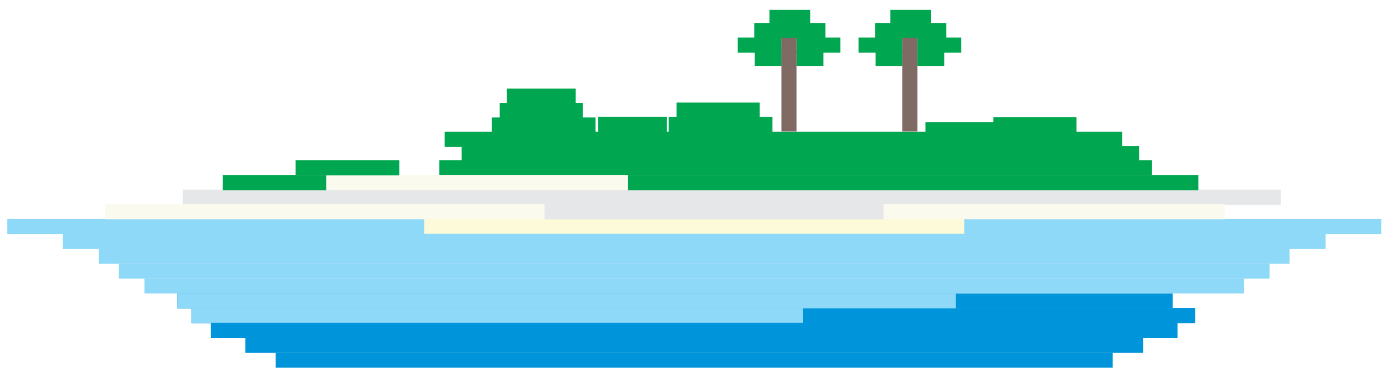




ENVIRONMENTAL NEWSLETTER
MINISTRY OF ENVIRONMENT AND ENERGY



25 Convention on
Biological Diversity
YEARS | SAFEGUARDING LIFE ON EARTH

Minister's Note

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Maldives with its unique geography is also host to many different species, particularly marine species. Given the inter-connectedness of our natural environment, the survival of these species is dependent on both the health of our environment and the balance in our ecosystem. Taking care of our rich biodiversity is also crucial given its inextricable link to our economy and overall well-being of our peoples.

The government continues to take bold and strategic action to safeguard our vulnerable environment and protect and conserve our biological diversity. The support and participation of all is required to ensure the success of such efforts. I encourage everyone to do your part and contribute towards protecting our rich environmental heritage.

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25 YEARS | Convention on
Biological Diversity
SAFEGUARDING LIFE ON EARTH

ACCORDING TO *MALDIVES VISITOR SURVEY, 2018*. THE MOST VISITED PLACES IN MALDIVES:

Whale Shark watching (Ari Atoll): 33%

Baa Atoll Biosphere Reserve (Hanifaru Bay): 16%

Cultural and heritage sites: 13%

"THE FROG DOES NOT DRINK UP THE POND IN WHICH IT LIVES"

-Lisama Sabry-

Mankind and nature have co-existed for a very long time. Humans have been living, and indeed thriving in the natural world. While there are 8.7 million¹ species on Earth and many more left to be discovered, the rate at which species are currently going extinct due to human activity is unprecedented and larger than anything the world has experienced since dinosaurs died out 65 million years ago.

As such, it is imperative that humans acknowledge the importance of conserving the variety of living organisms on Earth, also known as biodiversity. Nonetheless it is also true that biodiversity conservation has been on the international agenda for some decades now; the Convention on Biological Diversity (CBD) was formed at the Earth Summit in 1992 when the world came together and endorsed this cause.

May 22nd marks the International Day for Biological Diversity, declared by the United Nations on 29 December 1993, the date on which the CBD came into force. Our small island nation was among the first to join the global efforts when we became a Party to the Convention in 1992. Today, a total of 196 parties are working together to achieve the overarching three objectives of the Convention: the conservation of biological diversity; the sustainable use of biological diversity; and the fair and equitable sharing of benefits arising from the utilization of genetic resources.

This year marks a special landmark in the history of biodiversity conservation. It is the 25th anniversary of the CBD and the theme is "Celebrating 25 Years of Action for Biodiversity". As the whole world unites in celebrating life on Earth, sharing their success stories in a never-ending battle of biodiversity loss, with a hope for the future; it is a great opportunity to appreciate life here in the small island nation of Maldives.

Maldives is proud of the rich marine biological diversity in our waters. Hosting some of the world's critically endangered species and charismatic marine mega fauna, the marine biodiversity of Maldives is globally significant. Our coastal ecosystems are acclaimed for their aesthetics and coral reefs are stunningly diverse, while also supporting livelihoods and protecting island settlements. Maldivians are naturally, no strangers to the beauty and importance of life underwater, our economy being fueled through biodiversity-dependent sectors such as tourism and fisheries.

As the world concentrates on acting on global environmental challenges such as Climate Change, we must also be determined to protect the living. That would be the Earth's ultimate accomplishment.

¹Mora, C., Tittensor, D. P., Adl, S., Simpson, A. G. B. & Worm, B. PLoS Biol. 9, e1001127 (2011).

" A TIMELINE OF BIODIVERSITY CONSERVATION IN THE MALDIVES "

-Muhsina Abdul Rahman-

The Maldives is a unique archipelago of 1192 tiny islands located in the Indian Ocean. The coral reef systems of the Maldives are the fifth most diverse and seventh largest in the world covering a total area of 8,900 km² in size. This article highlights a timeline of major events and achievements by the Maldives for the conservation of biodiversity. The article is in line with this year's theme for International Day for Biological Diversity, which is "Celebrating 25 Years of Action for Biodiversity". The theme celebrates the 25th anniversary of the entry into force of the Convention on Biological Diversity and aims to highlight the national and global level achievements and progress toward biodiversity conservation.

1902: Captain Morisby conducted the first ever-recorded biodiversity research in the Maldives on 1835 on the morphology of the reefs in the Maldives. This article was published in Mister Sea Dorvin in 1874. This publication led to further detailed research on the reefs of the Maldives by Mr. J Stanley Gardiner focusing on the marine fauna and geography of the Maldives. This study was published in the Tropical Agricultural Journal in August 1901. This study was a significant milestone as it included a comprehensive survey of the species based on the depth, the relationship between and among species, the diet, and growth of coral polyps, erosion, and changes to the morphology of reefs and islands of the Maldives.

1933: The first ever legislation regarding biodiversity conservation was ratified by the King Mohamed Shamsudeen III. The law makes it compulsory to plant four plants for each plant cut for wood. This law also aims at conservation of native plants of the Maldives.

1942: The vulnerability of Maldives towards external shocks was realized by the Maldives during the Second World War, due to the food scarcity in the Maldives during the war. Several Maldivians died due to hunger, and a particular focus was given on planting trees after the Second World War.

1984: The first institutional set up for environmental protection was established in the Maldives which is the Environment Council created on 21 May 1984. The council was mandated to advise the government on the issues and status of the environment of the Maldives including the emerging issues at global level. This institution set up can be considered the first governance structure for biodiversity conservation in the Maldives. The members of the council represented the Maldives at several meetings, and negotiations relevant to the environment including the Man and Biosphere Meeting held at New Delhi from 18 to 19 March 1985.

1992: The Convention on Biological Diversity was opened for signature, and the Maldives became a party to the convention on biological diversity in 1993. The primary three objectives of the Convention are; (1) conservation of biological diversity, (2) sustainable use of biological resources, (3) fair and equitable sharing of benefits arising from the utilization of genetic resources.

1993: The Environment Protection and Preservation Act (4/93) was gazette where biodiversity conservation and protection was a key priority. Environmental Impact Assessment was introduced to the Maldives, and it was made mandatory to establish protected areas and nature reserves in the Maldives according to the Article 4 of the Act.

