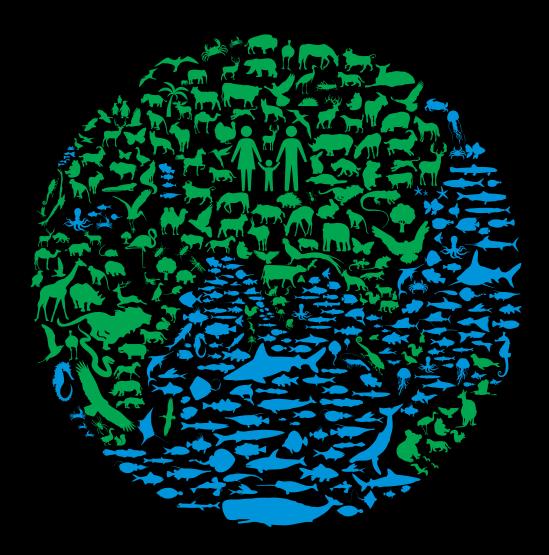
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BIODIVERSITY EDITION





## BAA. ATOLL BIOSPHERE RESERVE

Baa. Atoll was designated as a UNESCO biosphere reserve in 2011 for its delicate and immense biological richness, making it the first biosphere reserve in the Maldives. The biosphere reserve covers a surface area of 174,000 ha, compromising protected distinct units of coral reefs, islands and mangroves which have significant biodiversity values.

The atoll's reef provide habitat to some unique organisms such as the rare pink hydrozoan corals (Distichopra nitida), Bryozoans (Bugula) and sea slugs (Tambja olivaria). Whale sharks (Rhincodon typus), manta rays (Manta birostris), Green turtle (Chelonia mydas) and Hawksbill turtle (Eretmochelys imbricate) are species widely observed across the atoll; and furthermore several islands of the atoll provide breeding spots as well. Seabirds utilize the area as well for breeding and feeding.





Over 50% of the world's plant species and 42% of all terrestrial vertebrate species are endemic (native to that country and naturally do not exist anywhere else) to only 34 biodiversity hotspots. (Conservation International, 2004)

## **BIODIVERSITY OF MALDIVES**

The coral reefs of the Maldives are the seventh most extensive in the world with an area of  $21,000 \, \mathrm{km^2}$  representing 3% of the global reef area. It is home to  $250 \, \mathrm{species}$  of coral, providing habitat for over 100 fish species.



Coastal systems such as such as mangroves, salt marshes and seagrass meadows have the ability to absorb, or sequester, carbon at rates of up to 50 times those of the same area of tropical forest. Between 1980 and 2005, 35,000 square kilometres of mangroves were removed globally. (UNESCO Facts and figures on marine biodiversity)

## **ACREA PALM**

Dypsis lutescens also known as bamboo palm, golden cane palm, acrea palm, yellow palm or butterfly palm is often found in the tropics and sub-tropics. The plant is able to survive both indoor and outdoor; and it is often used as an interior decorative item.

The most astonishing fact about the plant is that it is the highest rated **air purifying plant** according to a research conducted by NASA and poses the ability to eliminate pollutants such as benzene, carbon monoxide, formaldehyde, trichloroethylene, xylene and more.



## HOW WOULD BIODIVERSITY LOSS AFFECT YOU?

Biodiversity or biological diversity is the variety of life found on Earth. It is an interdependent ecosystem wherein all organisms are linked to each other. If there is a biodiversity crisis, our health and livelihoods are at risk.

The human population is increasing at a rapid rate, and so is the use of natural resources. We are currently using 25% more natural resources than the planet can sustain. If this trend continues, millions of people will suffer from famine and lack of access to fresh water in the future.

How would the Maldives be affected because of this? The marine life is adversely affected by the biodiversity loss. About 100 million metric tonnes of aquatic life, including fish, molluscs and crustaceans are taken from the wild every year. Moreover, due to changes in climate, the natural habitats of the fish and other marine organisms are altered. Fish is a major source of food and a major source of income for us, and reduced fish stocks due to biodiversity loss will, without any doubt, have negative impacts on us.

