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## The Environmental Challenges to Biodiversity in Somalia: Addressing Deforestation and Conservation Strategies

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### Abstract

This paper provides information on the environmental factors affecting Somalia's diverse natural habitats, focusing on the effects of deforestation on native plants. It is clear that practices like charcoal production and expansion of agriculture for example have been greatly contributing to deforestation and as a result loss of habitats and endemic plant species like the *Boswellia sacra* tree. In the paper, the author examines the position of seed banks and their function as both genetic reserves and repositories for endangered species. Further, it makes the comparison between Kenya and Ethiopia to establish possible conservation measures that may be implemented in Somalia. The paper concludes by discussing how the problem of deforestation and the need to protect biodiversity can be addressed by increasing investment adopting even stricter environmental legislation and engaging local communities.

**Keywords:** Deforestation, Somalia, Endemic plants, *Boswellia sacra*

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### 1. Introduction

Somalia located in the Horn of Africa is privileged with unique and diverse biodiversity that is important in the conservation of the region's ecosystem. According to Fashing *et al.*, (2022) <sup>[3]</sup> vegetation, for example, plant life is a central feature in contributing to the state ability of the country's environment and that of its citizen's economy. However, this has been threatened by environmental pressure of which the most removal of trees through deliberate, natural, or accidental means. Being a result of charcoal production and other agricultural practices like land conversion for agriculture (Nur, 2024) <sup>[24]</sup>. Deforestation leads to habitat loss and thus threatens the existence of numerous native plant species. The study aims to assess the implications of deforestation on Somalian endemic plant species to discuss the existing measures that are being taken to conserve Somalian plants, particularly the use of seed banks, and look at the measures that neighboring countries like Kenya and Ethiopia are taking about similar issues as the ones Somalia is facing.

### 2. Biodiversity in Somalia

Somalia is blessed with diverse landforms hence the richness of the ecosystem where there is desert and coastal land. The country has several plant species where some of which are endemic and of great value for the maintenance of the biodiversity and the economy. According to Kumar *et al.* (2022) <sup>[5]</sup>, the frankincense tree *Boswellia sacra* is one of the most outstanding species since it is not only commercially valuable but has an extreme threshold in the ecosystem. The gum that comes from these trees has been marketed for over 500 years and it has offered income to many Somali people (Warsame *et al.*, 2024). Also, Somalia has a mangrove forest along the shores that offers to sea organisms and protects the coastal line from being eroded. Somali biodiversity is much richer and it is more endangered by human activities which negatively impact natural ecosystems.

Political instabilities of the country and other social economic adversities have compounded the pressure on the natural resource system. Because of the low level of implementation of environmental laws and policies, there are increased cases of illegal logging, unrestricted agriculture practices, and grazing. Such practices are creating a decline in plant diversity affecting the ecosystem and endemics with either existence threatened (Mohamed *et al.*, 2024) <sup>[8]</sup>. Flaws include the absence of basic surveys that capture the intensity of the degradation of species' habitats in this area which makes it even more challenging to tackle the

challenges appropriately.

### 3. The Impact of Deforestation on Native Flora

Losing of the forests has become one of the problems issued as of the country for the present times. It is mainly a result of the need for charcoal which is a prominent source of livelihood amongst the rural people. It has been the case since preparing charcoal involves felling a very large number of trees where which was fueled by a lack of other energy sources and surely no economic activities (Ogwu *et al.*, 2022) <sup>[13]</sup>. That has been a case especially where there has been a rampant exploitation of forests that put the various plant species at risk of extinction.

The *Boswellia sacra* tree is one example that is used in the manufacture of frankincense and is at very high risk due to deforestation. These trees are mostly used for charcoal to give way for agriculture and therefore their numbers have reduced and the species is in danger of extinction (Hassan-Kadle *et al.*, 2023) <sup>[14]</sup>. Such a loss is not felt in the ecosystem but is in loss of livelihood considering that the region has depended on frankincense trade for a long time (Nurmih *et al.* 2022) <sup>[9]</sup>. Deforestation affects availability with soil erosion thereby reducing the land capability for vegetation support.

Another key factor that contributes to deforestation in Somalia is agricultural land. Grassroots landscape transformation associated with agriculture is responsible for most of the alterations in Somalia's land cover. Masolele *et al.*, (2024) <sup>[7]</sup> stated that due to the increase in the population, there is therefore need to expand the land that can be used for growing crops. This has led to the change of use from forest to agricultural land which increases the destruction of natural lands. One of the current problems is the failure of adopting sustainable agriculture practices whereby the land is cleared and then frequently abandoned leading to a cycle of chopping and abandonment of the land. This cycle is especially so to the ecosystems of Somalia which has not yet recovered from some previous disturbances and even where recovery from such disturbances is slow and often incomplete. It is not only the issue of biological diversity that suffers from deforestation in Somalia. Cutting down trees also has a drastic effect on the sustainability of local inhabitants. A large number of people in rural areas rely on resources from forests to meet their energy, food, and medical needs (Ahmed *et al.*, 2022) <sup>[1]</sup>. These resources slip out of certain individual's reach and they have to spend many hours searching for them. This tends to limit the time they can spend on other activities where which hampers the other productive use of time. There is a sort of a vicious circle of intimate poverty and environmental pollution where the demand of the existence enhances more uncontrolled usage of any natural resources.

