrunk to less than 3–3.6% [22]. Forest loss in northern Ethiopia probably goes back many hundreds of years [23], with the main remaining forest now confined almost entirely to the southern part of the country.

Conclusion

There are over 1850 species of birds in Africa, of these 926 are found in Ethiopia. Among the avian species that occur in Ethiopia, 16 are endemic. The major causes of avifauna biodiversity decline are natural land-use changes, pollution, changes in atmospheric CO₂ concentrations, changes in the nitrogen cycle and acid rain, climate alterations, and the introduction of exotic birds. Ethiopia faces some serious environmental challenges including climate change and aspects of ecosystem degradation such as deforestation, loss of biodiversity, and soil fertility decline. Degradation related to land use and cover change costs Ethiopia about 4.3 billion dollars per year and deforestation is the main cause of biodiversity loss. These environmental challenges coupled with a fast-growing human population have contributed to persistent food insecurity and malnourishment. Birds provide numerous key roles in the ecological balance of resources in each habitat in the biosphere. Birds' seed dispersal mechanism helps to facilitate the wider distribution of numerous plant species to remote parts of the earth building up the biodiversity and richness of the receiving ecosystems, and the movement of the offspring away from the parent, thus helping to reduce competition. In addition, their scavenging nature prevents various infectious diseases by cleaning local habitat's carcass, which may harbor pathogenic microorganisms. Moreover, their role in nutrient cycling promotes the growth of primary producers, which in turn attract top predators exerting a bottom-up effect on the food web. Other services like recreational, pest control, pollination, and sacrament also have significant importance in sustaining the ecosystem and human welfare.

Implication for Conservation

Most of the services provided by birds in one way or another have economic and ecological value but few of them are not classified. Acknowledging the important ecosystem services birds offer is still uneasy and unaccredited because of insufficient information. Moreover, these services remain out of the market, perhaps, because they are generally obscure and hard to evaluate. Research-driven policies fostering lasting conservation of avifauna: conservation, restoration, and management of their habitats and control of illegal birds' trade are highly needed. The attempts of conserving and maintaining a healthy bird population and their habitats would preserve diverse ecosystem services by benefiting many different living species and finally human well-being. This review manuscript is relevant as it provides current status and gives hints of gaps for researchers as well as future fate biodiversity.

- **Ethics Approval and Consent to Participate:** Not applicable

- **Consent for Publication:** I agree to the publication policy and bylaws
- **Availability of Data and Materials:** All the data were put on the paper
- **Competing Interests:** Not applicable
- **Funding:** Not applicable
- **Authors' Contributions:** Not applicable, only a single author participated
- **Acknowledgments:** Not applicable

References

1. Secretariat of the Convention on Biological Diversity (CBD) (2010) Global Biodiversity Outlook 3. Montréal: CBD Secretariat.
2. Crutzen P (2002) The effects of industrial and agricultural practices on atmospheric chemistry and climate during the Anthropocene. *Journal of Environmental Science and Health* 37(4): 423-424.
3. IUCN (2011) IUCN Red List of Threatened Species. Version 2011.2.
4. Mengesha G, Mamo Y, Sahle K, Elphick C, Bekele A, et al. (2014) Effects of Land-use on Birds Diversity in and around Lake Zeway, Ethiopia. *Journal of Science and Development* 2(2).
5. Kolecek J, Reif J, Astny KS, Bejcek VR (2010) Changes in bird distribution in central European countries between 1985-1989 and 2001-2003. *J Ornith* 151: 923-932.
6. Hilli-Lukkarinen M, Markku K, Jukka S (2011) The effect of changes in land use on waterfowl species turnover in Finnish boreal lakes. *Ornis Fennica* 88: 01-10.
7. Aynalem Y, Afework B (2018) Diversity, distribution, and habitat association of birds in Menze-Guassa Community Conservation Area, Central Ethiopia. *International Journal of Biodiversity and Conservation* 10(9): 372-379.
8. Urban EK, Brown LH (1971) A Checklist of Birds of Ethiopia. Addis Ababa University Press. Addis Ababa, Ethiopia. *Ornithology* 89(2): 460-461.
9. Bhadja P, Vaghela A (2013) Study on Avifaunal Diversity from Two Freshwater Reservoirs of Rajkot, Gujarat, India. *International Journal of Research in Zoology* 3(2): 16-20.
10. Food and Agriculture Organization (2017) The future of food and agriculture: Trends and Challenges.
11. Prabhu L (2012) Green revolution: impacts, limits, and the path ahead. *Proc Natl Acad Sci USA* 109: 12302-

12308.

Stockholm University, Sweden.

12. Theodor F (2007) Degradation of Natural Resources and Measures for Mitigation. In: Handbook of the International Seminar on Enhancing Extension of Conservation Agriculture Techniques in Asia and the Pacific, Asian and Pacific Centre for Agricultural Engineering and Machinery (APCAEM) and Ministry of Agriculture of the Peoples Republic of China, Zhengzhou China pp: 24-26.
13. Gedion G (2000) The environmental strategy of Ethiopia at present and beyond pp: 1-29.
14. Hassen AG (2018) Land, Forest, Wild Life, Biodiversity, Water, and Soil Resources of Ethiopia and Their Problems Research & Reviews: Journal of Agriculture and Allied Sciences 7: 2.
15. Senbeta F (2006) Biodiversity and ecology of Afromontane rainforests with wild *Coffea arabica* L. populations in Ethiopia. Gottingen: Cuvillier Verlag.
16. Gemechu Ango T (2016) Ecosystem Services and Disservices in an Agriculture-Forest Mosaic: A Study of Forest and Tree Management and Landscape Transformation in Southwestern Ethiopia. Thesis, Stockholm University, Sweden.
17. Federal Democratic Republic of Ethiopia (FDRE) (2005a). National biodiversity strategy and action plan.
18. (2015) World Population Review. Ethiopian population.
19. FAO (2000a) Global Forest Resources Assessment. Rome, Italy.
20. Asefa A, Andrew DB, Andrew ED, Andrew EMA, McKechnie Berndt RB (2017) Effects of anthropogenic disturbance on bird diversity in Ethiopian montane forests. *The Condor* 119(3): 416-430.
21. Esayas K, Bekele A (2011) Avian Fauna of Entoto Natural Park and Escarpment, Addis Ababa. *SINET: Ethiop. J Sci* 34(2): 113-122.
22. Reusing M (1998) Monitoring of Natural High Forest Resources in Ethiopia. Addis Ababa, Ethiopia: Ministry of Agriculture.
23. Mengesha G (2014) Effects of Land-use on Birds Diversity in and around Lake Zeway, Ethiopia. *Journal of Science and Development* 2(2).

