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INSIGHT

INTO THE MAJOR CAUSES OF CORAL REEF DESTRUCTION

9 ARTICLES on coral reefs

DISCOVER

solutions to coral reef destruction

IS OVERFISHING THE ONLY PROBLEM?

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Editor
Kaaria Quash

Journalists
Akeem Francis
Anna Lee James
Asiah Rattan
Brendon Taylor
Kaaria Quash
Nicola Maurisa Mathura
Shirlena C Baldeosingh.

Newsletter Design and Layout
Kaaria Quash

Cover Design
Kaaria Quash

Images and comics sourced off the internet

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A CORAL CRISIS: COASTAL DEVELOPMENT

ARTICLE BY
KAARIA QUASH

"As the Caribbean relies on its 'sea, sun, sand' tourist product, this implies that a lot of activity is being concentrated towards coastal areas. Although this may have beneficial effects towards the country in terms of tourism, the coral reefs experience adverse effects."

Coastline in Port of Spain, Trinidad

Coral Reefs all over the world face threats, but especially so for ours in the Caribbean. According to the International Union for the Conservation of Nature (IUCN), Coral Reefs in the Caribbean could disappear within the next 20 years. Studies showed that in the1970s, there was 35% coral reef cover in the Caribbean, and less than 10% seaweed. Today, those numbers have changed drastically, with only 14%-15% coral reef cover, and an increase to 25% seaweed. In total, there has been a 50% decline in coral cover, with phase shift from coral to microalgal dominance. These changes have occurred mainly due to coral diseases and human activity.

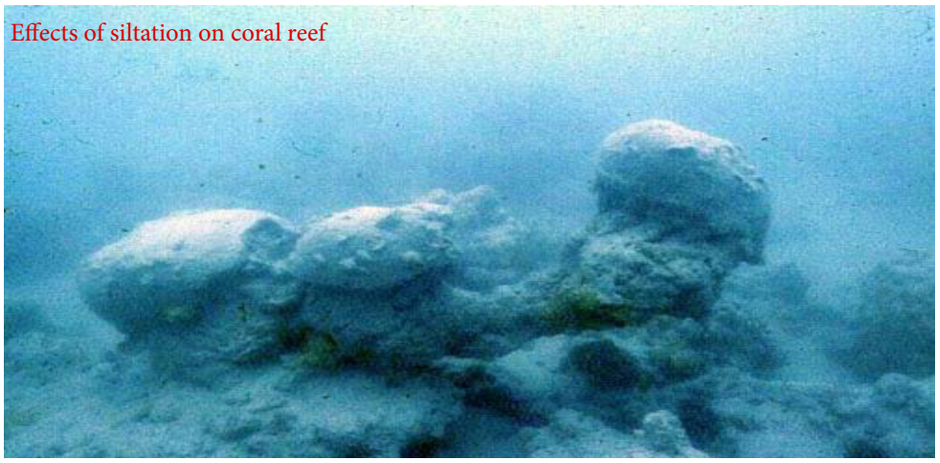
Coastal development is a major issue towards coral reefs in the Caribbean. As the Caribbean relies on its 'sea, sun, sand' tourist product, this implies that a lot of activity is being concentrated towards coastal areas. Although this may have beneficial effects towards the country in terms of tourism, the coral reefs experience adverse effects. Coastal development brings with it issues such as pollution, and siltation and ocean acidification.

Pollution

With an increased coastal population due to development in these regions, pollution is inevitable. Coral reefs within proximity of urban areas are subject to poor water quality due to the dumping of waste and other materials into the ocean. In order to survive, corals require the salinity of the water to be between 30 and 40 ppt. However, chemicals within pollutants alter this optimum salinity, providing a hostile environment for the corals to live in. In addition, debris or larger objects such as nets and plastic bags can get entangled in the branches of the corals, and thereby pose a trap to marine animals such as sea turtles

"approximately 80 % of ocean pollution originates from activities on the land"

Effects of siltation on coral reef



and fishes. Studies show that approximately 80 % of ocean pollution originates from activities on the land.

Siltation

Pollution can also come in the form of siltation. Siltation is the polluting of water bodies by fine particles such as silt and clay. These particles originate further inland, where they are transported towards the oceans via rivers or through surface run off. Dust from the Sahara is also blown over the Atlantic towards the Caribbean. With increased coastal development, land is cleared for construction, leading to excess sediments being washed into the ocean. Once inside the ocean, they are transported in suspension (the particles are not dissolved), and hence give the waters a cloudy and murky appearance. This is not great news for the coral reefs further below, who require the ocean to be clear in order to allow sunlight to penetrate to their depths. Decreased sunlight supply means less energy to use for photosynthesis, and if the producers in this ecosystem cannot provide energy for the consumers, the whole system fails.

Ocean acidification

Ocean acidification is the decrease in the pH of the ocean due to increased absorption of CO2. The ocean is generally known to absorb CO2 from the atmosphere, but these levels are rising due to industrialization, thereby increasing the amount of CO2 in the ocean. Studies show that between 1751 and 1994, the pH of the surface of the ocean dropped from 8.25 to 8.14. Although this may not sound like much, it has led to an increase in the concentration of H+ ions by up to 30%.

Plastic bag entangled in coral

As more CO2 is absorbed, the ocean tends to react with it to form carbonic acid (H2CO3). Carbonic acid is a known erosive agent of calcium carbonate (limestone). Now consider this- corals consist of polyps which secrete calcium carbonate to form an exoskeleton. So if corals contain limestone, and the ocean now contains an erosive agent of limestone, we can put two and two together to realize that the very waters within which corals live pose a threat to them. The coral structures therefore become vulnerable to dissolution.

Coastal Development- Is it worth it?

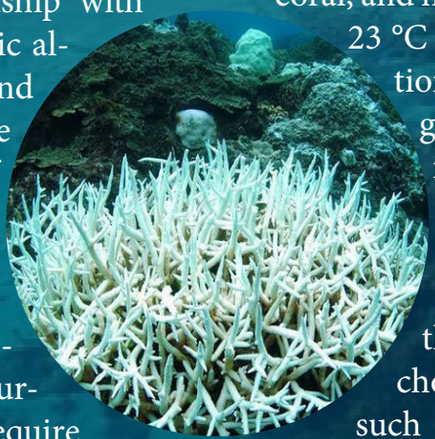
Should countries sacrifice their reefs in order to stimulate development and economic growth? Or is it more important to protect the reefs at the expense of profits for the country? The big question of whether it is worth it is a topic much debated.