It is vital that we understand the importance of biodiversity for us human beings. These problems need to be tackled as soon as possible. Biodiversity needs to be sustained to ensure that the future generations will be able to enjoy the benefits of the natural resources.



## **BLOOD SUCKERS OR GARDEN LIZARD**

Bloodsuckers or locally known as Rakis Bondu are lizards belonging to the Calotes genus. The name bloodsucker is unfairly pinned to this harmless creature due to the red throat which it displays during the breeding season and may change colour to reflect its mood.







## MILKWEED BUG

The Milkweed bug locally referred as Dhon-Moosa belongs to the Lygaeidae family. According to experts this type of Milkweed bug could be endemic to Maldives.



## MALDIVES ANEMONEFISH

Amphiprion nigripes or Maldive anemonefish is a clownfish belonging to the family Pomeacentridae. This type of anemone fish is believed to be endemic to Maldives and unlike the generally observed Ocellaris clownfish, amphiprion ocellaris or the "nemo fish" (slang name given through a popular kids animation), the Maldive anemonefish have one white band on its skin. There are two popular theories about the fish and its associated anemone. One is that they chase off other creatures that prey on the anemone while the other is that they false lure other fishes for prey.







#### Environmental Newsletter Ministry of Environment and Energy

## **REEF MANTA RAY**

Manta Alfredi or Reef Manta Ray belonging to the family Mobulidae (eagle and devil rays) can grow up to 5m across and is found in shallow coastal waters. Maldives provides habitat to considerable population of Reef Manta Rays estimated to be around 5000. Manta rays migrate depending upon the abundance of planktonic food. Shoals of Manta Alfredis can be spotted in the biodiversity rich water of Baa atoll. The species which can reach at least 36 years of age is considered as "vulnerable" by IUCN. Hanifaru Bay of Baa Atoll sees one of the largest gatherings of Manta Rays worldwide.



## ODONATA: DRAGONFLIES AND DAMSELFLIES

Odonatas (Dragonflies and Damselflies) are bio-indicators which can be widely observed throughout the Maldives. Locally refered to it as "Dhondhooni" or "Heiy nakathaa/ Heiy-Nakathu-Dhooni" (derived from the Heiy Nakai of Hulhangu Monsoon), Baburu or Baburu-Dhelo.

Odonata larvae require set water temperatures, good oxygen levels, and unpolluted water for its survival. These environmental quality limitations indicate that dragonflies and damselflies are important bioindicators of water quality. The predator-prey relationship of Dragonflies is also beneficial as it consumes mosquitoes and their larvae.

Odonata larvae rely on precise water temperatures, good oxygen levels and unpolluted water to survive. This limitation in the environmental quality indicates that dragonflies and damselflies are important bioindicators of water quality. The predator-prey relationship of Dragonflies is also beneficial as it consumes mosquitoes and their larvae.

Bioindicators include biological processes, species, or communities and are used to assess the quality of the environment and how it changes over time.

#### **ENALLAGMA MALDIVENSIS**

Enallagma maldivensis is a species of damselfly which is endemic to Maldives and is stated as critically endangered in the Red list of IUCN.

"This species is known only from the type series (five specimens); there is no information on current populations, but given the amount of development that has occurred in the Maldives, very small land area and high human population density (ca 1,105 persons per square kilometre), it can be inferred that the species is in decline; it may already be extinct." IUCN

Narated Anas bin Malik:

Allah's Messenger () said, "There is none amongst the Muslims who plants a tree or sows seeds, and then a bird, or a person or an animal eats from it, but is regarded as a charitable gift for him."

Sahih al-Bukhari 2320





The whale shark is the largest fish in the sea; they can grow up to 12 metres and weigh more than 20 metric tons. It is a slow-moving filter feeder. With a life span of about 70 years, these sharks are found in tropical and warm oceans and live in the open sea. They mainly feed on plankton.

Significant concentrations of whale sharks are found in the Hanifaru Bay of the Baa Atoll biosphere reserve.

