

OUR ENVIRONMENT OUR HERITAGE

CLIMATE CHANGE AND MANGROVES

We are often told that climate change is a major threat to Pacific islands and that we need to adapt in order to secure our future against this threat. But what does climate change really mean for our daily lives in the Pacific? Part of the answer to this question was revealed last week with the release of a special report on the effects of climate change on mangrove forests. The report, titled "Pacific Island Mangroves in a Changing Climate and Rising Sea" is part of the UNEP Regional Seas Program and was prepared by UNEP, SPREP and the Western Pacific Regional Fishery Management Council (WPRFMC).

With climate change awareness day just around the corner (10 August at Toaa Siamasiana Hall), now is a perfect time to reflect on some of the key findings of this report and what it means for Samoa. Some of key points raised in the report include are reproduced below.

The following are excerpts from the UNEP report:

Compared to just a few decades ago, the ever-increasing number and strength of forces affecting coastal ecosystems, including mangroves, require coastal managers to respond and adapt to ensure the sustainability of valued ecosystem services and products. One of the major challenges in the Pacific Islands region is adjusting to the responses of coastal ecosystems to the climate change-induced rise of relative sea levels by developing and implementing appropriate, affordable, and cost-effective adaptation measures with limited resources.

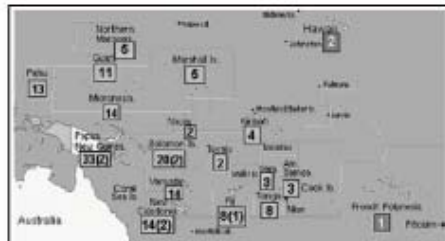


Fig. 3. Mangrove species distributions in the Pacific Islands region (Elison, 1995). Yellow squares give the number of mangrove species in the 16 countries and territories where mangroves are indigenous, blue squares are the two locations where mangroves are human-introductions. The number of mangrove hybrid species is in parentheses.

Accurate predictions of changes to coastal ecosystem area and health, including those originating from climate change effects, enable advanced planning to minimize and offset anticipated losses and reduce threats to coastal development and human safety for specific sections of coastline. Relative sea level rise is a major factor contributing to recent losses and projected future reductions of coastal habitats, including mangroves and other tidal wetlands. These losses exacerbate coastal hazards, increasing threats to human safety and shoreline development. Especially in the Pacific Islands region, shoreline development and coastal ecosystems are particularly vulnerable to small increases in sea level and other climate change effects. Many of the low islands do not exceed 4 m above current mean sea level, and even on islands with higher grounds, most development is located on narrow coastal plains. The small land mass, high population densities and population growth rates, limited funds, poorly developed infrastructure, and susceptibility to damage from natural disasters limit the capacity of small island states to adapt to relative sea level rise and the resulting ecosystem responses. It may not be physically or economically feasible for many small island communities to retreat from a landward migrating mangrove and other coastal ecosystems, or to establish zoning setbacks from coastal habitats for new development.

The central aim of this publication is to highlight the results and recommendations from a study that has assessed the capacity of Pacific Island countries and territories to determine mangrove vulnerability and adapt to mangrove responses to climate change effects. The report identifies national and regional priority needs for technical and institutional capacity-building and discusses how results from this Pacific Island study could contribute to other relevant regional and international initiatives. It also describes the status, trends and diversity of Pacific Island

mangroves; the services and products derived from mangrove communities; and considerations for the development of a strategy to plan and adapt to site-specific mangrove responses to climate change effects, including the critical need for community-based approaches, integrated coastal zone management, increased mangrove resistance and resilience, and outreach activities.

Some of the key findings in the report are summarized below:

Pacific Island Mangroves

In Brief

- Roughly 50% of the global mangrove area has been lost since 1900 and 35% has been lost in the past two decades. Due to limited monitoring, there is little information available on trends in the area and health of Pacific Island mangroves.
- The Pacific Islands, while containing only 3% of the global mangrove area, support unique mangrove community structures and provide valuable site-specific services and products.
- Papua New Guinea has the highest global mangrove diversity and supports over 70% of the region's mangrove area. Pacific Island mangroves decline in diversity from west to east, reaching a limit at American Samoa.

Mangrove Ecosystem Values

In Brief

- Pacific Islanders value mangroves for a wide range of services and products, including protecting coastlines and development from coastal hazards, supporting water quality, providing fish breeding habitats, and providing materials used in traditional practices such as dye from mangrove bark used in tapa and to treat textiles, nets, and fish traps.
- The annual economic values of mangroves, estimated by the cost of the products and services provided by mangroves, have been estimated to be between USD 200,000 – 900,000 per ha. The range of reported costs for mangrove restoration is USD 225 – 216,000 per ha.
- The existence of functional links between coastal ecosystems, including mangroves, seagrass beds, and coral reefs, means that degradation of one habitat type will adversely affect the health of neighboring habitats.