GLOBAL WARMING:

THE SILENT KILL

by BRENDON TAYLOR AND KAARIA QUASH

Coral exists in a complex, mutualistic and symbiotic relationship with zooxanthellae, a photosynthetic algae, which assists in growth and contains pigments that give the coral their distinct range of colours. In return, the coral provide a safe environment for the algae to live and offer them with raw materials for photosynthesis. For coral reefs to flourish and remain healthy, they require a salt water environment which is nutrient deficient, transparent to allow light to reach the coral, and has optimum temperatures between 23 °C to 30 °C. In analyzing the destruction of coral reefs, our minds tend to gravitate to the direct anthropogenic activities which contribute to the damage. Through a basic knowledge and understanding of coral reefs, most persons are aware of the physical damage caused by anchoring, destructive fishing methods such as dynamite fishing, and the removal of the coral for souvenir purposes. To



a lesser extent, persons are aware of the damage on a biochemical basis caused by water pollution through familiar occurrences like oil spills. From a human perspective, the fact that we are aware of the activities directly involved in destruction is understandable because the effects are recognized immediately. However, our common inability to foresee how actions not directly involved may still have a negative impact on general issues- in this instance coral reef destruction- limits us in our respective roles of effectively protecting and managing the environment in which we live.

"we all contribute to the destruction of coral through enhancing the effect of the biogeochemical phenomenon global warming"

So far, the focus on anthropogenic activities has been restricted to a particular group of people within a given population. For example, destructive fishing methods are associated with fishermen while nutrient pollution via the use of fertilizers and pesticides is associated with farming and persons involved in agriculture. However, the main purpose of this article is to address how we contribute to the destruction of coral reefs on an individual level. You may be wondering *"How does coral reef destruction apply to me?"*, or removing yourself from the blame for coral reef destruction if you are not involved in any of the activities described. The fact is that we all contribute to the destruction of coral through enhancing the effect of the biogeochemical phenomenon global warming, which refers to the increase in the mean temperature of the earth's surface. Although the process of global warming is slow, it is perhaps the most lethal because the world's population contributes to the rate of the process on a daily basis. The increased surface temperature increases the temperature of the oceans from the optimum temperature necessary for the successful coral growth. Corals generally thrive within temperatures ranging from 23°C to 30°C. Change this, and the corals start to die out. How does temperature affect them? Like all living organisms, corals require a specific temperature to survive. At temperatures too low, enzyme activity is restricted and organisms cannot function as well. With the majority of organisms in the coral reef unable to carry out their function or *niche*, the ecosystem as a whole fails. At temperatures too high, coral will release the zooxanthellae living in their tissues. As previously stated, the zooxanthellae contain the pigments which gives corals their variety of colours, and without them, the corals turn white in a process known as **coral bleaching**.

In addition, global warming leads to a eustatic rise in sea levels due to the melting of polar ice caps. This increase in sea level means that the depth of coral in the sea will also in-

GLOBAL WARMING: THE SILENT KILLER

Healthy coral reef

Cause of global warming

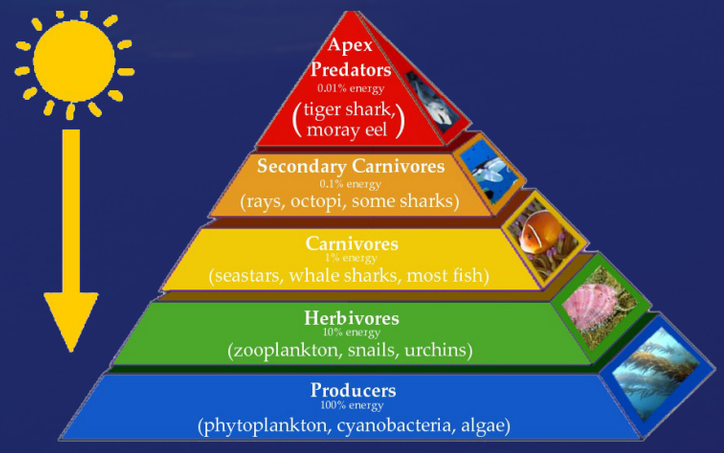
Bleached coral reef

crease. With increased depth comes less sunlight, and sunlight is important for the autotrophic photosynthesizing organisms which form the producers of the coral reef ecosystem. With the producers being unable to convert sunlight into useable energy, energy circulation throughout the ecosystem will be reduced. An ecosystem without enough energy to provide for all of its animal populations will therefore see a decrease in the number of organisms it can sustain, and feeding patterns will have to change. Predators will be forced to eat lower down the food chain in order to obtain the energy they need, and this disruption of the food chain will lead to an unstable ecosystem.

Therefore, global warming is detrimental to the health and growth of coral reefs. But how do we contribute to global warming? Our desire to consume products encourages producers to increase the quantity of products they manufacture for purchase. In the context of the Caribbean, the patterns of consumption are mainly based of the Western model where products are made obsolete either intentionally or through the advertisement of "better" products. Although this ensures continuous consumption and profit, there are hidden costs in production which enhance the effect of global warming. During production, energy is required to complete the process which includes powering machines and synthesizing materials. The energy is produced by the combustion of fossil fuels which releases gases such as carbon dioxide and methane into the atmosphere. These greenhouse gases trap heat in the atmosphere which results in the net increase in the earth's surface temperature.

"Your contribution may seem insignificant but if everyone is to adopt these simple measures, we can conserve a huge amount of energy and reduce the impact of global warming."