Listed as a vulnerable species in the IUCN Red List, immediate measures need to be taken to protect the whale shark as they are an important part of the biodiversity.

# Facts: Whale sharks may live for over 100 years You could swim with a whale shark; they have a gentle nature and does not pose a significant danger to humans Whale sharks are migratory

Female whale sharks are larger than males

tiniest creatures

They are the largest living fish, but they feed on some of the ocean's



## **GREY NICKERNUT**

Caesalpinia bonduc (family: Caesalpiniaceae, genus Fabaceae), commonly referred to as Grey Nickernut or Fevernut is a prickly shrub with grey hard, globular shaped seeds with a smooth shinning surface (Nadkarni, 1954). The plant is locally denoted in Maldives as KashiKunburu emphasizing on its thorny and spiky nature while the seed is referred as Laagulha.

Throughout the world and Maldives as well, the seeds of Grey Nickernut are used in the traditional board game named Mancala or locally known as "Ohvalhugondi".

Ecology—Grey nicker bean is intolerant of shade and is usually open-grown or at least grows in broken sunlight. It tolerates salt spray, salty soils, and occasional flooding with seawater. The species grows in all textures of mildly acid to alkaline soil. It grows most frequently on the beach strand, on coastal dunes, and at the better-drained edge of mangroves. It is found in Inland areas as well.

Nickernuts or Nickerbean gathers heat to a point where it can cause a burning sensation when rubbed on a rough surface through friction.

#### Habitat:

The tree which is sea water tolerant to some extent is commonly found in coastal habitats including beaches, scrubs, hammocks and mangrove areas.

#### Pharmacological uses

Pharmacological screening of the plant extracts reveals its medical potential of anti-helminthic, anti-cancer, anti-malarial, anti-hyperglycemic, antiinflammatory, anti-rheumatic, anti-measles, anti-pyretic, anti-diuretic and anti-bacterial, anticonvulsant, anti-asthmatic, anti-anaphylactic, antidiarrheal, anti-viral, anti-asthmatic, antiamoebic, anti-estrogenic, nematocidal and antioxidant.



being submerged underwater for half an hour. holes in each of their body segments.

Cockroaches can hold its breath for 40 minutes and can survive

Cockroaches can live for a week without its head, thanks to its open circulatory system and the fact that they can breathe through little

Habitat change, over-exploitation, invasive alien species, pollution, and climate change are the most important direct drivers of change in ecosystems (Millennium Ecosystem Assessment).



## SHY PLANT

Mimosa pudica is a perennial herb which is derived from the latin word pudica meaning "shy, bashful or shrinking". The compound leaves of the plant fold inwards when touched or disturbed and reopens after a while later. This characteristic of the plant tags its signature name of shyplant, sleepy plant or touch-me-not. Similarly the Dhivehi name of the plant "Ladhu-gas" is also derived from this characteristic of the plant.

A team of Biologists from the University of Western Australia conducted experiments to test the Mimosa's short and long term responses by repeatedly dropping water on them. The results astonished them as the Mimosa Plants stopped closing their leaves when they learnt that the repeated disturbances carry no real harm. The biologists concluded that even if the Mimosa plant lacks brains and neural tissues, they do have a sophisticated calcium based signalling network.

Traditionally, the plant has been used in the treatment of various illnesses including alopecia, diarrhoea, dysentery, insomnia, tumour, and various urogenital infections as well.



# THREATS TO THE BIODIVERSITY OF MALDIVES

Biodiversity of the nation have been challenged with the changes of economic and social landscape of the country; the booming economy and its associated developmental projects overtaken the efforts of environmental conservation.

- The natural habitats; aquatic and terrestrial have been lost to reclamation projects due to the scarcity of land area.
- Effects of climate change challenges the fragile ecosystem and the very existence of the nation. Rising sea levels, storm impacts, soil erosion, coral bleaching, impacts of severe weather events, etc. places the nation at the edge of environmental disasters.
- The issue of waste management is an issue which affects the wellbeing of the nation's most valued life forms. The aquatic gardens, the fragile coral reefs are threatened with the effects of waste. Experts and environmentalist have raised the concerns of bioaccumulation and biomagnification of toxic wastes through seepage from unethical and immoral waste management practices.
- Disturbances to the natural breeding and nurturing habitats of wildlife effects the biological richness of the nation
- Erosion is a challenge where most islands in Maldives have to experience; it is deduced that human activities often accelerate the process.
- Depletion and pollution of habitat and resources such as water bodies affect the functioning of ecosystems.