1995 to till date: Protected Areas

The first protected areas under the Environment Protection and Preservation Act (4/93) was declared in 1995 where 15 dive sites were declared as marine protected areas. Currently, there are 42 protected areas in the Maldives covering an area of 24,494 hectares. These sites include 33 marine area, five mangroves, one beach and three islands. These areas have an ecological significance of rich marine diversity including the presence of globally significant megafauna such as whale shark, manta rays, and turtles.

1996 to till date: Protected Species

The White Tern (*Gygis alba monte*) was the first species declared a protected species in the Maldives due to its limited distribution and declining population. The works of protecting species is an ongoing work by the government of the Maldives. All migratory birds are protected in the Maldives and 13 marine species, and the Maldivian Black turtle (*Melanochelays trijuda thermalis*) are also declared as protected species under the Environment Protection and Preservation Act (4/93). Additionally, Batoidae, a superorder of cartilaginous fish commonly known as rays and skates is also protected in the Maldives.

2002: The Maldives prepared the First National Biodiversity Strategy and Action Plan and also submitted the First National Report to the CBD. The overall vision of the first National Biodiversity Strategy and Action Plan is to build "a nation which appreciates the true value of the natural environment, utilizes its natural resources in a sustainable manner for national development, conserves its biological diversity, shares equitably the benefits from its biological resources, has build the capacity to learn about its natural environment and leaves a healthy natural environment for future generations".

2006: The Regulation for the Chopping, Uprooting, Removing and Transfer between islands, of Palms and Trees was gazetted. The objective of the regulation was to regulate the increasing number of plants being removed and uprooted leading to declining the vegetation cover of the islands.

2007: Recognizing the importance of protection of old plants and trees in the Maldives, 'the Regulation for the Protection and Conservation of the Natural Life and Character of Old Plants and Trees in the Maldives,' was ratified. According to this regulation, all plants above 50 years will be protected under the Environment Protection and Preservation Act (4/93). Additionally, this regulation gives protection to declining native plants and plants of important cultural and historical significance.

2008: The Constitution of the Maldives was ratified in 2008, where Article 22 states that "The State has a fundamental duty to protect and preserve the natural environment, biodiversity, resources and beauty of the country for the benefit of present and future generations. The State shall undertake and promote desirable economic and social goals through ecologically balance sustainable development and shall take measures necessary to foster conservation, prevent pollution, the extinction of any species and ecological degradation from any such goals."

2011: Baa Atoll was declared as a UNESCO biosphere reserve on 28 June 2011. The designation of Baa Atoll as a World Biosphere Reserve demonstrated the world-class nature of the marine areas in Baa Atoll, and the commitment of the locals to conserve biodiversity and develop sustainably. This is the first site in the Maldives with global recognition and was the result of the Atoll Ecosystem Conservation project funded by the GEF. Baa Atoll UNESCO Biosphere Reserve has three functions: conservation, livelihood, and learning. Baa Atoll Biosphere Reserve consists of 9 core areas (protected areas) covering 10% of the Atoll. Baa Atoll is also recognized as an Ecologically or Biologically Significant Areas (EBSAs) under the Convention on Biological Diversity.

2012 to till date: Management of Protected Areas

The first protected area that was managed under regulation was Hanifaru Protected Area located in Baa Atoll UNESCO Biosphere Reserve. In 2012, Regulation for the Protection and Preservation of Baa Atoll Hanifaru Area was gazetted. The regulation allows for the generation of revenue from access permit to Hanifaru which is a source of income for the Baa Atoll Conservation Fund. The Olhugiri Island of Baa Atoll is also managed through a community-based management which is to be implemented from April 2018. The additional sites with a management regime include the protected areas of Addu and Fuvahmulah Atoll.

2013: Maldives became the 177th Party to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) on 12 March 2013. The Convention aims to ensure that international trade in specimens of wild animals and plants does not threaten their survival. The Maldives is home to over 300 CITES-listed species, such as the whale shark, giant humphead wrasse, black seahorse, hawksbill turtle, Eurasian spoonbill, duck hawk and Indian flying-fox. CITES trade with the Maldives consists mainly of raw corals and ornamental plants.

2015: Rasdhoo Atoll Reef was recognized as an Ecologically or Biologically Significant Areas (EBSAs) under the Convention on Biological Diversity. Rasdhoo Atoll is among the few small atolls in the Maldives with special ecological features. The atoll has four islands and three sandbanks. The channel between Rasdhoo Island and Madivaru Island is known as a famous diving site to spot hammerhead sharks, which can be seen in abundance throughout the year at depths of 25 to 60 meters. Since the atoll is isolated and surrounded by deep sea, it acts as a sanctuary for the juvenile fishes to grow in safety at its shallow atoll rim. For this reason, the atoll is famous for its large number of reef fish and frequent visits by their predators like the hammerhead shark. Due to its rich biodiversity and unique value, the Environmental Protection Agency of Maldives has also included this atoll on its list of Environmentally Sensitive Areas.

2016: The National Biodiversity Strategy and Action Plan (NBSAP) 2016 - 2025 was formulated and submitted to the CBD together with the Fifth National Report on Biodiversity. The NBSAP 2016 - 2025 aims to contribute to the Aichi Biodiversity Targets and has 6 strategies and 26 Targets to conserve the biodiversity of the Maldives for future generations

A FISH IN CONTEMPLATION

-Hawwa Nabaaha Nashid-

Ah, summer time! The waters around Ari Atoll are always so warm and welcoming this time of the year. As I swim around feeding in the waters, I can see numbers of my friends arriving as well. These waters are popular among us because of the abundance supply of food available at the region, along with the fact that the whole 42km surrounding the reef habitat was declared a Marine Protected Area in 2009. We love our daily dose of plankton, the easiest meal for us, because despite being blessed with a mouth over 3ft wide with more than 3000 teeth, we have small throats and even smaller teeth which are pretty useless for chewing. Since the nice land humans work so hard to protect us and create welcoming environments, it is only appropriate that we make appearances and mingle with the water humans who await our arrival. The water human schools have increased over the years as well. Previously, they would just jump in with their special circular bags but now they have a small box on a stick which they carry around near us as well, probably something which gives them swimming directions. It is always nice seeing so many water humans coming up to us and swimming with us. I wonder if they know we enjoy their company as much as they seem to enjoy ours. If we could brand our corals and fins with their faces and large feet, we would do that as well. Word around the sea is that the merchandise with our images are have the highest demand.

It's not just their company we appreciate, it is also their continuous efforts around the world to protect and conserve all biodiversity. Their brilliantly efficient international conventions bring together people from all over the world to explore solutions for our most pressing issues and develop new measures and laws to be implemented for our protection and conservation. In this way, these conventions have banned the trade of our species for human profit, finning us and fishing for us and created sanctuaries for us to recover from our injuries. These conventions also emphasize greatly on sustainable development which is a brilliant mechanism allowing for humans to develop and grow on Earth without depleting Earth's natural resources. This is of such importance that they have set 17 whole Sustainable Development Goals, in which the 14th goal is specifically for life below water! That's us! Despite our life span of around 70 years and being able to reproduce vigorously we do need help in terms of surviving in this world.

Lastly, they have to be thanked for letting the world clear up so many misconceptions about us. For instance, we are the largest known of our kind but we do not owe this to a diet of other large marine animals or humans, we are filter feeders and eat the smallest organisms we come across such as plankton and small nektonic life. We also breathe through our special filtering gills which help us release oxygen and we lay eggs to reproduce instead of giving birth. And the most important of all, we are fish, unfortunate fish who grow sizes equivalent to the whale species, which was why we were given our confusing name of whale sharks.



PEMPHIS TALK

ILHAM ATHO MOHAMED

*Assistant Director,
Biodiversity Unit - Environment Department*



What sparked your interest to this field:

It is difficult to say exactly what sparked my interest. Along the way, many different factors must have played a role. One of the lasting memories of my childhood is when we used to catch dragonflies to keep them in jars. When my father sees them he would make us release them saying that dragonflies do not belong in jars and that keeping them captive will only hurt them. He also said that they will die a painful death in captivity. He was right, every time, they died within a day. It wasn't long before I lost the courage to capture them for my entertainment. I started hating it when others capture animals. Many years later when I was doing my undergraduate studies in Botany to become a biology teacher, I realized that I wanted to work in the biodiversity sector of Environment instead of being a teacher. So here I am.

