

# Module Three

## State of Indonesian reef resources



## Handout

### IMPORTANCE OF CORAL REEFS TO HUMANITY

#### a. SOURCE OF BIODIVERSITY

Coral reefs are among the biologically richest ecosystems on earth.

#### b. SOURCE OF FOOD

One square kilometer of healthy coral reef can produce up to 37 metric tons of fish. Indonesians depend directly on this catch for food.



#### c. SOURCE OF ENVIRONMENTAL PROTECTION

Coral reefs protect coastal communities from storms, wave action, and Tsunamis, and reduce the impacts of global warming by incorporating carbon dioxide through photosynthesis and carbonate production.

#### d. SOURCE OF RECREATION

Through natural carbonate sediment production, reefs create an important recreational item: thousands of miles of white sandy beaches that bring millions of dollars in income from tourists.

#### e. SOURCE OF POTENTIAL MEDICINAL PRODUCTS

In recent years scientists have begun to examine the coral reefs in search of cures for human diseases such as cancer.

#### f. SOURCE OF LIVELIHOOD

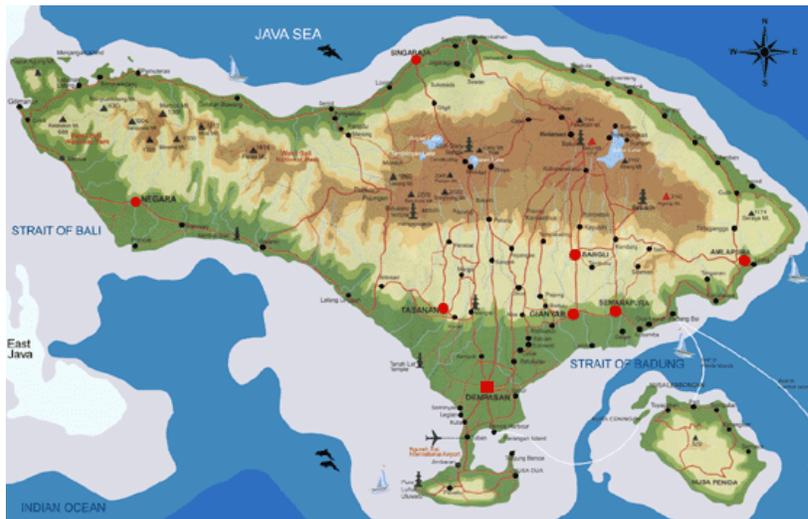
The marine ornamental fish industry acquires all of its supply from coral reefs.

The Indonesian government and local communities are dependent on coral reefs for subsistence, jobs, products, and revenue. Therefore, maintaining the health of coral reefs so they can continue to support food production, employment, and income from fisheries is an important issue for Indonesia.



Tragically, as important as they are, coral reefs are also under ever-increasing threat due to global warming, coastal development, destructive fishing practices and other human-related activities.

### Bali: Where the Indian Ocean meet the Pacific



**The Indonesian Through flow (Arus Lintas Indonesia):** If Indonesia did not exist, the earth's day would be significantly shorter than the 24 hours to which we have become accustomed. The ocean flow that passes through Indonesia is called Arus Lintas

Indonesia. Its sources are the Philippines Sea and the West Caroline Basin. In these areas, the trade winds and the current they generate trap water from the great expanse of the Pacific. The water is blocked by the complicated network of islands, trenches, and channels that forms the Indonesian Archipelago. In the Pacific Ocean, north-west of Indonesia, the sea level is 15 cm deeper than average, and, because of similar forces acting in an opposite direction, the Indian Ocean south of Indonesia is 15 cm shallower than average.

This difference in sea level is the origin of one of the biggest water movement on earth. This huge flow of water, of which 20% passes through the Lombok strait, is reason for the spectacular marine diversity of Bali. Larvae from the Pacific and from throughout the Indonesian Archipelago passes by Bali.

Furthermore, Bali has many different environments that can be home to marine animals. These habitats include black sand beaches, white sand beaches, barrier reefs, fringing reefs, patch reefs, mangroves, Laguna, etc.

This combination of factors makes Bali unique and in urgent need of a proper management. Bali should be protected for future generations to enjoy, and to ensure that tourists continue to bring financial benefits to the island.