## REGULATION FOR THE CHOPPING, UPROOTING, REMOVING AND TRANSFER BETWEEN ISLANDS, OF PALMS AND TREES

Palms and trees are not allowed to be chopped, uprooted, removed or transferred between islands unless out of mere necessity.

For every palm or tree chopped, removed, or taken out of an island in the Maldives, two palms for each palm removed and two trees for each tree removed, shall be planted on that island.

#### Types of palms and trees prohibited to be chopped, uprooted or removed

It is prohibited to chop, uproot or remove all forms of palms and trees

- Within 15 metres inward to an island, from the outermost trees closest to the beach
- Within 15 metres outward of ponds and pools
- On an area declared by the government as a protected area of Maldives
- Protected by the government for the purpose of preservation of biodiversity
- Of extraordinary nature

## Permit to chop, uproot, remove and transfer between islands of palms and trees

An EIA shall be conducted for review and permission from the Environmental Protection Agency before chopping, uprooting or removing palms and trees from a large area of land

The use of heavy machineries or such equipment shall only be used for removing palms and trees only if it does not cause harm to other palms or plants



## MIGRATORY BIRDS REGULATION

It is prohibited to capture, domesticate, trade, forage eggs and cause damage to the nests of migratory birds.

All birds in Maldives are migratory birds except

Maldivian Water Hen (Dhivehi Kanbili), Maldivian Pond Heron (Huvadhoo Raabondhi), Maldivian Little Heron (Dhivehi Raabondhi), Central Maldivian Heron (Medhu Raajjetherey Raabondhi), Asian Koel (Dhivehi Koveli), and Raven (Kaalhu)



## Twelfth meeting of the Conference of the Parties to the Convention on Biological Diversity (COP 12)

Seventh meeting of the Parties to the Cartagena Protocol on Biosafety (COP-MOP 7)

First meeting of the Parties to the Nagoya Protocol on Access and Benefit Sharing (COP-MOP 1)

## MALDIVES AT THE CBD COP12

The Maldives was represented at the Twelfth Meeting of the Conference of the Parties (COP 12) of the Convention Biological Diversity (CBD) which successfully concluded on the 17th of October 2014 at Pyeongchang, Republic of Korea. The COP12 centered around the theme 'Biodiversity for Sustainable Development'. The Maldivian delegation was led by the Deputy Minister for Environment and Energy Mr Abdulla Mohamed Didi.

At the conclusion of the meeting, the Pyeogchang Roadmap on Resource mobilization for the successful implementation of the Strategic Plan for Biodiversity 2011-2020, and the Gangwon Declaration of the High-level segment was adopted. The Pyeongchang roadmap includes concrete and effective actions for resource mobilization, milestones and modalities for the Aichi Biodiversity Targets and scientific and technical co-operation. The Gangwon Declaration invited the United Nations General Assembly to integrate the Strategic Plan for Biodiversity and the Aichi Biodiversity Targets into post 2015 development agenda.

The Fourth Edition of the Global Biodiversity Outlook (GBO4) was also released during the first session of the COP. Amongst other key findings, the report indicated that although most of the Aichi targets showed progress, these were not at a pace to achieve the 2020 deadline as set at Aichi. In this regard, while 3 targets out of the 20 are partly on track, target 10 on reducing anthropogenic pressures on coral reefs showed depressing negative trends with increase in pressures on these ecosystems. Given the significance of coral reef and their health to the ecosystem, economy and the entire way of life of the country, Maldives noted the importance of local action to achieve the global target and highlighted the need to find a clear balance between development and reducing anthropogenic pressures. Furthermore, Maldives highlighted the lack of capacity, financial, technical and human resources within the country in terms of catalyzing local action towards biodiversity conservation and management. As such, the Maldives welcomed the priority actions to achieve target 10 and suggested the inclusion of the use of citizen knowledge and mobile applications as tools to achieve the target.