Biggest challenge in the conservation of the natural biodiversity of Maldives?

I think it is the lack of connectedness we as human beings have with nature. We are so busy in dealing with our daily lives, we forget to appreciate all the natural resources of which we sustain our lives. We even take the food on our plates for granted without even trying to understand how and where this food originated from. The challenge we have is to make everyone look beyond their food plates.

Since we are celebrating 25 years of the Convention on Biological Diversity, what is the biggest achievement/milestone?

The fact that the global community has one voice to address the complexities of biodiversity is an achievement of the Convention. The Convention has managed to bring biodiversity onto the political agenda and has provided a platform to work together globally with the understanding that the earth is one biosphere shared by living beings that do not recognise political boundaries of nations.

“ For humans biodiversity is life. It is the services we take from biodiversity that keeps us alive, be it air, water, food, shelter or clothing. ”

In your opinion how significant is the biodiversity of the Maldives on a global scale:

There are many significant places around the world for biodiversity, many are in fragile and vulnerable ecosystems. In my opinion, the most significant feature of the biodiversity of Maldives is the unique way in which the coral reef ecosystems are sustaining humans on its islands. It is a wonder to many how Maldivians are able to continue living for centuries in these minute sandy islands hardly above sea level in the middle of the raging Indian Ocean. Of course, it is because of the coral reefs, they are the reason islands can continue to exist and be protected from the raging sea.

Could you tell us more about the Convention efforts by the MEE?

The convention has 3 main goals - conservation, sustainable use and equitable access and benefit sharing of genetic resources. To achieve these goals the convention agrees on global targets of which the latest is the Aichi Targets. At national level National Biodiversity Strategy and Action Plans (NBSAP) are developed to implement these target and to address biodiversity issues within the nation. Maldives has developed its NBSAP and continues to participate in the negotiations at the global level. With the assistance from various organizations, Ministry is working towards achieving these national and global targets.

How important is it to conserve the biodiversity for us mortals?

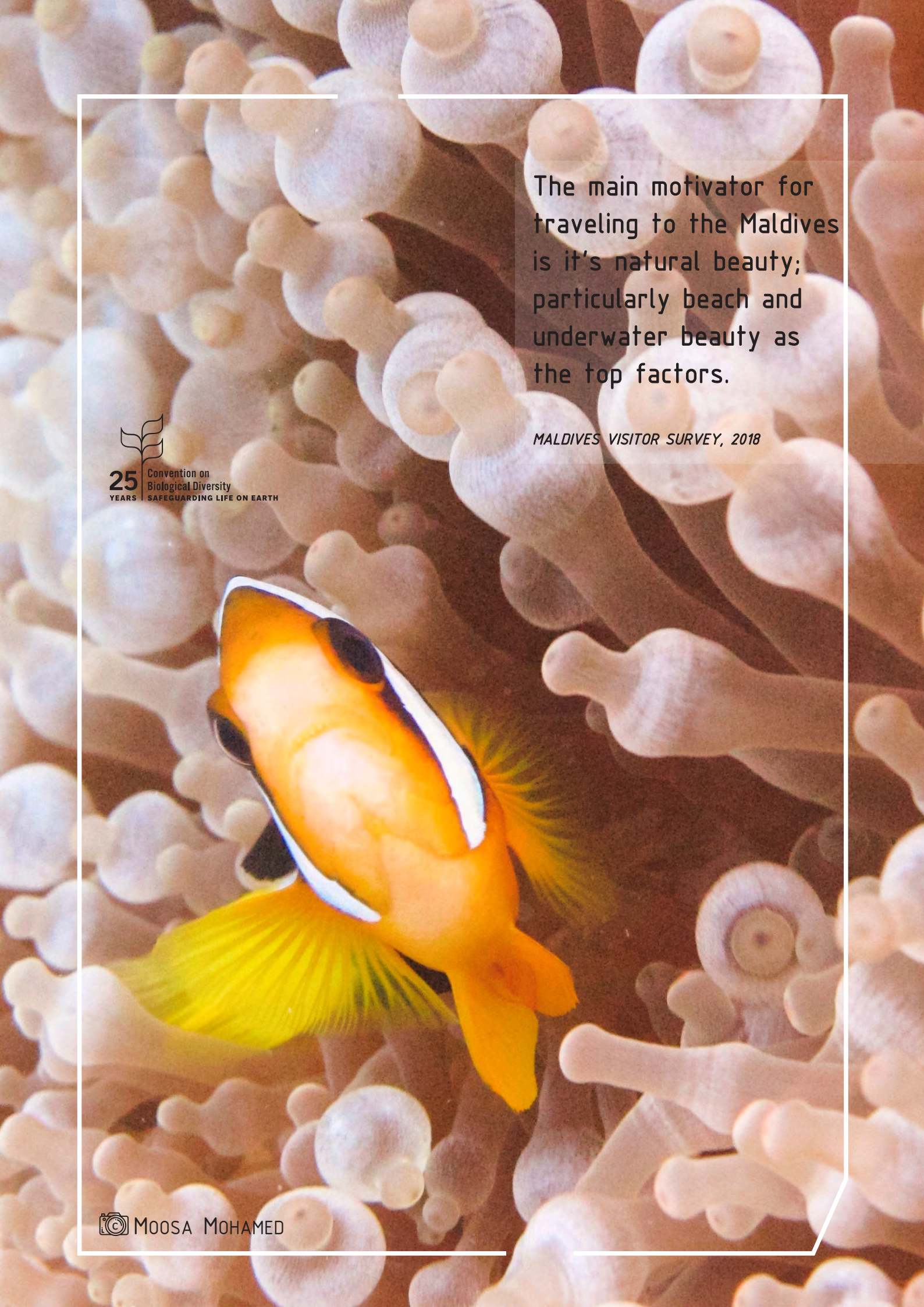
Well, humans are mortals only because we are living. For humans biodiversity is life. It is the services we take from biodiversity that keeps us alive, be it air, water, food, shelter or clothing. All these services are provided through the interactions of biodiversity. How many minutes can a human being expect to survive outside the boundaries of these services?

What makes working in this field so worthwhile?

This field probably has little rewards but many challenges, and working in the government has its own trials. What makes it worthwhile is the constant learning experience. Our environment is such a complex and delicate system, where a little disturbance to a seemingly insignificant factor could result in the collapse of an entire ecosystem. We know very little about these systems, and the more I learn, the more I realize how little I know of this mysterious systems of our planet. Although there are many struggles and challenges, it is worthwhile to try and get the messages across at all levels of society, because biodiversity is really worth it.

To conclude, what is the message that you want to give?

Biodiversity is an integral part of our being, but is miles away from our hearts. The Earth has finite resources to sustain only so many humans. We humans may be more powerful than everything else on this planet, but we must remember, with every great power, comes equally great responsibilities

A vibrant orange and white clownfish is swimming in a sea anemone. The anemone has many white, bulbous tentacles. The clownfish has a bright orange body with a white stripe running along its side and a black stripe near its eye. The background is a soft, out-of-focus view of the anemone's interior.

The main motivator for traveling to the Maldives is it's natural beauty; particularly beach and underwater beauty as the top factors.

MALDIVES VISITOR SURVEY, 2018



MARINE AND COASTAL BIODIVERSITY NATURAL CAPITAL OF MALDIVES

What is biodiversity? Biodiversity means the variety of plant and animal life in the world or in a particular habitat, a high level of which is usually considered to be important and desirable. But my topic is not only biodiversity; it is related to marine and coastal biodiversity. Marine and coastal biodiversity includes the oceans and the marine life and coastal habitats such as trees and birds. Some examples of marine and coastal habitats include mangrove forests, coral reefs, sea grass beds, estuaries in coastal areas, hydrothermal vents, and seamounts and soft sediments on the ocean floor a few kilometers below the surface.

