

# Madagascar and the indian-ocean islands biodiversity hotspot essay sample



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## Introduction

Since the turn of 20<sup>th</sup> century, there have been a lot of pressures from the growing population and human activities like industrialization that have continuously destabilized the world ecosystems. Human expansion has led to destruction of important ecosystems threatening the flora and fauna. The concept of biodiversity hotspot is used to describe the regions which are rich in biodiversity that are threatened to extinction (Kareiva and Marvier, 2003). Currently, it is only a very small percentage of the total area covered by biodiversity hotspots that is under protection. There are thousands of animal and plant species in these biodiversity hotspots that are threatened with extinction. Madagascar and the Indian Ocean islands is one of the biodiversity hotspot that is being threatened by expansion of human activities. Madagascar and the surrounding islands is home to more than 8 plant families, 4 bird families, and 5 primates that are not found anywhere on earth. It is estimated that since human arrived on the island, more than 15 species have been rendered extinct and there is a threat of more species going to extinction as well. This paper will study Madagascar and surrounding Indian Ocean islands.

## Madagascar and Indian Ocean islands

This biodiversity hot spot comprise of a number of islands which are scattered along the Indian Ocean. The Madagascar and Indian Ocean Island biodiversity hotspot is mainly dominated by Madagascar which is the fourth largest island in the world. It also comprise of other islands like Seychelles, Comoros, Mauritius (including Rodriguez) and French overseas departments

which including Reunion, Mayotte, and Iles Esparses which is formed around Madagascar (Conservation International, 2009).

It is believed that Madagascar and Seychelles separated from Gondwanaland more than 160 million years ago and hence they have been used by scientists to study evolution of species when isolated. Despite the island bordering Africa, they have no common animal species and have shown a high level of plant and animal species endemism. Madagascar and Indian Ocean Islands has a peculiar ecosystem that comprise of rare species in the world (Conservation International, 2009). It has remarkable mountain ecosystem like Tsaratanana, Andringitra, massifs, and moss and lichens. It also bears sub humid forests and lowland forests. Madagascar is home to six of the eight world baobab tree species and six of these species have been rated endemic.

The magnitude of the problem

Among the identified 25 biodiversity hotspots, Madagascar, Philippines and Caribbean islands have been prioritized as the most endangered. With a great number of rare creatures in the world, Madagascar is faced with a great challenge of conserving the rich diversity amid the rising human population. Though small, the region is home to 8 plant families, 5 bird families, and 5 primate families that cannot be found in any other part of the world. Madagascar houses rare colored chameleons and tree frogs, geckos which have leaf shaped feet, and other aye-ayes. It is estimated that more than 75% of the species in Madagascar are not found in any other place in the world (Conservation International, 2009).

To illustrate the extent of the problem in the island, the following table sums up the taxonomic groups present in the region and their extent of their endemism.

Taxonomy	# of species	Endemic species	% endemism
Plants	13, 000	11, 600	89. 2%
Mammals	155	144	92. 9
Birds	310	181	58. 4
Reptiles	384	367	95. 6
Amphibians	230	229	99. 6
Freshwater fishes	164	97	59. 1

From the above table, it is clearly evident that the problem in Madagascar Island has the high rate of endemism. As illustrated above, Madagascar is home to different species like amphibians which has an endemic rate of 99. 6%, one of the highest in the world (Conservation International, 2009). This shows that the important aspects illustrating flora and fauna in Madagascar are not their diversity but rather their high rate of endemism. The rate of diversity in the island is quite high considering the total size of the island, but this is undermined by the high level of endemism.

## Threatened, endangered and extinct species

There are thousands of endangered species in Madagascar. The following species are either threatened or endangered:

### 1. Plants

There are more than 13, 000 species of vascular plants in the region. It is recorded that more than 90% of these species are not found in any other place in the world. More than 8 of the total 160 plant families in Madagascar are endemic, which is the highest level of endemism compared to other biodiversity hotspots (Cultler, 2008). There are at least 310 endemic plant genera. For example Madagascar is home to six of eight baobab families in the world. Six of the eight families are endangered mostly found in Madagascar. In total, the rate of plant endemism in Madagascar is 89. 2%

### 1. Birds

The avifauna in Madagascar is a mix of low diversity but very high rate of endemism. There are more than 300 bird species in the island. More than 60% of these species are not found anywhere on earth. The rate of endemism is high with 42 genera and about 5 bird families showing high rate of endemism (Cultler, 2008). It is also recorded that more than 55 endemic bird species are also threatened and more than 32 endemic species are already extinct. The threatened species include ground-rollers, cuckoo-rollers, serpent eagle, red owl, and others. Example of extinct birds include flightless elephant bird (weighing 450 kilograms) which gone extinct more than 500 years ago, dodo, and Reunion solitaire. In total more than 10 birds species have become extinct in the island (Cultler, 2008).

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## 1. Mammals

Like birds, there is level of biodiversity and high rate of endemism. There are more than 150 mammal species in the island 90% of which are endemic. In the last 15 years, more than 22 new species have been discovered.

Madagascar is home to 72 families of lemurs including aye-aye, indri, and others (Cultler, 2008). Madagascar also house 15 endemic bat species inkling flying fox, rodents like giant jumping rat, carnivores like fossa which bears dog and cat characteristics, and others.