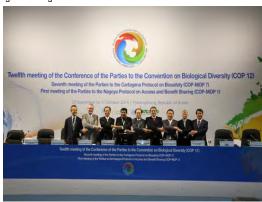
The COPI2 also adopted more than 150 areas worldwide as Ecologically or Biologically Significant Marine Areas (EBSAs) to be included in the EBSA Repository along with many other associated complementary decisions. Other significant decisions of COPI2 include key actions to enhance progress towards implementation of the Strategic Plan for Biodiversity, Synthetic Biology, Invasive Alien Species (IAS) and Biodiversity and Sustainable Development.

Concurrent to COPI2, the first Conference of the Parties Serving as the Meeting of the Parties to the Nagoya Protocol on Access and Benefit-Sharing was held during the second week. This celebrates the successful implementation of the 3rd goal of the convention: the fair and equitable sharing of benefits arising out of the utilization of genetic resources.

The Deputy Minister for Environment and Energy, Mr. Abdulla Mohamed Didi the High-level Ministerial event on the United Nations Decade on Biodiversity and participated as a panelist. The Maldives continues to be the only country with a Biodiversity Pledge. The pledge of Maldives to become a Biosphere Reserve was widely celebrated in the event. The Deputy Minister gave an update of the work being carried out in this regard.

The delegation from the Maldives also participated and gave presentations in two side-events, one on Aichi target 10, where Maldives presented the challenges at national level on achieving this target. The second side-event was on Island Initiatives on Invasive Alien Species where Maldives delivered a presentation on the capacity needs, need for baselines, and technical and financial resources to identify IAS, their introduction pathways, impacts as well as means of controlling, preventing and eradicating IAS. Maldives requested donor agencies to assist Maldives in this regard. Global studies on IAS shows that more than 60% of species loss caused by IAS occurs on islands.

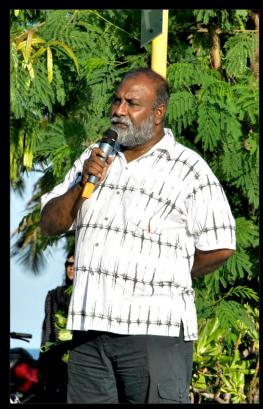
Maldives is currently finalizing the National Biodiversity Strategy and Action Plan with the aim to conserve national biodiversity and to contribute towards achieving Aichi Targets.



100 million hectares of forest were lost from 2000 to 2005, and has lost 20 percent of sea grass and mangrove habitats (UNEP Global Environment Outlook 5/ GEO-5)

The extinction risk is increasing faster for corals than for any other group of living organisms, with the condition of coral reefs declining by 38 per cent since 1980. Rapid contraction is projected by 2050. (UNEP Global Environment Outlook 5/GEO-5)

## PEMPHISTALK



Mohamed Zahir Director General Ministry of Environment and Energy

#### Biggest achievement in this field:

Paving way for biodegradable plastic bags in the Maldives and setting up the biosphere reserve can be considered as a huge achievement as it should have been put in place long back. Making the environmental concerns of the nation addressable to the whole world is another.

#### Most unforgettable day in this field:

The days which the government neglected issues of the environment

#### Anything you wish to change:

An independent Environmental institution should be established to address and rule decisions over the natural resources of Maldives

#### Personal ambition that you want to accomplish in the field of environment:

Place environmental political appointees within the umbrella of the laws and regulations.

## As a famous gymnast during the teenage years; able to do these routines at present?:

"It has been in my instincts to practice risky activities but upon leaving the school age, the human body restricts us to keep up with everything we did in those days. No one can endure risky physical activities as we age."

#### Sports played:

Gymnastic events, motorcycle stunt, volley ball, badminton, athletics, swimming.