Our beautiful country Maldives harbors are rich biodiversities. Maldives has a great number of marine and coastal habitats. Over 1,100 species of reef fishes and over 250 species of corals are found. Maldives coral reefs are the seventh largest in the world and represent as much as 5% of the world's reef area. But the saddest thing is that these habitats are under threat due to improper waste disposal and unsustainable coastal development practices, which are resulting in increased pollution and coral reef destruction.

Have you ever thought about the importance of these habitats for our country? Let's cast a light on the importance of marine and coastal biodiversity for Maldives. First of all, life in our seas produce a third of the oxygen that we breathe. And also, it offers a valuable source of protein and moderates global climatic changes. They provide coastal protection and are the mainstay of both the fisheries and tourism sectors, which are the most important for our economy. The most important source which the tourism sector in the Maldives depends on is the marine species. Now, let's discuss on some of the marine and coastal species found in Maldives. Here are some of the species with some information about each. Coral reefs: These are the most attractive and sensitive species found in the Maldivian underwater garden. Colourful corals attract many tourists. There are 250 different species of coral have been found in the Maldives. Fishes: These are the species which are consumed by most of the Maldivian people as food. Over 1,100 species of fishes have been found in the Maldives. Fishes are the most beneficial part in almost all Maldivian's diet. Turtles: There are different species of turtles found in the Maldives. They are called in different names among us. Turtles are protected by the government so the using and selling of which is banned to increase the turtle population.

Marine algae, sea grass and marine fungi; In the Maldives 285 species of marine algae including 21 species of blue-green algae, 163 red algae, 83 species of green algae and 18 of brown algae have been found.

The Maldivian biodiversity is healthier before than now. Now most of the habitats have been destroyed by the people for their own use. Before the use of plastic bags and amount of waste produced is far less than now. Now the beaches are flooded with waste and the birds cannot move freely on the beaches. And also the coastal trees cannot better because of the

-Shaunaa Rasheedh-
Al-madharusathul Munavvara
Maroshi



This essay has been published as submitted by the student to the Biodiversity Student Prize Essay Competition. The views expressed in the essay are purely of the student

wastes. There are many policies by the government to protect these species. Several government departments are responsible for ensuring the conservation and sustainable use of marine and coastal biodiversity in the Maldives, including the Ministry of environment, Energy and Water (now the Ministry of Housing, Transport and Environment) the Ministry of fisheries, Agriculture and Marine Resources and the Ministry of Atolls Administration. This country is heavily dependent on marine and coastal resources for economic wellbeing and development. That the major part of the Maldivian economy depends on biological resources and natural ecosystems, the failure to integrate biodiversity into economic policies, strategies and budgets may undermine the very basis for sustained and equitable economic growth in the future. Current investment in biodiversity does not adequately reflect its immense value to the national economy and future development. As a result, this vital asset the "Natural capital" of the Maldives, is being eroded with declines of several harvested marine species (ie, sharks, lobsters, sea cucumbers, reef fish). Pollution and damage to reefs from construction. This loss of biodiversity can be a significant problem for the economy of Maldives.

Now, I am going to present you some of the protected marine and coastal species in Maldives. This includes lobster, Triton, Napoleon wrasse, Dolphin, Whale shark, Whale, Black coral, Hawksbill and Green turtle. These are the marine species protected in the Maldives. But some people use this species as they are protected also. Lesser Crested Tern, Great Crested Tern, Northern House Martin, Maldivian Water Hen, Watercock, Caspian Tern, Sooty Tern, Brown Noddy, White tern, Common coot and there are a number of birds that are endangered and so protected in the Maldives. Some of these species are found in only one or two islands in the Maldives now. Cattle Egret is a seasonal bird and it is also protected in Maldives. But in the sunny season many people among us catches these birds and leaves them to die without caring them.

All of us should think about this rich biodiversity. We should protect these species to keep our Maldives beautiful. We all feel proud because we have got this rich coral gardens and white sandy beaches and dark green trees as a gift from God. We should be thankful to this gift and work together to protect these valuable species. We all should follow the rules made by the government. There will be no use of the rules if we didn't take actions on it. It is important to provide information about the marine and coastal species and protected species to each and every citizen in the country. So that everyone will do things to protect our country. I force all of you to make effort to protect our beautiful country. I hope all of you got some valuable information about marine and coastal biodiversity in Maldives.

IT'S TIME WE STOOD TOGETHER

'Climate change' is a phrase we hear often: at school, on the television and on various social media. It is an enemy we humans have created, and one we must battle. This is an issue that has people of all walks of life concerned, as it affects the Earth and all its residents as a whole. Lately, the impact of climate change on marine and coastal biodiversity has become the focus of global attention. The importance of coastal areas and marine life leads the global community to fear any negative impacts of climate change on these ecosystems.

Out of all the countries, the Maldives' marine and coastal life is one of the most vulnerable. Comprising of low lying islands, this archipelago is on the front line of the battle against climate change. The country has the world's seventh largest coral reef of the richest diversity. Its small size and the insularity of the Maldivians and tourists, though, causes the ecosystems to be in constant threat, especially from the consequences of climate change.

First and foremost, climate change is bringing about a rise in the surface temperature of the ocean. When high temperatures are prolonged, the Zooxanthellae, which are tiny algae living in the coral polyps, leave their abode. Coral polyps are tiny, soft bodied organisms that create a coral to protect themselves. The coral gains its vibrant colours from the tiny algae living in the tissues of the colony of polyps in the coral. Also, the Zooxanthellae are photosynthetic. The products from this photosynthesis provide the coral up to 80 percent of its nutrients. Without these algae, the coral is left colourless and starving. This process is known as bleaching. A survey suggests that more than 60 percent of the reefs in Maldives have become a victim to this effect of climate change, when, in 1998, an EL Nino caused a substantial rise in temperature of the Indian ocean. This has left some of the Maldivian reefs as a ghostly expanse of dull white, even now after two decades.

Recuperating the reefs back to its original beauty is a challenge as well. When high temperatures persist after coral bleaching, the Zooxanthellae cannot return to the coral polyps. The polyp, unable to survive long term without the Zooxanthellae, dies. What is left is a skeleton of calcium carbonate. Algae begin to grow on the dead coral, eliminating any chances of a new colony of polyps to form. However, if fish eat off the algae, A new colony of polyps may begin to form within the calcium carbonate skeleton. Even then, the new colony is also at risk if the temperature does not drop.

Bleaching, however, is the effect of extreme temperature escalations. Corals are temperature sensitive, meaning that even a miniscule rise in temperature would have negative impacts on them. In such a case, the coral may have reduced organic performances such as declines in growth and reproduction. This in turn has a direct effect on the coral's resilience to

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environmental changes and disturbances, as well as the coral's mortality rate.

As each organism in an ecosystem is connected, bleached corals do not only affect coral colonies, but also several other forms of marine life. Several species of fish, turtles and invertebrates rely on corals for food and shelter. They also use corals as a nursery to nurture their young. When corals die after bleaching, these organisms that depend heavily on corals remains with scarce food, no shelter and insufficient breeding grounds.

Fish are vulnerable to the rise in temperatures as well, due to their ectothermic nature. Being ectothermic means they depend on their environment for body heat. They are unable to regulate body temperatures by processes such as perspiration either. Rather, they move between areas of different temperatures. If they cannot move to waters of suitable temperatures swiftly, they will be forced into rapid adaptation, or die.

Although fish in Maldivian waters are not as affected as freshwater species, there are significant effects nonetheless. As Maldives is located on the equator, its oceans experience high temperatures all year round. The fish inhabiting these waters are already approaching the upper limit of their tolerated temperatures. An increase in temperature would not allow much of an opportunity for the fish to make adaptations or migrate easily. The rise in sea surface temperatures also impact the aggregation process of fish, that is, gathering in higher densities for the sole purpose of reproduction. This affects the mortality of several species of fish living in Maldivian seas and brings about changes in movement of fish.