### PRESENT STATUS OF INDONESIAN REEF RESOURCES

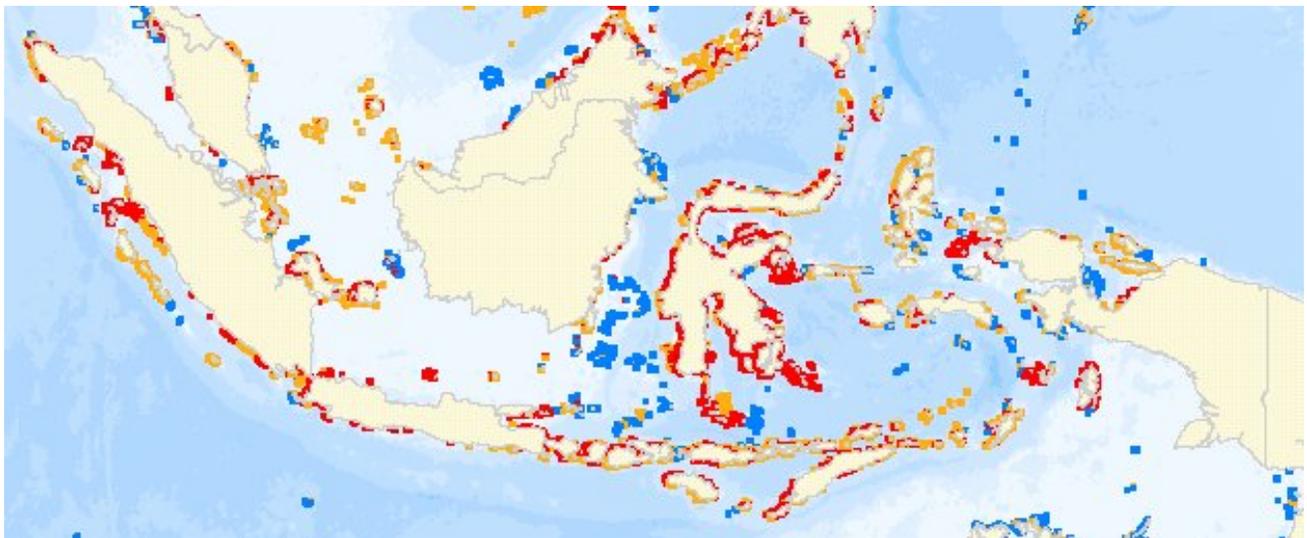
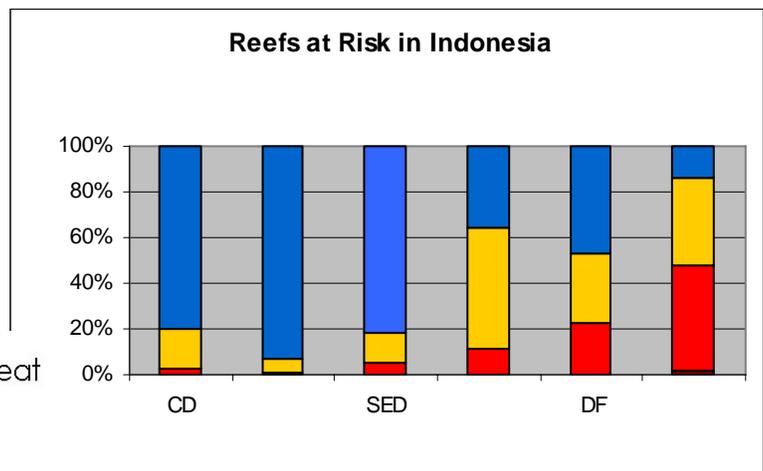
Fifty eight (58%) percent of the world's reefs are threatened by human activity. Coral reefs of Southeast Asia, the most species-rich on earth, are the most threatened. More than 80% are at risk. Ninety percent of Indonesian coral reefs have already been damaged.

*Threatened Reefs of the Indonesia.*

**Indonesia**  
 Reef area estimate-  
 51,000 sq. km.  
 (51% of regional total)

Estimated Threat

- Low
- Medium
- High



CD: Coastal Development  
MbP: Marine Base Pollution  
SED: Inland pollution and Sedimentation  
OVF: Over fishing  
DF: Destructive Fishing

The graph above shows low, medium, and high threats to coral reefs in Indonesia. The graph also identifies the major sources of these threats: coastal development; marine base pollution; inland pollution and sedimentation; over-fishing; and destructive fishing. These threats are discussed below.

## CAUSES OF DESTRUCTION

In many cases it is difficult to pinpoint the exact causes of the serious declines in coral reef health occurring around the world. Frequently, there is no single cause but a combination of factors.

### a. COASTAL DEVELOPMENT

Much of this problem results from rapid human population growth and increasing density of people along coasts. Nearly 40% of the Indonesian population lives within 100 km of the sea. This poses a range of threats. The most obvious are the human activities that directly destroy reefs, such as the construction of airports and other landfill projects on top of reefs, dredging for harbors, and extracting sand, gravel, and limestone rock for construction materials. Sediment and nutrients that are discharged into reef waters can smother the corals; this often happens when inland forests are logged, causing erosion and run-off. Sedimentation also reduces light levels needed for coral growth and for the establishment of new corals. Likewise, sewage and upland sources of excess nutrients, such as agricultural runoff with fertilizer, can create algae 'blooms' that block sunlight and reduce coral growth.

### b. MARINE POLLUTION

Much of this issue results from improper fishing methods such as cyanide and bomb fishing. Also result in coral destruction are disposal of waste, discharge of any petroleum products, erosion



MARINE AQUARIUM MARKET TRANSFORMATION INITIATIVE

BUSINESS TRAINING

Training of Trainers (TOT)

run-off from deforestation, intensive use of artificial fish feed and wetland conversion

#### c. CORAL BLEACHING

Periodic natural disturbances such as temperature extremes, hurricanes, cyclones and other natural events can cause coral bleaching. Climate change, for example, will likely elevate sea surface temperatures in many places, causing sea levels to rise and increasing the frequency and intensity of storms. Already we have experienced unusually high water temperatures caused by severe El Niño oceanographic events, which are likely due to global warming. These high water temperatures have been linked to the bleaching of corals, which is a phenomenon that occurs when stressed corals expel their symbiotic algae. During a 1998 bleaching event, up to 90% of reef coverage was destroyed in some areas of Indonesia and other countries. Fortunately, many reefs are recovering even after being hit badly by this event.

