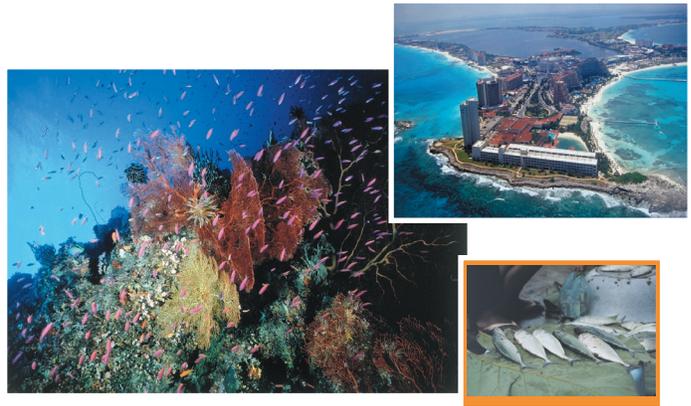


CORAL REEFS & SUSTAINABLE COASTAL DEVELOPMENT:

Planning for a sustainable reef

Almost half a billion people live within 100 km (60 miles) of coral reefs where they benefit from fisheries, wave and storm surge protection, and tourist income. With the worldwide coastal population expected to double by 2050, coral reefs will be facing increased pressure from unmanaged development along coasts. Unplanned

coastal development is not only a serious threat to coral reefs, it also leads to long-term socioeconomic loss. By using Integrated Coastal Zone Management (ICZM) practices, policy makers can create sustainable coastal development projects that protect their coral reef resources while meeting other economic needs.



UNPLANNED DEVELOPMENT CAN THREATEN CORAL REEFS AND TOURISM-BASED ECONOMIES

Unplanned coastal development projects not only damage coral reefs, but also local economies that are supported by tourism. Coral reefs are a significant driver of coastal tourism, which represents 85 percent of tourism worldwide and fuels a US \$385 billion industry. Unplanned, high-impact development compromises the sustainability of coral reefs, their tourist business, and the communities they support.

Ecological Impacts of Unplanned Coastal Development:

- Construction projects, such as piers, dikes, channels, and airstrips kill corals directly. Habitat degradation causes a decrease in fish populations, as fish have fewer places to live and breed.
- Removal of sections of reef can indirectly cause sand erosion, land retreat, and sedimentation.
- Unforeseen impacts of development—such as changed water flows and runoff, chronic sedimentation, sewage effluent, and industrial discharge—impact coral immune systems, growth rates, and reproductive abilities, and can kill corals.

Socioeconomic Impacts of Unplanned Coastal Development:

- The degradation of coral reef ecosystems results in a less marketable travel destination and the decline of the tourism industry, leading to a loss in revenue.
- The mining of coral for construction materials leads to long-term economic losses. Indonesia produces US\$121,000 of coral per km (per 0.6 miles) of reef while causing net losses of US\$93,600 in fisheries value, US\$12,000-260,000 in coastal protection and US\$2,900-481,900 in tourism value (plus unknown costs due to loss of food security and biodiversity) for a maximum total loss of US\$835,500 per km of reef.

A SOLUTION: INTEGRATED COASTAL ZONE MANAGEMENT

ICZM is an approach to develop and implement environmentally, culturally, and economically sustainable uses of the coastal zone. The goal of an ICZM strategy is to coordinate all coastal zone uses and activities, in both public and private sectors, according to an agreed upon set of resource management policies and practices. Without an integrated approach, it can be difficult to effectively manage development. Governments often regulate development activities through several different laws, regulations and agencies. There may be one law and set of regulations for pollution from factories, one for fisheries, and one for coastal building permits, all administered by different

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The Coral Reef Alliance (CORAL)
417 Montgomery Street Suite 205 San Francisco, CA 94104
Phone: (415)834-0900 Fax: (415)834-0999
www.coral.org • info@coral.org



A SOLUTION: INTEGRATED COASTAL ZONE MANAGEMENT *(continued)*

agencies. This sector-by-sector approach focuses solely on one issue or constituency and could result in a loss of valuable resources. For example, if a government establishes a marine reserve, but does not use an ICZM approach to coordinate with other coastal zone activities, the reserve may be undermined by a large private development site that is planned within the next 5 years.

The key to successful ICZM implementation involves cooperation among the large number of regulatory agencies that oversee coastal development as well as private sector stakeholders. This process usually requires strong government commitment to a coordinating mechanism, such as an inter-ministerial council or commission with representatives from all the public and private sectors. Also required are mechanisms that ensure proper implementation, such as the clarification of authorities, an accountable lead agency, and/or economic incentives (e.g. withholding of infrastructure funding until the plan is completed and/or implemented). Existing agencies will still carry out specific management programs while the ICZM authority will concentrate on policy, strategy, planning, design, supervision of research and coordination.

Creating an ICZM Strategy

The following strategies are useful for protecting coral reefs from unmanaged development. A model ICZM approach would incorporate many or all of the following:

1. **Determine whether traditional principles or resource management measures exist** and whether their appropriate implementation could enhance coastal resource management.
2. **Engage local communities to extract anecdotal and traditional knowledge**, to involve local stakeholders in policy planning and implementation, and to create local support for coastal management policies.
3. **Inventory coastal environments, resources, and programs** to learn about, improve the health, and better manage the coastal environment.
4. **Determine short-term and long-term goals** that call for coastal development consistent with the preservation of the environment and create a strategy for coastal zone management.
5. **Create and enforce a strong legal and institutional framework**, including economic incentives to reinforce desired behaviors and outcomes.
6. **Develop a strong coastal management constituency and partnerships** at the local, regional and national levels.
7. **Establish Marine Protected Areas (MPAs)**, including no-take reserves, to protect, preserve and sustainably manage species and ecosystems of special value (this includes threatened species and habitats).
8. **Perform Environmental Impact Assessments (EIAs)** of all development projects in the terrestrial and aquatic sections of the coastal zone.
9. **Assess and monitor pollutants** in the water column and make a plan for pollution control.

Related Policies and Agreements

Governments can also support coastal zone management by ratifying international and regional policies, such as:

- The Montreal Declaration on the Protection of Marine Environment from Land-based Activities
- The Convention of Biological Diversity
- The Convention on Wetlands, otherwise known as the Ramsar Convention
- Cartagena Convention for the Protection and Development of the Marine Environment
- Programme of Action from the Global Conference on the Sustainable Development of Small Island Developing States
- The Protocol for Specially Protected Areas and Wildlife (SPAW).

**For more information contact:
The Coral Reef Alliance • info@coral.org • www.coral.org**