Coral reefs are not the only victims to the temperature escalations in the Maldives. Mangroves are expected to change in species composition and phenological patterns. Ecosystems that thrive in deep waters are also expected to be affected by this phenomenon. Changes in the distribution and abundance of fish and alterations in their migratory paths are the most likely results of the rising temperature.

Rise in sea level is another dangerous outcome wrought by climate change. The biological diversity of mangroves throughout Maldives is expected to receive a high impact of the rising sea level. Sediment erosion, inundation stress and increased salinity all pose threats to the mangrove ecosystems. Since Mangroves provide significant facilities to adjacent ecosystems, this disturbs other ecosystems as well. Mangroves provide a secure breeding ground for several reef fish and invertebrates. They also trap sediments to sustain water quality of coral reefs. If the sediments spread through the coral reefs, it could form murky water that blocks out sunlight, restricting coral photosynthesis. It also causes a rise of algal bloom at an exponential

IT'S TIME WE STOOD TOGETHER

rate. However, if rise in sea level occurs slow enough, the mangroves could adapt to the rise and decrease the damage on its ecosystems.

Sea level rise also poses a noteworthy threat to sea turtles. Although turtles spend most of their life in the sea, they climb onto beaches to lay their eggs. These eggs lay in their protected hideaway, where they can incubate and hatch. The rising sea level, though, is slowly swallowing up these nesting grounds, threatening turtle reproduction. This loss of beach habitat could be the end of the already endangered species. Maldivian waters house five of the seven species of sea turtles. Consequently, the extinction of one of these species is unfavorable for the Maldives' fragile biodiversity.

As delicate as it is, the Maldives' marine and coastal biodiversity is precious to all Maldivians. During the past years, the Maldives has been benefiting from its biodiversity immensely. The country's topmost economic industry, tourism, has been thriving due to the various forms of marine life in Maldivian waters. Other than employment, these ecosystems are also intertwined with the threads of culture, nourishment and protection in the fabric of Maldivian society.

The aforementioned reasons illuminate how dangerous climate change is to the Maldives. Although several measures are being taken to stop any development of this issue, its effects have already been spotted throughout different regions of Maldives. These effects are already taking a toll on the development and environment of the Maldives. Although this essay focuses on the effects caused by rise in sea surface temperature and rising sea level, there are other threats to the Maldives' biodiversity caused by climate change. We as Maldivians must learn about these threats and make an effort to protect our biodiversity, to protect our country and its economy. We must protect these ecosystems so that we can continue to prosper from the marine and coastal biodiversity as we have been for hundreds of years.

THE CORAL REEFS IN MALDIVES ARE BLEACHING. CAN IT BE SAVED?

The closer coral reefs are to humans and increase of water activities the more damage it will cause to our reefs. The Maldives has 1,200 islands, but only 200 of them have humans on, so the further away you get from the human centers the better the reefs are. But even if they are away from humans, they are still suffering from human-induced impacts such as higher water temperature, high salinity and acidification.

Maldives is a country who highly depends on tourism sector. The coral reefs represent a big part of tourist attractions. Tourists come to Maldives to enjoy the sandy beaches and crystal clear lagoons. Snorkelling and diving are the main activities done by tourists in the Maldivian waters. So the reefs need to be alive and clean in order to satisfy the visitors. A bleached coral reef would most likely be dead.

More than 60% of coral reefs in the Maldives has been hit by "bleaching" as the world is gripped by record temperatures in 2016, a scientific survey suggests. Bleaching happens when algae that lives in the coral is expelled due to the stress caused by extreme and sustained changes in temperatures, turning the coral white and putting it at risk of dying if conditions do not return to normal. This is a serious problem not only facing to the Maldives but also other countries around the world.

A new study has found the conditions that led to the devastating bleaching on the Great Barrier Reef were made 175 times more likely by climate change, and on the current trajectory, would become the average conditions by the 2030s. Shocked researchers have found the colourful living structures described as the foundation of one of the planet's most desirable tourist attractions are either dead or dying. The warning about the plight of reefs that draw divers from across the globe to the crystal clear waters of the Indian Ocean archipelago comes from Biosphere Expeditions, the non-profit wildlife research and conservation organisation. They have been studying Maldives' reefs since 2011 and says its latest findings reveal "an ever increasing spiral of coral death and reef decline". Although studies show that corals can recover over a 12-15 year period, this depends on there being no other pressures such as "sedimentation, ocean acidification and other human impacts created by greed, short-sightedness and ignorance", Biosphere Expeditions said in a statement. They describes Maldives' corals as the "rainforests of the seas" in the way they are the basis for a multitude of species and the bedrock of the islands' fisheries, culture, economy and well-being.

Based on a research held in 2017, all shallow snorkel depths from water surface to about 3 metre was hardest hit by bleaching with a near total loss of table corals. There were few reefs on outside of atolls and in high water flow areas where table corals did survive. These areas are the most critical for recovery of the species. It will take a min of five years before we start seeing a lot of table corals again and 10-15 years before they are a meter or more in size according to the research. Throughout the country the massive Boulder corals (Porites) mostly survived and these are now the

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dominant species on the reefs. These are very important in forming the framework of the reef.

Plastic is one of the reason why our coral reefs are bleaching. The scientists who conducted the studies related to ecosystem and marine life did not set out to research plastic but were confronted by it across the regions they surveyed. The correlation between plastic pollution and high rates of disease was very striking and the researchers think sharp plastic fragments cut the coral organisms, while plastic fabrics smother them and block out light and oxygen. Corals are animals just like all other animals – they become wounded, infected and damaged. Plastics are ideal vessels for microorganisms such as algae, with pits and pores, the fragments will cut the micro-organisms in corals like a sharp knife. The plastic could be making the corals sick because of a variety of reasons. . The debris could stress the corals by depriving them of light and oxygen, it could damage or cut their tissue by tangling around them, or it could carry disease around because it's easily colonized by bacteria. Previous research has shown that plastic debris is dominated by the bacterial genus *Vibrio*, which causes the disease white syndrome. Pieces of plastic also accumulate pollutants such as PCBs anywhere from 100,000 to 1,000,000 times the levels found in seawater.

Extreme El Niños, which spread warm water across the Pacific and warm the globe, were not seen before 1982 and have occurred three times since. Extreme El Niños are expected to increase in frequency as a result of climate change. Maldivian marine life has suffered during the three times of El Niños. Those El Niños were also occurring in an ocean where the surface has already warmed by 1°C, putting corals in danger of heating up or reaching near their thermal limits. When the temperature increase and the coral stay in shallow water for too long, it gets stressed and expels the algae that provides it with about 90% of its energy. If it stays stressed for more than a couple of weeks it starts to starve, become diseased, and dies. The stress of corals will bleach them sooner. Most of the reefs in Maldives is very shallow about 3 to 4 metres. Therefore these reefs are too prone to climatic conditions such as El Niño.

Over-fishing is another threat to our coral reefs, especially close to human habitation. There's too much fishing going for food. If you fish out the ocean that keep the algae down then the algae will overwhelm the corals. So the coral reefs die and you get a face-change from a coral reef to an algal reef. Among the other threats to the corals are pollution and ocean warming.

When we snorkel or dive across reefs we will find small Boulder corals mixed among dead coral skeletons. The staghorn corals that were once standing on the lagoonal environments throughout the country are mostly dead. These reefs used to have many branching corals. We are very

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fortunate that we didn't lose these small Boulder corals as they could take decades to centuries to recover. There are also patches of staghorn corals on every atolls of Maldives. These small patches will rapidly expand in size and within 5 years they should form thickets once again.

One of the most positive signs is the appearance of high numbers of young juvenile corals in our on reef slopes, especially in lagoon areas. These reefs are still dominated by branching corals that were formally very abundant on all reefs. The people who carried out the above research saw baby corals that spawned right before the bleaching event in during the 1990s. This is a really positive sign as this means they were able to tolerate higher water temperature and are likely to survive during periods of future high water temperatures. They predicted that the corals will double in size within a year and within two to three years will be old enough to begin reproducing. The corals which survive high temperature are critical as they will produce new corals during annual spawning events that will start to recolonize other reefs.