In addition, the reluctance to conserve our non-renewable energy resources as consumers increases the rate at which the gases are released into the atmosphere via combustion. This reluctance is due to the advancements in technology with time and an increasing dependency on technology in order for persons to function. For instance, in past years persons would hang laundry outdoors to dry but with the invention of the dryer, the practice has ceased for most people, especially since the laundry is dried faster. There has also been an increase in the number of motor vehicles in use, resulting in the increased import of oil and an increased concentration of greenhouse gases in the atmosphere. Much debate and discussion has surrounded the use of a "park and



Energy and trophic levels in a coral reef ecosystem

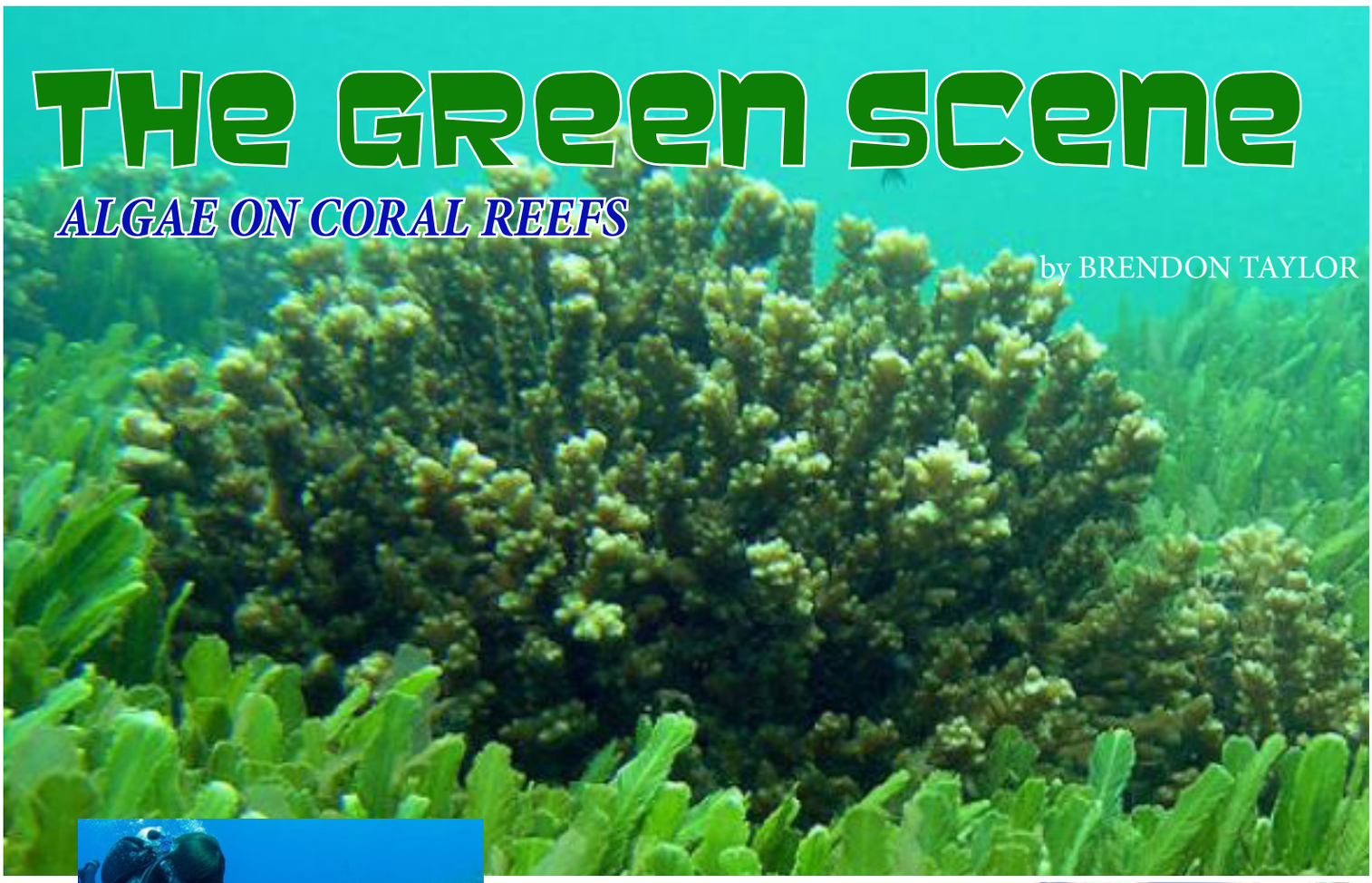
ride" system in Caribbean countries, where public transport motor vehicles are used to minimize traffic congestion, the importation of oil, and the air pollution by exhaust fumes. In spite of the discussion, no solid attempts have been made by governments to initiate the projects. Generally speaking, the attempts to reduce the impacts of global warming have been laboured because the effects are not realized immediately; the process takes a long period of time. Since persons are not directly affected, they express less consideration for the issue but we need to understand the seriousness of the situation.

You may ask, **"What can I do?"** There are measures you can take as simple as unplugging home appliances when not in use, switching the engine off when you are parked and walking to your destination rather than driving provided the distance is short. Your contribution may seem insignificant but if everyone is to adopt these simple measures, we can conserve a huge amount of energy and reduce the impact of global warming. The truth of the matter is that we may not be able to control the other variables which result in coral reef destruction. Still, **as we reduce the impact of global warming, we aid in the protection of our coral** and enable the coral to perform its role as a biological habitat and the vital role it plays in the growth of our economies as well as the satisfaction of our societies.

