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**Environmental Impacts on Near-shore Marine Resources in Indonesia:
The Banggai Islands, Central Sulawesi.**

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At this conference we have heard much concerning El Nino, ocean circulation, global warming, climate change and multinational cooperation, monitoring and predicting exactly what may happen.

But why are we bothering to expend all this time, energy and money? Why - because the family of humankind is worried about the health of this planet as it relates to our children and grandchildren.

As a mere biologist, I would applaud all your work, all your expertise, all your hyper-activity, all your concern. But I add a word of warning - if something isn't done to stop the disruption of village lifestyles, the burning of the forests, the destruction of the mangrove and reef habitats, and the over-fishing of your waters, and if we don't do it right now, all your hard work and concern will be but in vain, because the living system that helps support millions of Indonesians will no longer exist and there will be little chance of rehabilitation.

Remember the wise words of Professor Zen, Chairman of the Steering Committee of this crucially important conference: invest in natural capital; invest in rehabilitation of natural capital; invest in village life. The latter is now the cornerstone of Indonesian planning for the future as you move towards self sufficiency. For the Koran warns that one may not have more children than you can support.

Your Presidents' Board for the Development of East Indonesia is based on taking work to the people in their villages, raising the quality of that work to world open market standards, then connecting to the world open market. In essence, bringing money into the community to take care of the family and to replenish and further develop their skills.

Indonesia is the world's largest maritime continent, with over 81,000 km of coastline and some 17,500 islands. Indonesia is blessed with being one of the most biodiverse countries on earth. Within its coastal zone lies over half of the World's tropical peatlands (swamp forest) and more mangrove forest than any other nation.

Indonesia has one-eighth of the world's total coral reefs, and is the center of biodiversity for coral reef life. Of particular importance are the Banggai Islands of Central Sulawesi which lie within the bio-geographical divide between Asia and Australasia known as "Wallacea". All evidence points to this area as being the most biodiverse region of earth. With their barrier, fringing and patch reefs, faros and atolls, the Banggai Islands are the "mother of all coral reefs", a unique bank of genetic material of immense value.

Coral reefs are one of the essential "life support systems" on earth. In Indonesia alone they protect most of the coastline from erosion and provide the potential for 250,000 tonnes of sustainable fish catch per year - an important point when you consider that each day most Indonesians rely on seafood for the majority of their dietary protein, and that one of the main reasons tourists come to Indonesia is to sample your wonderful seafood cuisine.

The economic value of healthy coral reefs is enormous. Bioprospecting for new and powerful pharmacologically active compounds within the tissues of living reef organisms is a booming business. Tourism is now the world's number one industry and Indonesia's coral reefs are of key importance to the millions of recreational divers looking for an experience of a lifetime. In Indonesia, tourism and fishing alone are worth an estimated annual income of 2 billion dollars.

But the world's coral reefs are in a mess. 10% have been destroyed beyond recovery and if nothing changes, a further 30% will be lost within 20 years. According to the World Bank, 94% of Indonesia's reefs have suffered some degree of damage by man, and in some areas, these reefs have been totally destroyed.

Over-fishing and the use of destructive fishing methods (like explosives and cyanide), pollution, dredging, mining and siltation caused by deforestation and unsustainable agriculture, all share the blame. Think for a moment about the current forest fires raging in Kalimantan - if the tropical swamp forests continue to burn for 6 months, 1 billion tonnes of carbon will be released into the atmospheric greenhouse, equivalent to over twice the amount of annual carbon dioxide released from the whole of Europe. When the rains do eventually come, the remaining ash and acidified exposed soils will be washed down rivers and onto the coastal reefs, choking them to death within a matter of weeks and destroying one of the last food reserves of the communities who have suffered most from these dreadful fires. The real irony here is two fold: firstly that it is these same marine habitats that would have helped control the carbon emissions by locking it away into their carbonate exoskeletons, and secondly there is a real chance that these acidified sediments will dissolve the now dead coral, releasing even more carbon into the environment.