It is important to note that corals grow very slowly and we can't expect to see fully constructed coral reef overnight or in one or two years' time.

What is most positive is that these reefs are showing very positive signs of recovery unlike many other reefs in the Indian and Pacific oceans. So we need to be patient with these coral reefs if we are to have even slightest chance of saving them.

There's a lot at stake – what kind of reef do we want to pass on to our children, what kind of natural world? There are also arguments that there's this wealth, there are ecosystem services, so for example there might be new compounds in medical research that are yet to be discovered that might make a big difference and they come from the reef. They're also acting as breakwater protecting us from wave currents and so on. So, all these things are important – especially in the Maldives – as a basis for the livelihoods of people.

There are many things we can do on an individual level and as a society. Government need to be more serious about the coral bleaching problem. The good news is that these problems can be solved by implementing better waste management in developing countries like in the Maldives which the government is now trying to reduce the amount of plastics thrown into the sea.

**THE CORAL REEFS IN MALDIVES
ARE BLEACHING.
CAN IT BE SAVED?**

THREATS TO MARINE AND COASTAL BIODIVERSITY

The ocean covers 70% of our planet and represent over 95% of the biosphere. The ocean is at the origins of life on earth and makes the Earth habitable for people. It also provides us with a vital source of nourishment, especially to people in the world's poorest nations. It supports the livelihood of about 540 million people directly or indirectly.

This wealth of biodiversity and ecosystem services is not, however, infinite. All of these social, economic, cultural and environmental benefits may be lost. Today human activities are greatly threatening the seas and coasts through overfishing, destructive fishing practices, pollution and, waste disposal, agricultural runoff, illegal fishing, industrial and agricultural waste, greenhouse gas emissions (GMG), and environmental stresses like severe storms and habitat destruction. Global climate change adds additional pressures by raising the sea level, increasing the water temperature and leading to more storms and natural disasters. Sea water is acidifying due to increasing levels of atmospheric CO₂, with significant implications for marine biodiversity.

Oceans have absorbed one quarter to one third of the CO₂ emitted to the atmosphere from burning of fossil fuels, deforestation and other human activities since 1800. And the pressures on coastal and marine biodiversity will continue to increase, as 50% of the world's population will live along coasts, putting unsustainable pressures on coastal resources.

Coastal habitats are under pressure, with approximately 20% of the world's coral reefs lost and another 20% degraded. Mangroves have been reduced 50% to 30% of their historical cover, impacting biodiversity, habitat of inshore fisheries, and carbon sequestration potential. 29% of sea grass habitats are estimated to have disappeared since the late eighteen hundreds. Over 80% of the world's 232 marine eco regions reported the presence of invasive species, which the second most significant cause of biodiversity loss on a global scale.

Land based sources account for approximately 80% of marine pollution, globally. Excessive nutrients from sewage outfalls and agricultural runoff have contributed to rise in the number of dead zones, resulting in the collapse of some eco systems.

In addition to land based and marine pollution, plastic materials and other litters are also affecting the health of our oceans. Light, resistant plastics float in the ocean, releasing contaminants as they break down into toxic micro particles that animals mistakes for food. Fish and birds choke on these particles, get sick and often die. They also become entangled in larger debris.

Coastal developments are seriously affecting the health of our ocean. 40% of our global oceans are heavily affected by human activities. These activities leads to a reduction in the availability of calcium for plankton fish and shell fish species, threatening there way of survival. Since many of these organisms as the base of much of the food chain, the potential impact of acidification on entire ecosystems could be catastrophic.

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If we continue business as usual the ocean will become 150% more acidic by 2100.

90% of the world's fisheries are already fully exploited or overfished, while billions of unwanted fish and other animals die needlessly each year. Unsustainable fishing is the largest threat to ocean life and habitats.

They might cover 70% of the earth's surface but, only a tiny fraction of the oceans has been protected. Without more and better managed marine protected areas, the future of the ocean's rich biodiversity and the local economies it supports remains uncertain.

The beach is not just a favorite holiday destination, it's our favorite place to live. Around the world, coastlines have been steadily turned into new housing and tourist developments, and many beaches disappear under floods of holiday makers each year. This intense human presence is taking its toll on marine life.

The oceans are huge highways, across which we ship all kinds of goods. Like other human activities, this heavy traffic is leaving its mark. Oil spills, ship groundings, anchor damage, and the dumping of rubbish, ballast water and oily waste are endangering marine habitats around the world.

Important reserves of oil, gas, and minerals lie deep beneath the sea floor. However, prospecting and drilling for these poses a major threat to sensitive marine habitats and species.

Untreated sewage, garbage, fertilizers, pesticides, industrial chemicals, plastics and most of the pollutants on land eventually make their way in to the ocean, either deliberately dumped there or entering from water run-off and the atmosphere. Not surprisingly, this pollution is harming the entire marine food chain—all the way up to the humans.

Fish farming is often touted as the answer to declining wild fish stocks. But more often than not, the farming of fish and shell fish is actually harming wild fish, through the pollution the discharge, escaped farmed fish, increase parasite loads, and the need to catch wild fish as feed.

Coral bleaching, rising sea level, changing species disruptions, global warming and climate change are already having a marked effect on the oceans. Strategies are needed to deal with these phenomena, and to reduce other pressures on marine habitats, already stressed by rising water temperatures and levels.

Mass mortalities due to disease outbreaks have recently affected major taxa in the oceans. For closely monitored groups like corals and marine mammals, reports of the frequency of epidemics and the number of a new disease have increased recently. A dramatic global increase in the severity of coral bleaching in 1997-98 is coincident with high temperatures. Such climate mediated, physiological stresses may compromise host resistance and increase frequency of opportunistic diseases. Where

documented, new diseases typically have emerged through host or range shifts of known pathogens. Both climate and human activities may have also accelerated global transport of species, bringing together pathogens and previously unexposed host populations.

Globally there has been a surge of interest in designing areas as marine reserves and protected areas to maintain and conserve marine species and habitats threatened by human activities. There is a growing consensus that living marine resources require more stringent protections, however, choosing the best methods to maintain or restore the health of marine ecosystems is a difficult task for resource managers and a source of disagreement among user groups, scientists, and the conservation community.

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Biodiversity as per many iterations of the word can be summed up as the variety and abundance of animal and plant life in the world or within a certain habitat or ecosystem. So, in this respect marine biodiversity is the animal and plant species residing in the oceans and seas and coastal biodiversity is the assortment of plants and animals which thrive in the coastal region of the land. As the Maldives' geographical makeup is about 99% ocean it is safe to say our marine biodiversity is a lot broader than our coastal biodiversity. However, that does not take away from the fact that both of these are an innate part of our lives. That being said let's take a look back at how we have relied on our marine and coastal biodiversity and enjoyed the benefits of both in the last 25 years of Maldivian history.

Our oceans are teeming with an endless array of wildlife. It is home to countless species of crustaceans, seaweeds and algae, reef and oceanic fish as well as abundant varieties of corals. Due to our oceans carrying such diverse and rich marine life the people of Maldives have enjoyed a diet brimming with an assortment of seafood. While tunas such as skipjacks, yellowfin and frigate tuna remain part of our staple diet in the form of broths (garudhiya) and curries. Reef fish including mahi-mahi (fiyala), red snappers, wahoo (kurumas) and groupers are very commonly eaten foods as well. These types of fish are mostly eaten grilled, with a spicy chili paste so they have made an easy transition into barbecues in recent years. Some of the more exquisite delicacies Maldivians consume include shellfish like spider conches (raakani), periwinkles (golhaa), turban snails (handha) and lobsters. As these are not sold widely like other fish, people tend to go out by themselves or in groups in search of such creatures. Although animals such as turtles and sharks are now banned from being caught for food, Maldivians have been known to eat them in the same manner. Along with being in the middle of migratory routes through which many different species of fish travel, we should appreciate that the Maldives is situated in a prime location which allows for such an immense amount of life to exist and thrive in our waters. It is only because of this that we have experienced such an exuberant palate and one which we will hopefully continue to enjoy the same way for years to come.