THE GREEN SCENE

ALGAE ON CORAL REEFS

by BRENDON TAYLOR



Diver identifying algae on a coral reef

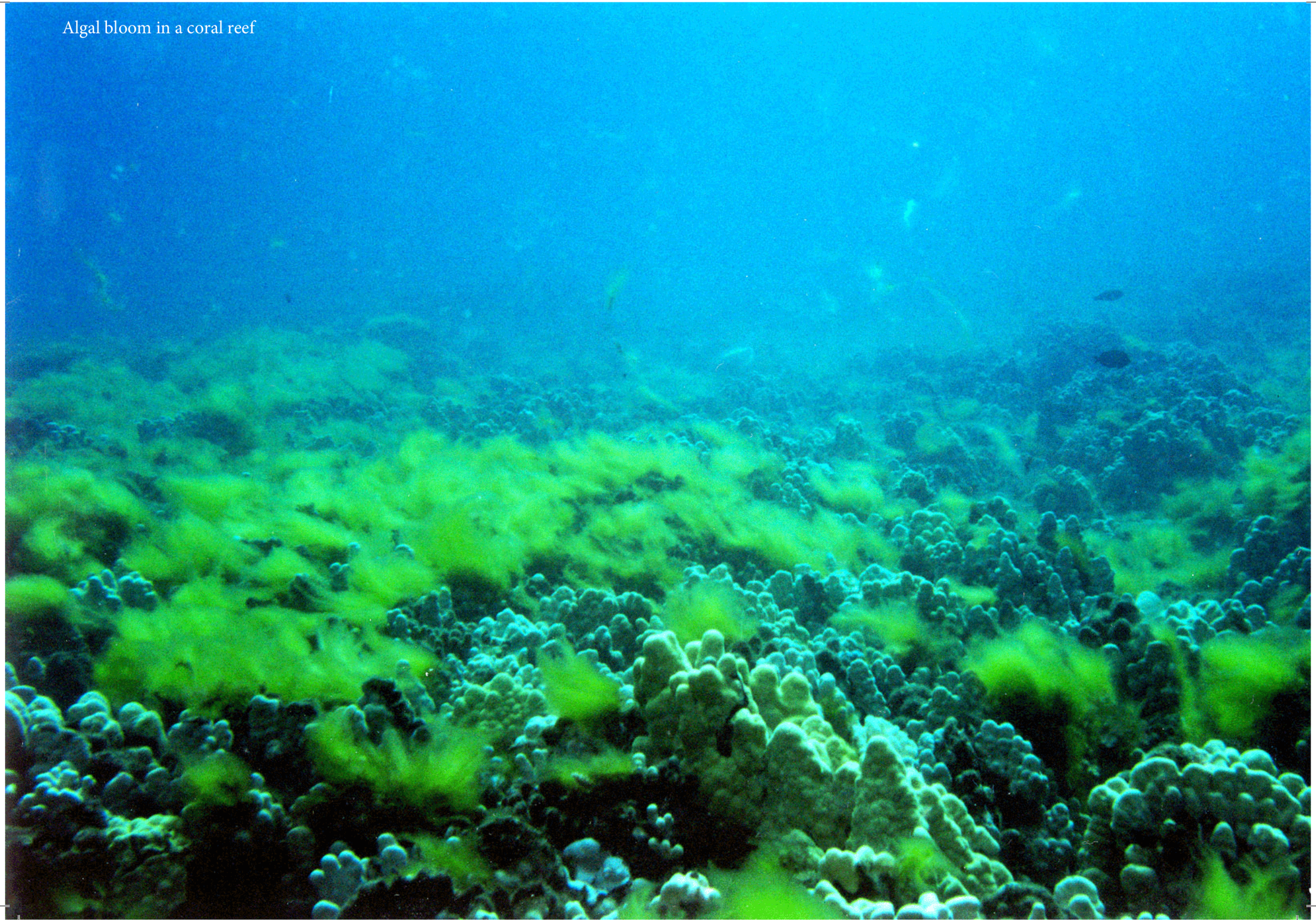
of algae. Algal blooms increase turbidity, therefore decreasing the transparency of the water and hence the availability of light to the coral for photosynthesis. The lack of photosynthesis results in the death of the zooxanthellae which gives the coral its bleached appearance as a result of the lack of pigment.

Eutrophication originates with pesticide use

"ALGAL BLOOMS DECREASE THE TRANSPARENCY OF THE WATER AND THE AVAILABILITY OF LIGHT TO THE CORAL FOR PHOTOSYNTHESIS."

One of the most popular activities which indirectly contributes to the destruction of coral reefs is nutrient pollution through the excess use of fertilizers, pesticides and insecticides for agricultural purposes. During periods of heavy and intense rainfall, the chemicals are leached from the soil and are carried in solution into water bodies such as rivers and streams which lead to the ocean where coral reef ecosystems are found. Another source of nutrient pollution is the improper treatment of both organic and inorganic waste which is discharged into the ocean ecosystem as effluent. In both instances, there is an excess of nutrients in the water termed as eutrophication which promotes the rapid growth

In a yearlong study conducted in the coral reef waters of Curacao by Dr. Gert Jan Gast in 1998, it was found that there were three main sources of nutrient pollution which included sewage and industrial waste discharge from pipes, surface run-off from precipitation (which transported sediment), and waste and groundwater seepage from septic tanks. Dr. Gast determined that coral reef degradation increased with the proximity to human settlement and activity. His study was based on observations made for coral reefs at investigated points where the levels of human activity were considered to be different. At Eastpoint, where there was no human influence, the reefs were judged to be " Healthy, well developed reefs with many species and large colonies" as stated by Dr. Gast. In comparison, between the points Seaquarium beach and Princess Beach there was a drainage channel which was usually dry but when observations were made at times of heavy rainfall, much sediment and organic nutrients evolved causing turbid waters. Finally, between Princess beach and the Anna Bay, there were 3 sewage pipes and some artificial beaches where the reefs were observed to be strongly degraded.



Algal bloom in a coral reef

COLLAPSE OF CARIBBEAN CORAL REEFS

by NICOLA MAURISA MATHURA

Are we destroying our reefs deliberately or not? We should ask ourselves this question. Caribbean Coral Reefs are on the verge of collapse as less than ten percent of the reefs are showing live coral cover. A plethora of marine organisms and corals depict a vivid and picturesque scenery within coral reefs. Many anthropogenic activities which further lead to environmental problems cause this destruction or aid in it. Some of the causes of coral reef destruction are overfishing and destructive fishing methods, coastal development, unsustainable tourism and pollution.

