Summary Sheet: Global warming & climate change in American Samoa

It is widely recognized that a warming of our earth is now in progress due to man's activities. The impacts of climate change are possibly the most critical environmental issue facing Pacific Island Countries (SPREP 2002). To examine the broad impacts of climate change (eg, freshwater supply, drought impacts to agriculture, increase in infectious diseases, damage to coastal infrastructure, etc.), a Governor-level Task Force will be proposed. CRAG itself will focus on climate change impacts to coral reef ecosystems.

Sea surface temperatures in the tropics have increased by almost 1^0 C over the past 100 years. It is predicted that these temperatures will increase another 1-3.5^0 C over the next 100 years, sea levels will rise 0.1-0.9 meters, and El Nino weather events may become more frequent. During the last El Nino in 1998, droughts wiped out many crops on South Pacific islands, and high water temperatures caused a complete loss of live corals in some parts of the world.

Reef-building corals live close to their thermal limits. Only a slight increase in water temperatures of 1-2 degrees may cause them to bleach and die. Additionally, increased levels of carbon dioxide (the main greenhouse gas) will reduce the growth (calcification rate) of corals by 35% over this century, so some reefs may erode and others may not be able to keep up with the predicted rate of sea level rise. Increases in ultraviolet radiation (due to ozone depletion) are also coral killers. These rapid changes spell catastrophe for tropical marine ecosystems on a global scale (Hoegh-Guldberg 1999).

Nonetheless, there are several things we can do. CRAG is preparing a Local Action Strategy to identify country-specific issues and impacts due to climate change to local coral reefs. Components of this strategy will include:

a) learn about, and collaborate with, other climate change programs, eg, SPREP, Reefbase;
b) monitor the condition of coral reefs over time to track changes;
c) promote American Samoa as a strategic place to conduct climate change research, through directed research and as a comparative site in existing studies;
d) identify and protect areas were corals are temperature-tolerant to reseed impacted areas;
e) identify and monitor coral diseases found locally (elevated temperatures cause corals to become stressed, thus making them vulnerable to disease);
f) promote public awareness about the importance of this issue
g) propose a governor-level Task Force to identify impacts of climate change to the territory;

Related efforts to date in American Samoa include:

1. NOAA's SST buoys deployed in territory to monitor sea surface temperatures
2. Local study: Craig et al. 2001. High temperatures tolerated by a diverse assemblage of shallow-water corals in American Samoa. Coral Reefs 20:185-189.
3. WWF study (Lara Hansen): coral resilience to stresses in A.Samoa
4. CRAG study (L.Hanson, WWF): natural resilience of corals in Ofu lagoon
5. National Park temperature monitoring in outer Vatia Bay and Ofu lagoon
6. NPS-U.Hawaii (Lance Smith) study: coral distributions versus temperature, etc. in Ofu lagoon.