When painting the idyllic picture which is the Maldives, it would not be complete without including our beaches full of pearly white sand. The Maldives has a coastline of 644 kilometers which is a considerably large number even though it is split up between the 1196 islands that comprise the country. We can owe a debt of gratitude to our fauna which has developed with certain capabilities which keep our beaches and coastline from eroding and dissolving back into the ocean. The types of plants and trees which line the shores of our islands are designed to help protect the islands from the sea and wind. Trees like the Octopus bush (Boashi), Beach

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gardenia (Uni) and Sea hibiscus (Dhiggaa) have large lateral and vertical root systems which make them very strong and so they act as windbreakers and soil stabilizers. They also protect the coast from salt sprays and reduce damage during storm surges. More plants such as Sea lettuce (magoo), Beach morning glory (Thanburu) and Ironwood (Kuredhi) grow right along the beach as they are well adapted to saline conditions, in fact, ironwood trees become weak without regular sprays of salt water. These plants help hold the soil together and act as a sand binder, they work well in preventing beach erosion. Other even more hardy trees including Red sandalwood (madhoshi), Banyan trees (nika) and Seal almond (Gobu) trees provide another great layer of protection against harsh sea winds that may be caused by cyclones and other natural events. Without such plants growing along our coasts our beautiful sandy beaches and even our islands as a whole would be very vulnerable against tidal surges and heavy rainfall. Which would mean that our very way of life could be threatened if not for such trees and plants acting as a boundary and barrier against the forces of mother nature. Therefore, as we lay on our glistening sand banks soaking up the sun or while having an excursion with our family and friends. We must always remember that if not for the variety of plant life on our shores we could not enjoy such moments. Even now as people scramble to preserve their islands from destruction, planting trees with adaptations like these can help secure the island a bit better until a manmade alternative is constructed. This way nature and humans can work together in these conservative efforts.

It is not only food and protection that our marine and coastal biodiversity has provided for us, it has also provided us with the means to take care of ourselves in times of sickness and ill health. For generations, men and women across Maldives have been making medicine for common ailments with plants that are readily available on our islands. These medicines which hold roots in Aryurvedic treatments are used to cure common diseases like colds and fevers to poisoning and weak bones. The beach morning glory plant is as widely used medicinal plant which is used to treat bladder infections, jellyfish sting, stomach ache, ulcers and boils. Grey nickernut (Kashikunburu) is another plant used for medicinal purposes. The seeds of the plant are nicknamed "poor man's quinine" due to its use in treating malaria. In Maldives, the tips of the shoots are given to women to hasten postnatal recovery. The poison bulb (Maakan'dholhu) is known to be entirely poisonous and unsafe for consumption. However, the leaves, roots and stem are widely used in traditional medicine. The leaves of the plant are often wilted on burning ambers and a thin film is peeled off and used to wrap medicine applied on the skin in the same way as a bandage would. The octopus bush is also used to treat many different conditions. The meristem and inner root bark of the octopus bush are often used to treat children suffering from dermatitis and diarrhea. A mixture of the inner root bark and coconut is

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used to treat hemorrhoids. An infusion from the leaves is ingested to treat food poisoning. In addition to this the leaves are also put in a bath as a restorative for women after childbirth. Despite the fact that these practices are now on the verge of dying out we would not have enjoyed the blessing of good health without such practitioners and our vast biodiversity that has helped so many people live a better life. It would also be in our best interest to not let such useful species of plants to die out from our environment.

Maldivians have traditionally always been people who have lived by the means that the land provided for them. Whether it be for food, shelter or mode of transportation we have relied on our ecosystems to provide us with the ingredients needed for our daily lives. The way we made a living is also the same. These days we still rely heavily on our environment to get an income and provide for our families. Fishing has always been the quintessential part of our lives so much so that it is called often referred to as our "blood line". This just goes to show how important the fishing industry truly is. Tuna are caught in large numbers by fisherman across the country. Our vessels have been upgraded from small row boats to boats which have holding capacities of over ten tons. We export large numbers of tuna overseas as well, our biggest importer being Japan where bluefin and yellowfin tuna are used in making sushi. Not only this, canned fish is another valuable export in overseas markets. It has given our fisherman other ways to earn money as they can now go commercial and sell to canning factories in bulk. With modern processing and packaging factories having been built it is quite an easy process as well. Setting this aside, the biggest contributor to our economy also relies extremely heavily if not entirely on our pristine environment and outstanding level of biodiversity. Of course, I am talking about tourism. Maldives is one of the hottest destinations for tourists to visit thanks to our sun kissed beaches and sparkling crystal-clear waters and astonishingly beautiful marine life. People pay a hefty sum to get up-close and personal with our colorful coral reefs and striking array of sea life. It has provided us with the means to build many people's livelihoods as well provide funds to develop our country. All of this is possible by virtue of our exceptional biodiversity which we should try to protect if we are to continue our way of life for future generations.

Recollecting my thoughts about how we have lived for the last 25 years, these are the ways in which I believe us as Maldivians have enjoyed our biodiversity. It has helped us put food on our tables and in times of famine, it has provided alternative sources of nutrition to reduce the number of people affected by such catastrophe. It has served us dutifully as a guard protecting us and our islands from natural disasters and threats which could have reduced the size of our ever so small islands and completely wiped us from the map. In the form of roots, shoots and stems of plants it

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has equipped us with medicine to fend off sometimes deadly diseases and significantly improved our way of life. It has granted us shade from the searing heat of the sun and it has also provided us with shelter so that we may be safe from any outside threats. It has presented us with opportunities to utilize our biodiversity to find different ways of earning a living so that the quality of life we can give to our families can be better than what we have experienced before. In these many ways we have found ourselves relishing in our incredible marine and coastal biodiversity. By using what our environment has bestowed upon we have enjoyed pleasure in all these different facets of our lives.

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MARINE AND COASTAL BIODIVERSITY AND THE ECONOMY OF MALDIVES

In April, 2018, I had my first snorkeling experience as part of an activity organized by the Ministry of Education. When I saw the beautiful fishes, the variety of colors, the designs and patterns on the fishes, starfishes, octopuses, eels, and the beautiful corals, soft and hard corals, I was in awe of the magnificent beauty and the diversity of our marine and coastal biodiversity. Sadly, I also saw many rubbish and waste, organic and inorganic, thrown in to the ocean and beaches. Under-valuing the importance and the usefulness of these ecosystems and failure to care for it will have negative effects, both in the short and long-term.

The oceans, coasts and reefs that surround the low-lying islands of the Maldives and the various organisms that live within these ecosystems are very important for the country's economy. This natural biodiversity attracts international interest, which is extremely important for a country that has significantly limited natural resources. Therefore, it is necessary to recognize the value of the marine environment and take measures to preserve it for the future. Destroying the marine environment upsets the balance of our beautiful ecosystem, poses long-term challenges to the tourism industry, the country's economy and the livelihoods of many locals. In order to protect them, firstly, we must recognize its importance. As such, this essay will discuss the economic value of the marine and coastal biodiversity of the Maldives by looking at the past and the present.

Maldives is a nation of several hundreds of small islands surrounded by one of the world's richest marine and coastal biodiversity. Furthermore, Maldives has the world's most diverse marine ecosystems. Researchers show that we have more than 250 different species of corals, 1200 reef fish species, 5000 different shell species, 5000 different shell species, 100-200 sponge species, more than 1 000 species of marine crustaceans, over 100 species of echinoderms exist and several different types of marine algae. In addition, we have a variety of sharks, eels, rays, dolphins, whales and aquarium fish in our oceans. Our ocean is also home to five species of endangered turtles. The Marine Research Centre has documented 900 economically important fish species in the Maldives. Nearly 300 of which were recorded for the first time in the Maldives, and 7 of these species had never been found anywhere in the world.