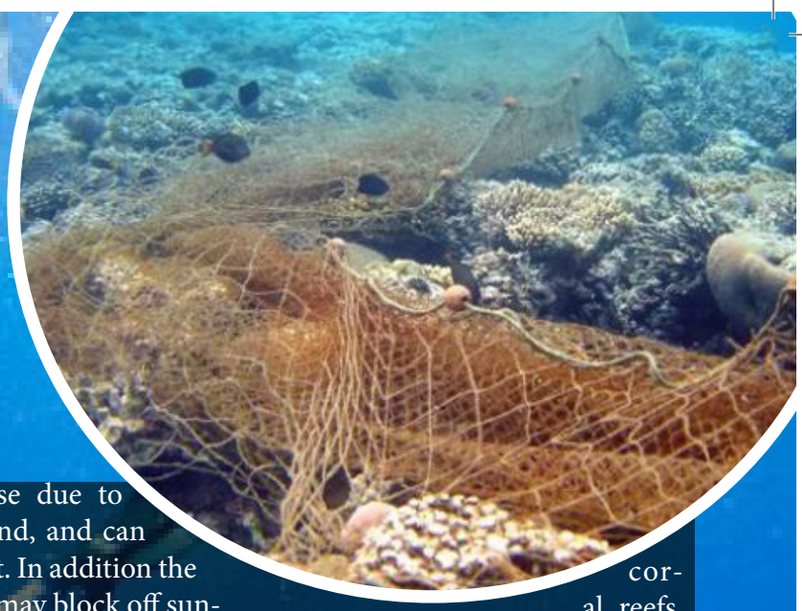
Overfishing

Overfishing exploits our marine population not only in the deep ocean but as well as key reef species. This act may cause an imbalance of certain populations within the coral reef ecosystem and biodiversity. An example is: Herbivorous fishes which feed on algal growth that is being overfished will decrease in numbers and this in turn will cause an increase in algal growth. Once there is an increased algal growth this will lead to eutrophication within the system. This will decrease oxygen levels in the water and block off the sunlight which will affect photosynthesis. Oxygen and sunlight are two of the important factors for growth of coral reefs.

In addition with overfishing, there are many methods in which fishermen and fisheries go about this act. Such fishing methods are usually destructive. Cyanide, dynamite as well as trawling near to coral reefs are all unsustainable methods of fishing and cause severe damage to reefs in the Caribbean. These practices do not attack a certain species of fish and often results in even young fishes being killed and hence not giving fish populations enough time to recover. This might lead to death of an entire fish species within the coral reef, and in the future cause a problem with the livelihoods of

Coastal Development in Trinidad

Overfishing



fishermen that actually practice fishing conservation methods.

Tourism

Tourism brings in large amounts of foreign money for many Caribbean islands as some of them solely depend on tourism as their source of income. Pressures from tourism can cause damage to the very environment upon which the industry depends. Contact from careless swimmers, divers, and poorly placed boat anchors can cause physical harm to coral reefs. With increased tourist arrivals in peak seasons, hotels and resorts may discharge untreated sewage and wastewater into the ocean. As they are located mostly close to coastal areas, they pollute the water and encourage the growth of algae (eutrophication) which will destroy the reefs in timely manner.

Development

The development of coastal cities and towns, in the thought that it will attract more tourists to their island, generates a range of threats to nearby coral reefs. Sometimes space is limited. Sensitive habitats can be destroyed or disturbed by dredging activities to make deep-water channels or marinas, and through the dumping of waste materials. This waste material can cause a build-up of sediment from construction in the coral reefs. This in turn will make the coral reef nutrient content increase due to the soil and sand, and can cause harm to it. In addition the sedimentation may block off sunlight which will cause the rate of photosynthesis to decrease.

Pollution

Coral reefs need clean water to thrive. Increased pollution of coral reefs this will destroy them. Pollution can also make coral reefs susceptible to disease and increase coral growth. Land-based sources of pollution to coral reef ecosystems include pesticides from agriculture, petroleum hydrocarbons and pharmaceuticals from industries, heavy metals, pathogens, and excess nutrients. These pollutants can exacerbate the effects of watershed transport of pollutant constituents onto coral reefs. Excess nutrients, including dissolved nitrogen and phosphorus from sewage, wastewater, and fertilizers, promote the growth of algae which competes with juvenile and adult corals for space on benthic reef surfaces.

In retrospect, these problems destroy the very same Caribbean coral reefs in which Caribbean islands depend on for an income every year. Are we creating our own problem? When will we stop?

Pollution of the ocean

Coral reef tourism

IMPACT ON SOCIETY

THE SOCIAL IMPACTS OF CORAL REEF DESTRUCTION

by BRENDON TAYLOR

Decrease in consumer satisfaction due to lack of variety

The demographic diversity of a society affects the diets of a people among many other characteristics, and so different people will have different preferences with respect to choice of meats. The depletion of fish populations on coral reefs will limit the availability of fish for consumption and therefore the range of choice for the consumer which decreases satisfaction.

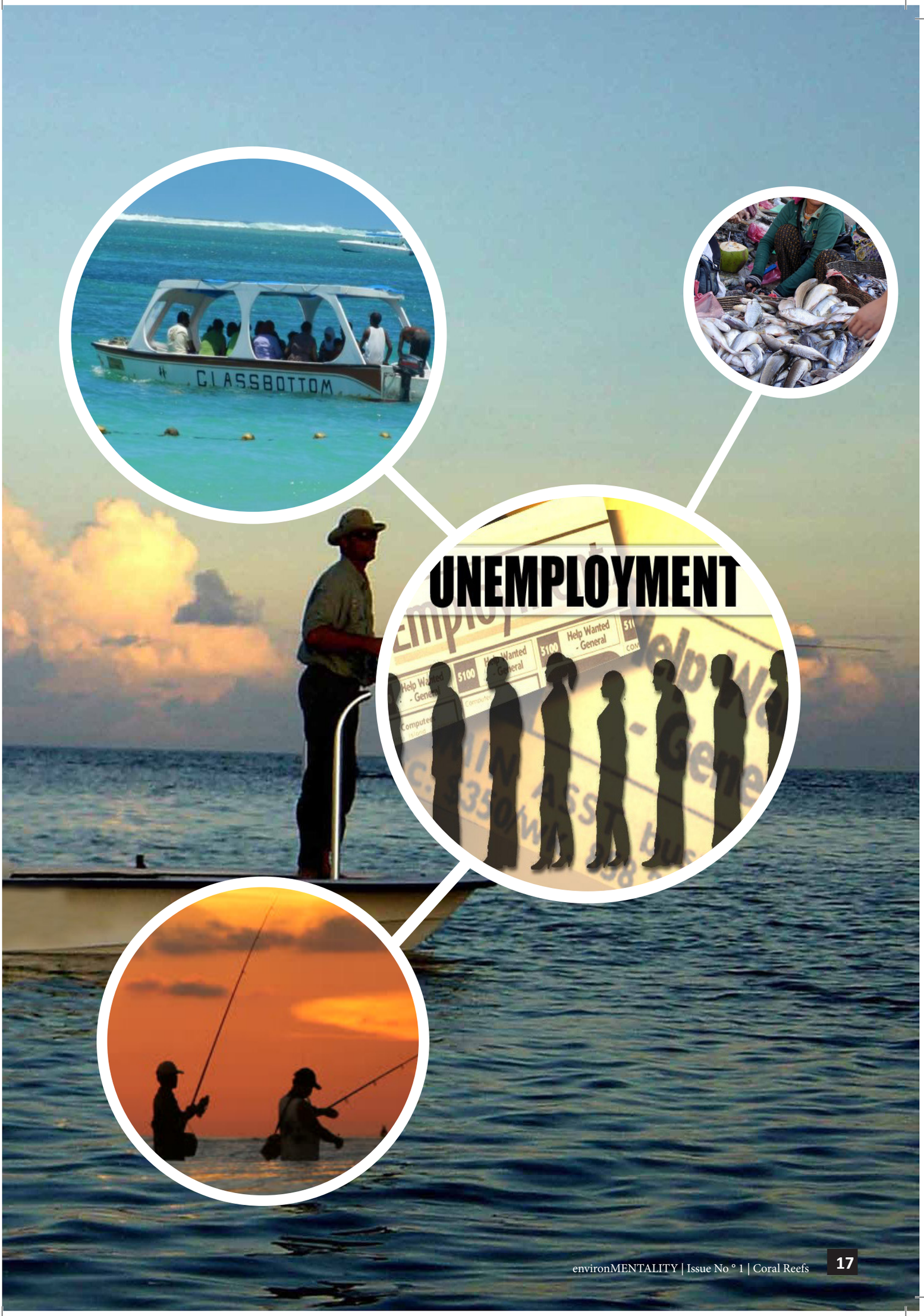
Potential increase in unemployment rates