## 1. Reptiles, Amphibians, and Freshwater fish

There is high reptile diversity and low endemism. More than 96% of 400 reptile species in Madagascar are not found anywhere in the world and only one family (Opluridae) is endemic. It is also home to chameleons with aldabra giant tortoise believed to be endemic. There are more than 150, 000 tortoise which are threatened by development, natural disasters and illegal tortoise trade (Cultler, 2008). At the same time there are about two endemic amphibian families including Sooglossidae and Mantellidae. Of the 230 species present, it is only one which is not endemic.

Madagascar has two fresh water fish groups. Most of the fish species are freshwater originating from the continent and evolving over thousands of years to more than 1000 endemic species including 14 endemic genres and 2 endemic families.

## 1. Invertebrates

The endemic species in Madagascar are not well studied. However, the current research shows that there are 651 snail species all which are <https://assignbuster.com/madagascar-and-the-indian-ocean-islands-biodiversity-hotspot-essay-sample/>

endemic, 40 endemic scorpion species, 459 species of spider and 390 are endemic, 181 specie of dragonflies and damselflies 132 of which are endangered, 148 endemic species of scarab beetles, 300 specie of true butterflies with 211 species endemic, and many others. Interestingly, all the known invertebrate species in Madagascar shows a high rate of endemism.

#### Ethical considerations of the native population

Madagascar does not have any native human population except native plant and animal population. Today, there are more than 12 million people in the island and together with the surrounding Indian Ocean Islands the population swells to more than 19. 2 million. It is believed that the isolation of Madagascar from the Gondwanaland led to evolvment of unique flora and fauna, but there is no history of human development in that Island.

Human settlement in the islands did not take place not until 1, 500 to 2, 000 years ago (Cultler, 2008). It is believed that the native animal and plant population was by then more diversified but quite naïve. Animals were slaughtered by colonists. The strategic location of the island from the mainland Africa made it an important trade route and a home for pirates. Historical evidence shows that the extinction of megafuana of the area can be attributed to uncontrolled hunting.

The first native inhabitants of the Island were Malagasy people who brought with them agricultural methods from Africa and Asia. Once settled, they practiced a wide range of agricultural practices like slash and burn methods, grazing, and others which led to land degradation (Conservation

International, 2009). Today, it is estimated that the remaining original

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vegetation does not comprise more than 17% of the land cover. More than 80% of the native vegetation has been lost.

Although human settlement took place only 2000 year ago, Malagasy people can be considered as native population of the area (Cultler, 2008). This means that any conservation effort must take into practice ethical considerations like the livelihood of these people and the impact of their settlement on the flora and fauna. This means that conservation efforts must not compromise economic activities like agriculture and fishing which represent the lifeline of the people. However, there has to continuous education that will enlighten people on the importance of conserving the fauna and flora while drawing maximum benefits in a more conservative way. It will be ethically wrong to consider that human population can be considered as alien these islands since people have been there and have contributed to the development of the islands.

### Challenges

The greatest challenge facing conservation efforts in Madagascar is the explosion of human population (Dickie, 2009). There are more than 19.2 million in the Madagascar and Indian Ocean islands and the growth rate is more than 3%. This means that in the next 25 years the population may double. Increase human population coupled with the struggling economy and political instability has greatly hampered on the conservation efforts.

Human activities like farming have greatly impacted on the biodiversity.

More than 90% of Madagascar forests have been lost to farming land, fuel works, and mining activities. More than 111, 000 hectares of the Eastern  
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rainforest were lost between 1950 and 1985 (Dickie, 2009). Disappearance of forests is accompanied by extinction and migration of species and loss of biodiversity. In the recent past, Madagascar economy has been struggling. The economy is still reliant on primary activities like farming, herding, mining and others which have a great impact on the environment. Conservation efforts have also been compounded by unstable political environment with a recent take over by the army eliciting international acrimony and hampering coordinated conservation efforts (Dickie, 2009).

### Plan of action

If I was to draft conservation plan for Madagascar and the Indian Ocean Islands, my first plan of action would be to sensitize the inhabitants about the importance of conserving their biodiversity. This would make inhabitants understand that they can earn more from conserved biodiversity through tourism than through agriculture. Sensitizing the population would be followed by equipping them with conservation skills that would enable them take care of their environment (Dickie, 2009). This initial step would lay foundation for others like government setting up protected land areas, promoting responsible eco-tourism, raising funds for conservation efforts, and others.

### Conclusion

Madagascar and Indian Ocean islands have been prioritized as one the three most endemic biodiversity hotspot. Madagascar and Indian Ocean Island are marked by high biodiversity and high rate of endemism. There are thousands of endemic and threatened animal and plant species while tens of <https://assignbuster.com/madagascar-and-the-indian-ocean-islands-biodiversity-hotspot-essay-sample/>

others have been rendered extinct including the famous dodo. The main challenge facing conservation efforts in Madagascar include the high rate of population growth, struggling economy, political conflicts and many others. In order to raise the conservation effort, there must be enough sensitization and empowering of the inhabitants to take charge of the conservation efforts.

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