Maldives is a nation of small islands entirely depends on marine and coastal resources for economic growth, livelihood and development. Sustainable uses of these ecosystems are very important going forward because the economic value of the marine and coastal biodiversity in the Maldives is very high. Where the economy depends mainly on that for goods and services. A research conducted by IUCN showed that bio-diversity sectors provide 78,500 jobs to the local people. A lot of young people are working in the tourism sector, in watersports and diving. Their incomes depend on the

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beautiful coastal and marine ecosystems. Biodiversity sector also contributes to 49% of public revenue and 98% of our exports are from products we get from the coastal and marine environment. Fisheries create a lot of jobs for the Maldivian people, and fish products are exported internationally. As a country that depends on tourism and fishing as the main sources of national income, our coastal and marine diversity has a very high value for the economy and for the people. Aside from the economic value, the organisms that live in coral and marine environments are also useful for the balance of the ecosystems. For example, mangroves provide habitat for these species to survive. Very importantly, coral reefs, mangroves and the vegetation in the coastal parts protects the islands shorelines and settlements, protects the islands from powerful waves and tidal surges.

Although the economic values, direct and indirect, of these natural ecosystems are very high, until recently it has not been given much national priority. Even today, organizations like IUCN state that the national investments in biodiversity do not recognize the actual economic value of it. Due to the lack of adequate laws and policy, activities that destroy the marine and coastal ecosystems go unchecked. Many people harvest lobsters, sea cucumbers without a sustainable way. This means that rare species can be endangered or even be extinct. Pollution and damage to reefs from constructions, new development projects, harbour dredging and land reclamation are also very high and very concerning. Organic and inorganic waste disposal in to the oceans also threatens the future of this ecosystem. Mangrove timber was used in the past for boat building, fencing, fuel and poles and more. The cutting of the trees in the mangroves was not properly monitored and so the bigger trees were cut down most of the time. If the trees are not replaced for the future, the mangrove ecosystem will struggle to survive. Practices like this are damaging for the natural ecosystems we have and is not sustainable.

Recognizing the critical importance of these resources, the government of Maldives has been making a strategy of marine and coastal conservation. The ecosystem conservation project implemented by Ministry, with the support of GEF and UNDP is working on the conservation and sustainable use of globally significant biological diversity in the Maldives. A good example of conservation practices was in 2004, the Atoll Ecosystem Conservation (AEC) project was initiated to conserve the environment in and around Baa Atoll, supported by the United Nations Development Programme (UNDP) and financed by the Global Environment Facility (GEF). Baa Atoll was declared a UNESCO Biosphere Reserve in June 2011, the first in the Maldives.

The government initiatives and activities of NGOs are raising awareness on

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the importance of the coastal and marine environment. However, many efforts need to be taken for sustainable use of the resources that we have, for adequate monitoring and regulation of resource use. Also, development projects that impact the coral reefs need to be well considered before starting. The consequences not only affect the economy but affect the wellbeing of the people, their health, the balance in the ecosystem, physical land and the livelihoods of many people who depend on coastal and marine biodiversity for their income. Even though measures are being taken, we need to be able to do even more to cover the damages that have already been caused to the environment so that it can be preserved for the future. There is a saying that you grow a date tree not for yourself but for the future. This is very true, because it takes years for a tree to grow to its full potential. We need to plant the seeds today so that the future generations can have the use of those trees.

MARINE AND COASTAL BIODIVERSITY: A BLESSING FROM THE GOD.

Introduction

The oceans cover 70% of the planet surface area and Marine and coastal environments contain an abundance of marine life. Life in our Seas produces a third of the oxygen that we breathe, offers a valuable source of protein and moderates global climatic change. Some examples of marine and coastal habitats include mangrove forest; coral reefs; seagrass beds; estuaries in coastal areas; hydrothermal vents; and seamounts and soft sediments on the ocean floor a few kilometers below the surface. But now, since the last 25 year, our marine and coastal Habitat are getting damaged. They are now having threats. Some of the major threats that they are facing are climate change, destructive fishing practices, overfishing, careless tourism, pollution, sedimentation and the Coral mining.

Climate change

Corals cannot survive if the water temperature is too high. Global warming has already led to increased levels of Coral bleaching and this is predicted to increase in frequency and severity in the coming decades. Now also Coral bleaching is taking place in almost all of the reefs in our country. Such bleaching events may be the final nail in the coffin for already stressed coral reefs and reef ecosystem. Many scientific evidence now clearly indicates that Earth atmosphere and ocean are warming and that the changes are primarily due to greenhouse gases derived from human activities. These greenhouse gases result in climate change and ocean acidification.

Fishing

The next threat which our lives are facing is destructive fishing practices. It includes cyanide fishing, blast or dynamite fishing, bottom trawling and muro-ami (banging on the roof with sticks). Now, bottom trawling is one of the greatest threat to cold water coral reefs.

Overfishing is also one of the most common things in our country. But little people does know that it actually is a threat to our Marine and coastal habitats. Overfishing results in affecting the ecological balance of coral reef communities warping in the food chain and causing affects the far beyond the directly over fished population. A lot of marine species are now endangered due to our fishing and now already some of the marine lives has been extinct from the Earth due to our actions or activities.

Tourism

Now a days, tourism is the biggest earning industry of Maldives. But

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unknowingly, tourism is giving a lot of threats to our coastal and marine biodiversity. This is known as careless tourism. Careless tourism includes careless boating, diving, snorkeling and fishing. This things happens all around the country with people touching reefs, stirring up sediments, collectcorals and dropping anchors on the reef. In order to collect corals, tourists or visitors break and take oral from branches. Due to this the corals die marine life lose their habitat. Snorkellers or divers catch fish. Some tourist resort and infrastructure have been built directly on top of reef due to which the corals die and our marine life loses its natural habitat.

Pollution

Next is pollution. Pollution is a really big problem. It is a really threat to our ocean. Urban and industrial waste, sewage, agrochemicals and oil pollutions are poisoning reefs due to which a large number from our oil life is dying. This toxins are dumbed directly into the ocean or carried by river systems from sources upstream. Some pollutants, such as sewage and runoff from farming, increase the level of nitrogen in sea water, causing and overgrowth of algae, 'smothers' reefs by cutting of their sunlight. Also it creates an unclean environment for our marine life.

Noise Pollution from Ships

It has been scientifically proved that the noise generated from shipping operations is harmful for marine organisms. Harmful effects of noise pollution on marine organisms include hemorrhages, changed diving pattern, migration to newer places, and damage to internal organs and an overall panic response to foreign sounds.

Sedimentation

Sedimentation is also one of the threats. Erosion caused by construction (both along coast and inland), mining, logging and farming is leading to increased sediment in rivers. This ends up in the ocean, where it can 'smother' corals by depriving them off the light needed to survive. The destruction of mangrove forests, which normally trap large amounts of sediment, is exacerbating the problem. Mangrove forests are shelter for many marine lives and when we destroy mangrove forest the marine lives' shelter is lost.

Coral mining

Coral mining is also a threat to our marine life and coast. The big waves which are formed are decreased due to our coral reef. It minimizes the threatd that our coastal areas are facing such as beach erosion. And the

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corals act as a shelter for the marine life. It is important for them as much as our home are important for us as well, though, nobody realises this and coral mining is taking place. But now it is banned to mine corals in many islands. This action was taken in order to protect our marine life.

Dredging

The activity of dredging has been a major result of disturbance in the marine ecosystem since many years. Though steps have been taken to mitigate the effects of dredging on the marine environment, several cases involving destruction of underwater lives are still extensively heard about.

Ocean Acidification

The issue of ocean acidification is quickly becoming dangerous to marine lives and humans. Ocean has the power to greatly endanger the lives of marine organisms and through them an entire class of people who depend on fish and fish products for their daily sustenance.

Recommendations

There are a lot of measures that we can do to stop all the threats to our beloved marine and coastal habitat and animals. Such measures are banning all the threats, charging a huge amount of money for doing any damage, etc. In addition, we can conduct programs and gather people who are willing to dive into the ocean to clean it.

Conclusion

In conclusion, I firmly believe that the marine and coastal habitat and animals being threatened. I hope that our generation people will do something in order to keep our marine and coastal habitats and animals live for our future generation.



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