#### Most passionate thing in the field of environment:

To promote awareness and develop environmental stewards

#### Reason of choosing this field:

"The place, the resources, and the environment, where I was brought up along with the interest which I have. Even at my school era I was involved in environmental activities such as planting, camping, etc. Furthermore I happened to be the first employee of the environmental sector in the government."

#### Since you have conducted many awareness workshop on different mediums; in your opinion and personal experience what are the changes this have brought:

"I have met TV presenters, politicians, resort managers, and sometimes I have seen people stating through interviews that my talks or presentations were the reason behind studying environment or choosing this field. One of the most pleasing things while serving in this field is knowing that I have played a part in developing and producing environmental leaders."

## Since we lack comprehensive studies and data regarding the biodiversity of Maldives, What are your concerns regarding the issue:

"Like I stated earlier, to have an independent environmental institution is much more important to Maldives than others. Since we lack environmental specialists in the Maldives while some who are, works in other fields; the full backing of the government is needed to document and publish them. Personally I have written books and articles regarding the environment, and for that I have been awarded the "Liyunetheri kamuge ran galan" (Golden pen of Writers) and Public service award. Furthermore, I am currently involved in creating a database of all the flora of the Maldives."

#### An event or thing which caused a career turning point:

"I have always challenged the trials that I have encountered in this field. I've experienced and faced direct challenges that I came across when the environment department was first founded; therefore I don't have a turning point."

#### The impacts of 2004 South Asia Tsunami on the Biodiversity of Maldives:

"I believe the 1987 tidal waves brought more impact, leading us to build the seawall around the capital. Nevertheless, Maldives was among the worst hit countries in the 2004 tsunami with respect to the lost lives and livelihood. Intellectually speaking, the biodiversity would be affected by two ways; when seawater is washed through that phenomenon, materials such as minerals would be deposited to the ground while many of the constituents existing in the ground would also be washed out. This has caused some plant species to grow more while others to reduce. Generally this might have reduced or increased the biodiversity of the Maldives."



#### Comparison of Environment Sector, Then and Now:

The golden age of the environmental sector of Maldives would be 10 years back, while at present we are experiencing the sector in disorder.

#### The biggest environmental issue in Maldives:

Non-biodegradable wastes specially plastics

Environmental activists have raised concerns of the bad practices adopted in Thilafushi which eventually causes contaminants to seep into the sea and then bioaccumulate into the food chain:

Our practices when dealing with wastes and sewer can cause such catastrophes. Even medical wastes and toxic wastes can be seen in the general waste; the chances of these toxins to be passed through the food chain and eventually to humans are large.

#### Nation's capacity to deal with the waste and sewer issue properly:

Maldives is a place we can do anything, but the problem is we haven't built up the right attitude towards these issues.

The population of the Maldives is ever increasing; they need developmental projects, so in your opinion how can the nation achieve symbiosis between developmental goals and the environment:

Logically speaking we can't, as "environmentally sustainable development" is not anyone's policy. With respect to the population per land space, **the nation** is **not short of land**. Environmental and best practice urban planning was neglected in the sudden economic boom of this nation brought up with the introduction of tourism; **money was put forward before the environment**. This symbiosis can only be achieved through better planning and policy making.

Dredging and land reclamation commonly practiced in Maldives would have significant impacts on its associated ecosystem and biodiversity. What is your opinion on this:

At first, dredging and land reclamation is something which I am against of; it has been always used as a political tool but this is not a safe practice. Harbours should be constructed in planned and designated areas where large vessels could be harboured with security and other required facilities such as restrooms, along with a complimenting ferry system where the crews can visit their respective islands. Through this system fisherman can spend 2 to 3 days per week in the open sea and take break on the rest.

As a Maldivian; what is your advice or statement to the Maldivian Community:

"Our forefathers have left us many islands untouched for us, to utilize and research; but at present we are consuming and destructing these resources; there will come a time our grandchildren would question "why haven't our past generation conserved our resources for us". We should not give the chance for this."