Contrary to popular belief, the fisherman does not have the only occupation which has high dependency on the health of coral reefs. In the Caribbean, there are vendors who purchase the fish to sell to the population as well as entrepreneurs who feed off of tourism. Hotels which employ thousands of workers also depend on the reefs to attract tourists. For example, the owner of the famous "glass bottom boat" must have something to display in order to make his living. Essentially, destruction of the coral reefs will ruin the business endeavours of all those associated and increase the number of unemployed people.

> "overfishing on coral reefs would be a potential source of cultural erasure through the extinction of species and collapse of the fishing industry"

Cultural erasure

Cultural erasure refers to practices or traditions that have been lost, died out or are in the process of dying out. In the context of the Caribbean, the fishing industry has been an integral sector of the economy with its function in food production since the region's earliest times with the Neo-Indian people. In more recent times, fishing as a career has been a tradition of families, passed down through generations. For instance, fathers would most likely teach their sons the skills of fishing in order to continue the tradition in the family. However, overfishing on coral reefs would be a potential source of cultural erasure through the extinction of species and collapse of the fishing industry.


GLASSBOTTOM
UNEMPLOYMENT
Help Wanted - General
5100

IMPACT ON THE ECONOMY

by ASIAH RATTAN

"Countries such as Tobago and Belize thrive economically from visitors to reefs through diving tours, recreational fishing trips, hotels and restaurants based near the reef ecosystem."

According to Dr. Owen Day, coral reefs are truly breathtaking monuments, but coral reefs are not just beautiful natural wonders. They are a vital part of the ecological fabric and economic activities of small Caribbean islands. For example in Tobago they are the backbone of two largest industries; tourism and fishing, providing both jobs and food. Coral reefs also protect the coastline from erosion by breaking ocean swells. They produce the sand on our beaches. In fact, the whole of South-west Tobago rests on ancient coral limestone deposited over hundreds of thousands of years by the tiny coral polyps that make up coral reefs (THAT 2012). Today, many coral reefs are being destroyed and one of the main reasons for this is overfishing.

Over fishing is a driving force that has damaging impacts on coral reefs. According to reef defense over fishing contributes to the depletion of the world's oceans and directly impacts the health of coral reef systems (Dolphin 2011). Overfishing can degrade reefs because fish are one of the key functional groups that keep reefs intact. In some areas, overfishing has already resulted in the local extinction of important species such as giant clam and grouper. By removing specific species, overfishing changes the coral reef food web (THAT 2012). For example, removing algae eating species, like the parrot fish, can create conditions where algae may replace corals, which ultimately disrupts overall reef balance.

As mentioned before island reefs are very important to countries that are blessed with them, one major reason being economically. Island reefs support subsistence and commercial fisheries, as well as jobs and businesses through tourism and recreation. Countries such as Tobago and Belize thrive economically from visitors to reefs through diving tours, recreational fishing trips, hotels and restaurants based near the reef ecosystem (THAT 2012). According to the research of the NOAA Coral Reef Conserva-

Locals fishing on the reef. It is people like these who rely on coral reefs as a source of income.

"Caribbean countries which attract millions of visitors annually to their reefs derive on average half of their GDP from the tourism industry."

Coral reef tourism in Tobago. Tourists like these take tours on the famous glass bottom boats.

tion Program, Caribbean countries which attract millions of visitors annually to their reefs derive on average half of their GDP from the tourism industry.

"So how does overfishing affect coral reefs and a countries economy?" Based on the ICRI (International Coral Reef Initiative), an increasing demand for food, fish and tourism has resulted in over fishing of not only deep-water commercial fish, but key reef species as well. Overfishing of certain species near coral reefs can easily affect the reef's ecological balance and biodiversity. For example, overfishing of herbivorous fish can also lead to high levels of algal growth. From subsistence level fishing to the live fish trade, inadequate fisheries management is forcing the decline of fish stocks (ICRI 2012). Overfishing has devastating economic impacts- it can cost over 100,000 jobs and loss of millions of dollars annually. When the fish populations aren't given chance to reproduce and replenish themselves many fishermen lose their jobs as the availability of fish is low. Imbalance of the ecosystem and vast removal of fish result in unhealthy and damaged reefs which make then less valuable and even an unpleasant site to the human eyes. This has a domino effect on tourism, therefore reducing the annual earnings through the tourism industry.

Even though reefs are being severely threatened, things can be done to help them replenish. A solution to problem of overfishing could be improving fisheries management by putting and enforcing government policies.

"From subsistence level fishing to the live fish trade, inadequate fisheries management is forcing the decline of fish stocks."

