



What is Coastal Erosion



Erosion is the process where soft shorelines (sand, gravel or cobble) disappear and land is lost. Erosion generally comes in two forms:

- A Natural part of the coastal environment where a soft shore moves and changes in response to cyclic climate conditions
- Erosion can be induced by human interference of natural sand movement and budget patterns.

Erosion can be slow and ongoing over many years or fast and dramatic following large storm events. Many erosion problems in the Pacific today, occur because of poor planning, inappropriate shoreline development, overcrowding, beach mining for building material and due to reef degradation.

Erosion is a Natural Process

It is important to understand that erosion is a natural process and in many cases is accompanied by its equal and opposite process "accretion". Put simply, sandy shorelines are dynamic and should be expected to shift and change over time, sometimes by 100's of meters. This process becomes an "erosion problem" if development is not carefully planned to avoid unstable shorelines.



Why is it that erosion seems more of a problem these days?

In past times, people lived in harmony with their moving coasts. Their houses could be easily moved to and shoreline homes were built in way which did not disturb shoreline processes (eg. On stilts or pylons). People knew and avoided dangerous or unstable locations. Today, building styles have changed and homes cannot be easily moved or replaced and lack of space often results in people building in locations which are known to be inappropriate. When such buildings are situated too close to a naturally dynamic shoreline we end up with a human settlement and planning problem which is too expensive. The beach has always moved we just forget to plan for this movement.

Example: Relocation of Vunidogoloa Village in Vanualevu. (before and after the relocation)



What causes coastal erosion?

Coastal Engineering:

Any development which changes how sand moves to, from or along a beach can cause erosion; these include sea-walls, reclamation, groynes. Causeways, boat channels, clearing of coastal vegetation (eg. Mangroves), changing water flow/current patterns, etc.

Beach Mining

Of increasing importance is beach aggregate (sand, gravel and rock) mining. As populations grow, the need for housing and infrastructure means that more and more material is being mining from our beaches. This upsets the sedimentary budget and can cause widespread, irreversible erosion.



Degraded reef health and productivity.

Most Pacific Island coasts are protected by living barrier reef systems. These reefs produce huge volumes of sand, gravel and rock which build and maintain our beaches. Nearly all white beaches of the tropical Pacific are composed from once living reef organisms. Any disturbance to the populations, diversity or functions of these reefs can result in changes to volumes of material moving to the beach and can lead to widespread erosion.

Great Astrolabe Reef Kadavu.

Poor management, pollution and over exploitation of living reefs, can reduce the health and productivity of our reef systems – this in turn can reduce sand supply to our beaches – causing erosion.



Future sea level and climate uncertainty

The IPCC (Intergovernmental Panel on Climate Change, 2007) indicates that whilst exact patterns of climate/ocean system changes are not well understood a clear trend of increasing atmospheric and ocean temperatures exists and these are accelerating. In turn, sea levels have risen during the 20th century by approximately 170mm (about 6 1/2 inches) and are currently estimated to be rising at a rate of about 3.1mm/year (about 1/8inch/year).

Our natural systems such as beaches and living reefs have a limited ability to absorb and adapt to such environmental change. However, if we weaken our shorelines through in-appropriate coastal development, beach mining and pollution it is likely these weakened shorelines and reefs will be less resilient. Put another way. Avoiding activities which weaken out coastal reef and beach system is an excellent way of assuring we have the best natural coastal defences to climate stresses and uncertainty.

Protecting our reefs and beaches also has additional benefits to our communities, not only maintaining important economic activities such as tourism.

What can you do about Erosion?

WHAT YOU SHOULD DO:

- Follow local building codes and zoning advice, if available
- Plan very carefully before you build.
- Learn what you can about your coastline. Elderly people who know the area are a good source of information.
- Many countries have some GIS and historical mapping facilities, ask if they can show you such maps.
- Always leave an adequate distance back from the shore.

WHAT YOU SHOULD AVOID:

- Avoid building barriers which prevent sand from moving along your beach, eg. Groyne, seawall, etc,
- Avoid building too close to an active beach
- Avoid building seawalls unless absolutely necessary. Seawall must be correctly designed or they will fail and cause more erosion.
- Avoid dumping domestic waste and machinery on the beach to attempt to prevent erosion.

IF YOU MUST BUILD NEAR OR ON AN ACTIVE BEACH:

- Consider the most extreme weather events in your area – the structure should either be moveable or be able to survive these events.
- Consider your neighbors – if your building stops sand movement you will cause erosion to neighboring areas, you may be liable for damages.
- Expect the beach to move – build on stilts so that the beach can move without affecting your structure. Stilts also allow the natural movement of sand along the beach.

REMEMBER:

- The best protection against storm waves is a healthy functioning beach – it costs nothing and builds and repairs itself.



NATIONAL DISASTER MANAGEMENT OFFICE
1 Knolly Street, Suva.
Phone: 3319250. Fax: 3319315

www.ndmfiji.gov.fj