## Biodiversity! They are very unique & extremely diverse but they may soon be extinct

Eastern Long-beaked Echidna (Zaglossus bartoni)

#### Overview

Long-beaked echidnas belong to an ancient clade of egg-laying mammals that includes the platypus of Australia. They are easily distinguished from short-beaked echidnas by their long snouts, which account for two-thirds of the length of the head. The eastern long-beaked echidna has the widest distribution of the three long-beaked echidna species. However, while relatively common in the recent fossil record, this species is in decline in areas accessible to humans. It has lost much of its forest habitat to logging, mining and farming and is regarded as a highly prized game animal by local people, who hunt it with specially trained dogs. It has already been driven to extinction in parts of its range. Urgent conservation action is now needed to ensure that remaining populations survive.



#### Description

Size: Head and body length: 600-1000 mm, Weight: 5-10 kg

The most distinguishing feature of long-beaked echidnas is their long snouts, which curve downwards and account for two-thirds of the length of the head. They have no teeth; instead their tongues are covered in spikes (teeth-like projections), which are very effective in hooking prey and drawing it into the mouth. They have compact, muscular bodies, with strong limbs and claws for digging.

#### Habitat

The eastern long-beaked echidna occurs in tropical hill forests to sub-alpine forests, upland grasslands and scrub. It is found in both primary and secondary habitats. Historically it occurred from sea level to an elevation of at least 4,150 m. However, it is rarely found at sea level today.

#### Status

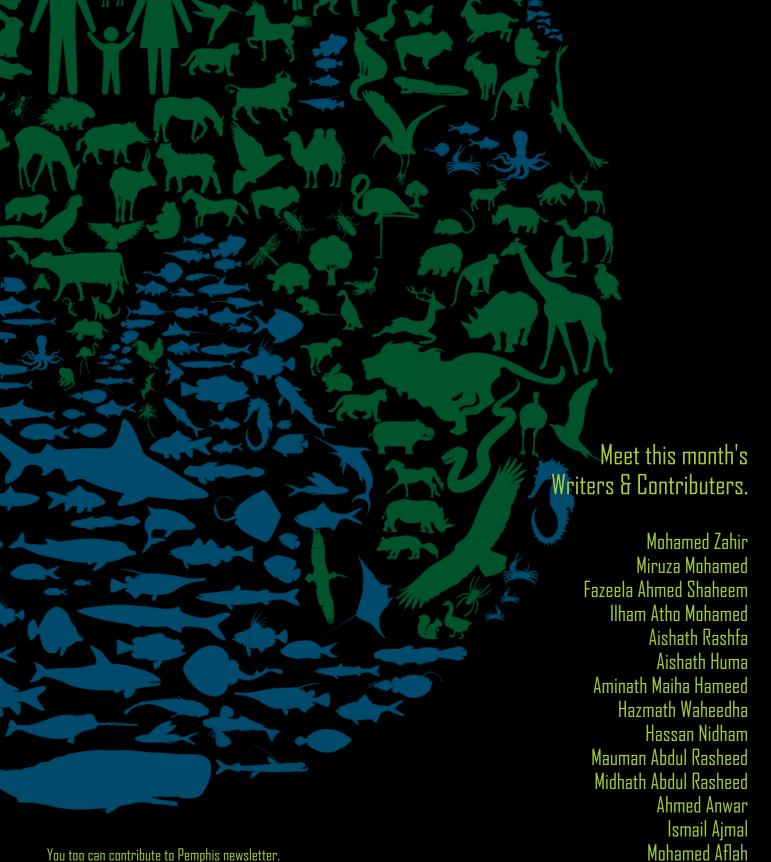
Classified as Critically Endangered (CR A2acd) on the 2010 IUCN Red List of Threatened Species.

#### Threats

Traditional hunting is the main reason for the species' decline. Long-beaked echidnas are highly prized game species and are hunted for food by local people with trained dogs. The other threats come from farming, logging and mining, which are causing a decline in the echidnas' forest habitat. Of particular concern is the proposed nickel mine at Wowo Gap, an area that supports a good population of this species. Competition with feral pigs may also be having a negative impact by disturbing habitat with their digs.

Snurri

http://www.edgeofexistence.org/mammals/species\_info.php?id=1394



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