ACTIVITY PAGE

Comics

Word Search

CORAL REEFS

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ANEMONE
BLEACHING
CLOWNFISH
CORAL
ENDANGERED
HABITAT
OVERFISHING
POLYP
PORROTFISH
REEF
TURTLE

Jokes

What sea animal can be adjusted to play music?
The tune-a fish!

What do you call a fish with no eye?
F sh

Why are fish so smart?
Because they live in schools

What fish is the most valuable?
The goldfish.

SOLUTIONS TO THE PROBLEM OF OVERFISHING

by SHIRLENA C BALDEOSINGH

Overfishing, while it is a problem, something can be done to rectify the effects it has on the environment. If left unchecked, the commercial fish stock may decline at such an alarming rate that it may become unprofitable. However, this is reversible if the right corrective measures are put in place. For a sustainable fishing industry some key rules must implemented and enforced. These rules are:

Protection of important habitats

Spawning grounds, fish nurseries, and fragile ecosystems (such as coral reefs) must be protected. These areas should be zoned as 'no-fish' zones, if not year round then for at least part of the year. The above mentioned areas should fall under the Marine Protected Areas (MPAs). On the other hand, only 1.6% of the world's oceans are MPAs, of that 90% are open to fishing. These areas allow depleted fish population to recover and provide refuge for endangered species. MPAs allow stressed reefs to recover from things such as bleaching due to climate change. The benefits to society is great. There will be improved food security for those who rely on the sea as a means of survival, i.e. for sustenance and livelihood.

Catch Limit

There must be a fixed number of fish than can be caught and landed by a fishery, with individual quotas (Individual Transferable Quotas - ITQs) given to each fisherman. Each member of the fishery is granted rights to a percentage of the total allowable catch that can be harvested each year. These quotas can be bought, sold and leased, which allow for the lowest cost vessels to be used.

This limit must be continuously reassessed to ensure that the remaining fish population is at a sustainable level. These limits should be determined regardless of political influence and economic incentives.

Control on by-catch

By-catch refers to fish or other marine species that are inadvertently caught, while fishing for a specific 'target' species.

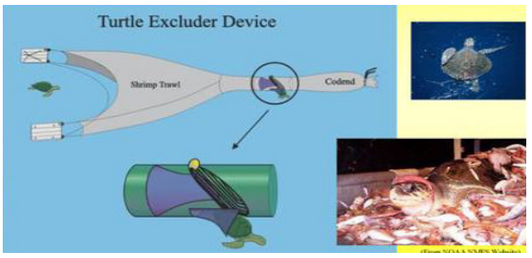
Controls include:

1. The banning of fishing in areas where by-catch is very high. This can be permanent or seasonal. This practice is common in 'bottom-trawl' fisheries. In some cases, the relocation of fishing vessels are necessary, when by-catch becomes an issue.

Diver using cyanide to kill fishes

A fish net caught on the reef

Dynamite fishing



2. The use of alternative fishing equipment can be used. Modifying existing equipment may also be done to ensure that unwanted species are not caught.
Examples:
- Nets with larger mesh sizes
- By-catch Reduction Devices (BRDs)
- Turtle Excluder Devices

In some cases, by-catch are not released but are sold as food (in Asia and Africa). It may also be turned into fish hydrolysate (minced/ground up fish carcasses) which in added to soil in organic agriculture.

Consumer awareness also plays a large part in curbing overfishing. The sustainability of seafood has become more popular as more people become aware of overfishing and its environmental impact. With consumers becoming conscious of the limits placed on fishermen, they become more understanding and less demanding. Educating the general public can play a major role in reducing overfishing.
Being informed about the issue, knowing what you are eating and spreading the word are just a few ways the consumer can help stop overfishing.

"Consumer awareness also plays a large part in curbing overfishing"

Proper Monitoring

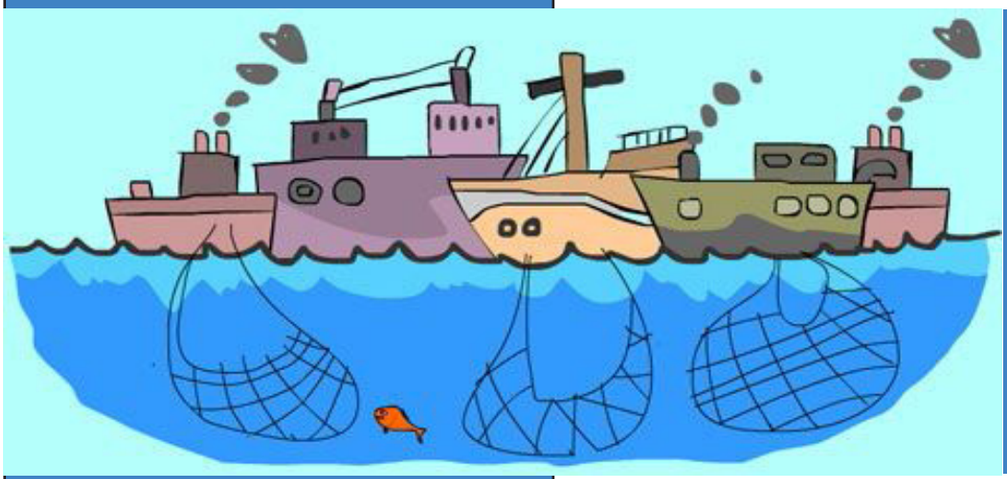
There must be effective monitoring of the fishing industry. The system that is put in place to serve this purpose must ensure that:

- The fishermen do not land more fish than they are allowed to.
- There is no fishing in restricted or protected areas.
- The proper equipment is used.

Hefty monetary fines must be administered and more importantly enforced, to discourage the breaking of the laws.

The transformation of the fishing industry from unsustainable to sustainable, via the enactment of the 4 basic principles mentioned above, can lead to a reduction in overfishing, as well as job security for a number of people, in the Caribbean who depend on this industry as their major source of income. As overfishing becomes rampant in the Caribbean, the 'death',so to speak, of many coral reefs can be expected. This chief folly can be averted if the appropriate measures are taken, implemented and adhered to, by the local fishermen.