Luckily, the Banggai islands are not on fire and there is hope that with proper protection, the surrounding reefs will continue to do their job of providing food and livelihoods for 337,000 Banggai fisherfolk, as well as doing their bit to help control global warming. I would also like to understand the role of the Banda enigma in all this.

In 1996, a team of 24 volunteers from Coral Cay Conservation joined forces with 11 counterparts from the Ministry of Environment and the NGO Yayasan Sumber Daya Laut, to initiate surveys of the coastal marine resources of the Banggai Islands and provide conservation education and training opportunities for local communities, in a effort to help these communities become guardians of their own reefs.

Coral Cay Conservation is an international, non-profit organisation which provides resources to help protect coastal biodiversity and the livelihoods of the people dependent upon these fragile habitats. Since 1986, Coral Cay has helped establish eight new marine protected areas and wildlife sanctuaries in Southeast Asia and the Caribbean, including the new Belize Barrier Reef World Heritage Site. Best of all, Coral Cay does all of this free of charge by recruiting teams of volunteers to help. If you had to pay for this service, your annual bill would be an estimated 8 million dollars!

During the three month Banggai project, the Coral Cay team surveyed 159 full reef transects within 15 areas and collected data from a total of 260 survey dives. A preliminary list of 438 fish species was compiled, including the rare and poorly known Banggai Cardinalfish, a species endemic to the islands.

All 15 reef areas surveyed showed some degree of anthropogenic disturbance, primarily related to the use of destructive fishing methods, including bombing and the use of cyanide. This is not surprising since a recent Reefwatch survey of over 300 coral reefs worldwide showed that there are no reefs left in the world which have escaped some level of damage from our careless actions. In Banggai, the reefs adjacent to fishing villages were most affected, and in some areas, had less than 10% of coral cover remaining. These reefs were often completely smothered in choking mats of algae and with almost no fish life remaining. The local fisherfolk told us that their fish catches has crashed over the past two years and that whilst they were aware that this was connected to the destruction of reefs by bombing and cyanide, they felt caught in a vicious cycle and helpless to change things.

The good news is that the reefs further offshore were less impacted and appeared to be in relatively good condition.

Obtaining information about coral reefs is useless unless it can be made available to local communities and decision makers. During the course of the project, 160 children from 16 local schools within the Banggai Islands participated in reef awareness programmes, and 11 counterparts from regional and national government departments and from local communities were taught to scuba dive and given training in marine ecology, marine life identification and survey techniques so that they could become fully involved in the project.

The reefs of the Banggai Islands are unique and possibly the most biodiverse in the world. If action is not taken right now to help the local fisherfolk protect these reefs, at the current rate of destruction they will be obliterated within three years. What is now needed is an integrated coastal zone management plan for Banggai based upon community development and eliminating destructive fishing practices, capacity building via village-level public education and proper training, and improved scientific understanding of the reef systems.

This many splendid Maritime Continent of Indonesia is the solar-driven pump-house of the world's oceans, a free delivery service for all marine organisms that make the Banggai reefs the most biodiverse on earth. Perhaps we should re-name them the *Bank-ai islands* - the only world bank that holds within its vaults the core portfolio of coral reef biodiversity that if used wisely, could rehabilitate the crumbling reefs of the world. Give Coral Cay Conservation and our Indonesian colleagues three more years of hard work in the *Bank-ai* vaults, and we will deliver you an inventory of that portfolio and a role-model for the wise use of coral reefs that will be the envy of the world.

Planet earth currently supports almost 6 billion people. This single home of ours is now showing serious signs of over-crowding and wear and tear. The planets human population is set to double over the next 50 years while our combined economic activity in global GNP is set to increase 5-fold over the same period. Indonesia is a very special place, a key part of the problem and the solution.

The worlds eyes are focused (albeit through the smoke) on what steps Indonesia will now take to protect its natural heritage and it is my belief that with the help and encouragement of the international community of scientists and conservationists such as Coral Cay, Indonesia has the chance to become the global leader in the conservation and wise stewardship of its outstanding natural heritage.