If reefs are not stressed at all by human activities, they are not affected strongly by increased temperature. It is the combination of human and natural disturbances that causes mass bleaching.

#### d. DESTRUCTIVE FISHING PRACTICES

*<Move on to the next topic to define, illustrate and demonstrate this section in detail>*



#### **DESTRUCTIVE FISHING PRACTICES AND THEIR CONSEQUENCES ON THE CORAL REEFS**

Coral reefs are destroyed directly by some fishing methods, such as fishing with dynamite, cyanide, and other poisonous chemicals, and trawling. Even untrained, careless snorkelers and divers can trample coral reefs, and boat anchoring on coral reefs can cause damage.

Over fishing can cause shifts in fish size, abundance, and species composition within reef communities. When nonselective fishing methods are used, large numbers of other species, along with the targeted species, may be swept up in nets or killed by poisons or explosives. Very few people realize that the removal of key species (target or non-target) can cause ecosystem-level changes. For instance, excessive removal of the salaries blenny, surgeon, rabbitfish, or other algae-eating fish can lead to algae-domination that will smother corals.

High mortality suffered by fish while the animals are collected and held is another issue that needs to be addressed. Almost half of the total catch of an average collector is lost even before it reaches the exporters aquarium. Furthermore, the delivery of fish that should have been screened out means wasted fish, and will be of no use to anyone.

### **THE CONCLUSION: WHAT HAPPENS TO US WHEN REEFS CONTINUE TO BE DESTROYED AND FISHES WASTED?**

A threat to coral reefs, regardless of its source, is a threat to the marine ornamentals industry because destruction of coral reefs leads to loss of marine aquarium organism habitat and eventual loss of valuable animals themselves. Speaking simply, if the reef dies, we would all go under. Therefore, we should all do our share to save our coral reefs, not only to save biodiversity, but also to protect the marine ornamentals industry.

### **GOVERNMENT REGULATIONS IMPLEMENTED TO STOP FURTHER DEGRADATION OF OUR CORAL REEFS AND MARINE LIFE**

Enumerate and define the government regulations that affect ornamental fish collection for the awareness and understanding of participants. Point out that the government is trying to shepherd the situation to a better future for the Indonesian through these ordinances. (Complete reference on Undang Undang Perikanan 2004 (fisheries code) provided in Reference section)

#### **a. FISHING OR TAKING OF RARE, THREATENED, OR ENDANGERED SPECIES**

It is unlawful to harm or take rare, threatened, or endangered species as listed in the CITES (Convention on International Trade of Endangered Species) (for more information see [www.cites.org](http://www.cites.org)).



The trade of species mention below is tightly regulated by the Indonesian government, and collecting, holding, transporting, and selling of these species requires a special license.

- Whales, dolphins, sea cows/dugongs
- Seahorses and corals
- Mangroves

Due to over collection, it is now forbidden thus not possible to get any authorization or license from fisheries department for the collection of the following species:

- Giant clam
- Nautilus and
- Turban shell

According to Article 50 of Government Regulation Number 7 of the Indonesian Republic about the collection of flora and fauna:

The collection of endangered species will result in a fine in the amount of Rp 50 000 000 (Fifty million Rupiah) and a cessation of fishing activities for 5 years.

#### b. FISHING WITH EXPLOSIVE, NOXIOUS, OR POISONOUS SUBSTANCES

It is illegal to catch or cultivate fish using chemical, biological, explosive products or any other means that might endanger the natural resources and environment in Indonesian waters. (Article 8, verse 1)

Such an act could result in six years of imprisonment and a fine of 1.200.000.000 Rph (Article 84, verse 1)

#### c. FISHING IN FISHERY RESERVES, REFUGES, AND SANCTUARIES

It is be unlawful to fish in areas declared by the government as fishery reserves, refuge and sanctuaries.

#### d. AQUATIC POLLUTION

Article 12 of the fisheries code states:

Aquatic pollution refers to the introduction of any substances or energy to the aquatic environment that (1) result in or are likely to result in harm to living and non-living aquatic resources, (2) pose potential or real hazard to human health, or (3) hinder aquatic activities such as fishing and navigation.

Aquatic pollution results from:

- dumping/ disposal of waste and other marine litters
- discharge of any petroleum products and other radioactive, noxious, or harmful liquids, and gaseous or solid substances, from any water, land or air transport or other human-made structure
- erosion run-off from deforestation
- run-off from unsound agricultural practices such as the use of banned chemicals and excessive use of chemicals
- intensive use of artificial fish feed
- wetland conversion

The above activities are unlawful and can be punished by up to ten years in jail and a 2 000 000 000Rupiah fine. (Article 86, verse 1).