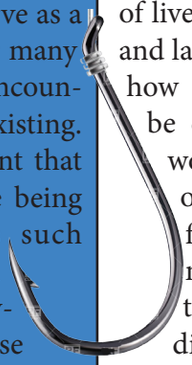
THE ISSUES FACED WITH MANAGING OVERFISHING



by ANNA LEE JAMES

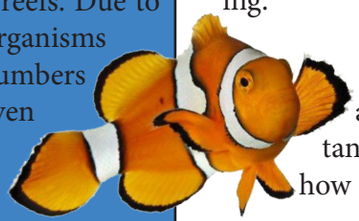
Coral reefs are the most diverse communities in our oceans. Some of them are even hundreds and thousands of years old. While they serve as a habitat and breeding grounds for many distinct aquatic organisms, they encounter many problems while simply existing. What is the problem? It is evident that coral reefs around the world are being destroyed due to human activities such as over fishing. Over fishing in our reefs are becoming more prevalent in today's society and its cause for concern! Although laws are being enforced by environmental management organizations to mitigate the destruction of coral reefs, several challenges arise which led to the negligence of coral reefs.

One of the many encounters faced is high demand for seafood. A growing population means there would be an increase in customers who want to consume seafood. Fish may be considered for many people a main source of protein, thus a high demand would be put on it. To feed the population more fish will have to be caught thereby decreasing the variety of fishes in our reefs. Due to this some distinct aquatic organisms have become so low in numbers that eventually they may even become extinct!



Livelihood of fishermen is another challenge faced. For many fishermen, fishing is their only source of livelihood. Though regulations and laws might be put in place on how much fish is permitted to be caught, and this definitely wouldn't be taken into serious consideration by these fishermen, who want to make profits. Environmental managers may face a very difficult time trying to get fishermen complying with these rules and regulations.

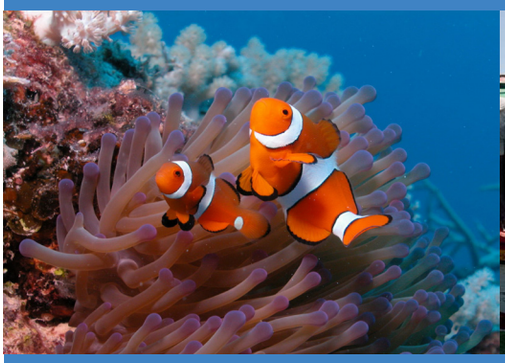
A retrenchment in the public sector that increases the level of unemployment is one particular issue that led to the failure of laws enforced by environmental management organization to protect the coral reefs. Due to high levels of unemployment, individuals are forced to explore other alternatives that may generate income in order to satisfy their needs. Some of these individuals resort to fishing.



Lack of education about the importance of coral reefs and how they function is another cause of its destruction. In many developing countries, individuals are not opportune to acquire proper education. With little or no proper skills to attain a job, some of these individuals resort to jobs that require intensive human labour such as farming and fishing. The relative abundance of fishes in coral reefs attract these individuals, who have little or no education about the consequences of destroying coral reefs through overfishing. They fish carelessly and fail to see and appreciate the value of the ecosystem they are destroying.

Although law enforcements can help preserve coral reefs, the consequences of enforcing these laws must also be dealt with. In order for the enforced laws to be effective, environmental organizations must provide jobs for individuals that depend on fishing to generate income. Not only must they implement harsher penalties, but also make relevant accommodations for those who depend on fishing only as means of livelihood.

Overfishing has been proven



to be very destructive to ecosystems. However it is not only the cause of its destruction, but also an incentive stage to the introduction of invasive species to the ecosystem. Disregarding the grazing caused by fishing boats to corals, and assuming that fishing does not directly or physically harm any organism living in that ecosystem, overfishing can still be fatal to coral reefs. Overfishing can de-generate the population of fishes in a coral reef and since a coral reef functions as a system where every organism has a fundamental niche that has been naturally fashioned to suit them, de-generating the population of fishes will alter the whole balance of the ecosystem. Fishes have a role in a coral reef, one of which is population control of other species through feeding. When the population of fishes de-generate, a significant increase will result in the population of species that the fishes feed on, increasing the level of competition amongst them. When there is such imbalance in an ecosystem, an ecosystem may face the risk of invasive species migrating into the ecosystem and destroying the primate species of that ecosystem.

It is important that the many issues environmental managers face with the protection and conservation of our coral reefs be resolved as soon as possible. Our coral reefs are just as important to us as our 'bread and butter'.

CORAL REEF DANGER

by AKEEM FRANCIS

*A **giant grouper** which was caught and cooked. Fishes like these are delicacies in East Asia, but their capture damages the coral reef ecosystem.*

OVERFISHING ON CORAL REEFS AROUND THE WORLD

Coral reefs are the most diverse community in the ocean- they give fishes protection from predators and provide breeding grounds. However, the fishes are under attack because they are a delicacy in some countries such as China, and are in high demand due to a huge market.

The problem firstly starts from overfishing in the coral reefs, but the big issue is that they are taking the juvenile fishes and not giving them enough time to reach full maturity. Because of this the fishes do not have a chance to reproduce, thereby destroying the future generation of the fishes and depleting the population of the coral reef. Some coral reef fishes such as the Humphead Wrasse and the Giant Grouper are able to live up to 20 years or more, but they rarely reach that age these days because there is a high demand for these exotic fishes for consumption.

A humphead wrasse

If overfishing in reefs doesn't stop, we would not be able to enjoy the beauty of the coral reefs in the near future.

Parrot Fish

Spear fishing on a reef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DREAM PRIZE CONTEST
pepsi
WIN A TRIP OF A LIFETIME TO MEET
MESSI IN MIAMI FLORIDA, USA
MESSI 10
KICK IN THE MIX
INSTRUCTIONS
ANSWER THE QUESTIONS THAT WILL BE POSTED FOR YOU EVERY DAY ON PEPSI PAKISTAN'S WALL DURING THIS CAMPAIGN
THE FIRST TWO FANS TO ANSWER EACH POST CORRECTLY WILL ENTER THE POOL OF FINALISTS
WHEN THE CAMPAIGN IS OVER, THE POOL OF FINALISTS WILL ENTER A LUCKY DRAW
CROSS YOUR FINGERS, BECAUSE IF YOU WIN THE DRAW, THREE OF YOU ARE FLYING TO MIAMI, FLORIDA!