Threats to Pacific Island Mangroves

In Brief

- Stresses associated with rise in relative mean sea level, increase in the frequency and level of extreme high water events, and other effects from climate change present one set of threats to mangroves and other coastal ecosystems.
- Mangroves migrate landward as a natural response to rising sea level relative to the mangrove surface. This landward migration can be obstructed by seawalls and other development, reducing the area of coastal ecosystems.
- Global sea level rise is one of the more certain outcomes of global warming, 10-20 cm occurred during the last century, and several climate models project an accelerated rate of sea level rise over coming decades. Global mean sea level is projected to rise by 0.09 to 0.88 m between 1990 and 2100 due primarily to thermal expansion of seawater and transfer of ice from glaciers and ice caps to water in the oceans, which are results of global warming.
- Some Pacific islands are experiencing a rise in relative sea level while others are experiencing lowering. Over the past few decades, the average change in relative sea level of the 10 countries and territories in the Pacific Islands region with native mangroves that are experiencing a rise in relative sea level is 2.0 mm a⁻¹.
- Mangroves could experience serious problems due to rising sea level, and low island mangroves may already be under stress. Regionally, a reduction in area by 13% of the current 524,369 ha of mangroves of the sixteen Pacific Island Countries and territories where mangroves are indigenous is roughly predicted when employing an upper projection for global sea level rise through the year 2100.
- Increased frequency and levels of extreme high water events could affect the position and health of coastal ecosystems and pose a hazard to coastal development and human safety. Extreme high water events are projected to increase over coming decades as a result of the same forces projected to cause global sea level rise, and possibly additional forces such as variations in regional climate and changes in storminess. An assessment of trends in extreme high water events has been conducted only for American Samoa in the Pacific Islands region.
- Outcomes from global climate change other than sea level rise, such as increased air and sea-surface temperatures, changes in precipitation, and changes in storminess, are less certain than global change in sea level and the response of mangrove wetlands and other coastal systems to these changes are not well understood.
- In addition to climate change effects, mangroves and other coastal ecosystems face numerous other threats, ranging from filling for development to disease outbreaks.

Key messages for us in Samoa:

Some of the key messages that we in Samoa can take from this report include:

- We should all do our bit to preserve the mangroves that we still have. This means avoiding chopping down the mangrove trees and keeping the mangroves free of rubbish and pollution.
- People and companies building along the coast should preserve mangroves and other coastal

resources to ensure they can withstand the changing climate and rising seas.

- We should start to re-plant mangroves in areas where they used to be. This will help to protect our coastline from storm-surges and will also improve the overall resilience of these important ecosystems.

The full report can be downloaded from the UNEP website: <http://www.unep.org/Documents/Multiilingual/Default.asp?documentID=483&ArticleID=5312&I=en>

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(((CHILDREN'S CORNER)))

Children aged 9-14 are invited to answer the following corner. The name of 3 students with top scores at the end of every month will be posted under the "Children's Corner" for special prizes. "Children's Environment Awareness 2006 Awards will be given to 10 students with top total scores in November during the 2006 National Environment Week".

FILL IN THE GAPS

Relative ___ level rise is a major factor ___ to recent losses and projected future reductions of ___ habitats, including ___ and other tidal wetlands. These losses exacerbate coastal hazards, increasing ___ to human safety and shoreline development. Especially in the ___ Islands region, shoreline development and coastal ___ are particularly vulnerable to small increases in sea level and other climate change ___.

DEFINE THE FOLLOWING TERMS

1. climate
2. adapt
3. decade
4. sustain
5. ensure

LONG-FORM

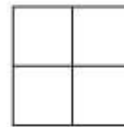
1. UNEP
2. SPREP
3. WPRFMC
4. UNDP
5. GEF
6. UNESCO

COLOUR
THE PICTURE



STICK PUZZLES

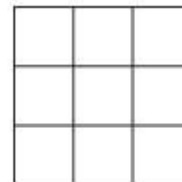
While this kind of puzzle is usually called a matchstick puzzle, it can be worked easily with toothpicks or, on a large surface with pencils. Try it out kids and then draw the answers on a piece of paper and bring it together with your other answers.



1. Remove three sticks from this layout and replace them to form three squares.



- 2 (a). Take away six of these seventeen sticks and leave two squares.
(b). Take away five sticks and leave three squares.



- 3 (a). Take away eight sticks and leave two squares.
(b). Arrange the eight sticks you took away to form two squares and four triangles.

ACKNOWLEDGEMENTS

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