### 4. Conservation Strategies in Somalia

As the effects of deforestation and loss of biological diversity in Somalia, some conservation measures have been taken. According to Nzau (2022) <sup>[10]</sup>, these efforts are achieved through the involvement of NGOs and international organizations thereby calling for a limited situation to remain ragged. Another of the effective approaches that are being applied is the creation of seed repositories which is an important technique of gene conservation of threatened plant species.

Seed banks work in a way that it gathers and conserves seeds of a range especially those that are threatened by logging and destruction of their natural habitats. According to Ogwu *et al.*

(2023) <sup>[12]</sup>, these seeds can be kept in environments that will ensure their viability for use as time goes by. It can also be useful in case the species has gone locally extinct; the seeds can be used to replant the species so that it can reoccur in its accustomed area. This is the reason seed banks have significant roles for plants such as *Boswellia sacra* within Somalia because the high rate of rocks experiencing elastic deformation return to their original shape and size puts the species at extreme risk of extinction.

The effectiveness of seed banks and other strategies of conservation as identified in this article is dependent on following several factors. One of these concerns spotlight requires more funding and more resources for these kinds of initiatives. The present rate of conservation is inadequate to meet the task at hand most people believe that many conservation projects will falter without more help. Also, it is necessary to bring awareness among the people and enhance their knowledge regarding the need for biodiversity and the threats to it (Ofozor *et al.*, 2024) <sup>[11]</sup>. Some of Somali communities have no clue that deforestation has long-term effects they might not be fully aware of the virtues of afforestation. That becomes a reason why increasing people's awareness and engaging them in the conservation process helps to develop more appropriate measures for the management of natural resources.

Somalia faces a problem of compliance with the existing measures of conserving the environment and natural resources since many of the regulations are violated by individuals and organizations (Teshome, 2021) <sup>[14]</sup>. There are legal measures in place that are designed to prevent deforestation and the loss of endangered species however these are rarely effectively implemented for a variety of reasons which include inadequate funding and no political will. Enhancing compliance with environmental legislation and enhancing the capacity of decentralized governments to assess and regulate natural resources is critical in the conservation of natural resources in Somalia.

### 5. Comparative analysis with neighboring countries

Despite the numerous obstacles to the conservation of the biological resources in Somalia, there are lessons to be learned from other countries in the region such as Kenya. Kenya boasts of great achievements in the conservation of its natural resources attributed to well-coordinated government policies, public participation, and support from the international community. For instance, Kenyan-led afforestation activities have played a key role in the rehabilitation of otherwise degraded habitats and facilitation of endangered species conservation (Teshome, 2021) <sup>[14]</sup>. The country has also banned charcoal business and logging where this has been very crucial in fighting deforestation and encouraging right use of the land.

According to Bantekas (2022) <sup>[2]</sup>, the following factors explain Kenya's achievements in the sustainable conservation of biodiversity. The Kenyan government has expressed significant policy commitment to environmental conservation, policies that seek to protect natural resources. This has been accompanied by a massive investment in conservation measures such as afforestation and setting up of protected areas. Also, there was an attempt to ensure that local people take active participation in the conservation process. The people of Kenya have been able to practice sustainability by being given other sources of income through different activities that are economically viable and are also

taught about the need to conserve natural resources.

Like Somalia, Ethiopia has problems regarding deforestation and the exploitation of wildlife. Madalcho *et al.* (2022) [6] explained that due to population pressure, most Ethiopians have shifted towards the use of firewood hence contributing immensely to the destruction of country forests and other forms of vegetation. Similar to Somalia, Ethiopia faces problems with poor implementation of environmental laws and a poorly developed ability to govern the use of natural resources. However, there is also the positive side that the country has benefited from the leadership of Ethiopia in that country has carried out massive campaigns of planting trees to encourage the growth of trees as a means of checking on the growth of deserts and restoring the barren land.

The experiences of Kenya and Ethiopia reestablish the necessity of the multi-sectoral approach to the problem of biological diversity preservation. Conservation policies thus require the support of the government, diplomacy of the communities, and support international community. If implemented, some of these practices may greatly improve the fight for the conservation of biological diversity in Somalia. Specifically, they noted the necessity of increased funds for conservation initiatives, increased compliance with environmental laws, and increased involvement of local populations in conservation.

## 6. Conclusion

Deforestation and other environmental challenges are enormous threats to Somalia's biological heritage and the substance of its people. The effect of this on such species as the *Boswellia sacra* tree is magnified since it does not endanger the biological integrity of the region but the commercial approaches like seed banks may be, it is imperative to do considerably more than that to counter the act of deforestation within Somalia. The case of other neighboring countries offers the best standpoint on what more could be done by Somalia to enhance conservationism, greater attention should be paid to a broader and more coherent approach to the problem of Biodiversity conservation in Somalia because in this way the country can defend its resources and provide the population with the opportunities for its sustainable development. This will require an increase in spending on conservation, improving commitment to legal norms in the sphere of environmental protection, and joining the local population to the conservation. Therefore, only by joining our strengths in such a manner is the opportunity to pass on the diverse flora and fauna of Somalia to future generations possible.

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