

CLIMATE CHANGE

CHALLENGES TUVALU



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A German version of this booklet can be down-
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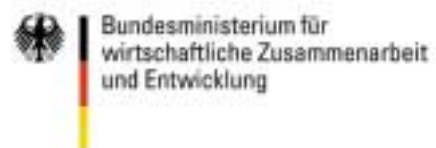


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"It's now coming back to haunt us that in Rio we hardly concerned ourselves with the monitoring and suability of the agreements. [...] It would be important to have [...] a framework convention for environmental liability. Liability is the decisive economical instrument that demands commitment."

Klaus Töpfer, general director UNEP; DIE ZEIT, May 8, 2002



Damages caused by a storm on Vaitupu Island (photo: McQuarrie)

Climate Change challenges Tuvalu

"We don't want to leave this place. We don't want to leave, it's our land, our God given land, it is our culture, we can't leave. People won't leave until the very last minute."

With these dramatic words, Paani Laupepa, the former assistant secretary at Tuvalu's Ministry of Natural Resources, Energy and Environment, expressed the feelings of many Tuvaluans when it comes to the worst-case scenario of climate change and its effects on small island nations.

The scenarios and warnings of international scientists on climate change and its inevitable consequences must be like a constant Damocles Sword for the inhabitants of Tuvalu. For the 21st century, the Intergovernmental Panel on Climate Change

(IPCC, see box 2) states that there will be a warming of global temperatures and a rise of the sea level by up to almost one meter.

How is such a country in peril, like Tuvalu, comprised of nine small low-lying islands in the South Pacific, affected by climate change? How can it protect itself from this intangible threat, especially when there is no precedent for such action? Tuvalu has raised these questions.

Solutions will have to be created to avoid catastrophes. Consistent international action like the implementation of the Kyoto Protocol, however, is still missing, despite the fact that Tuvalu, for example, is already experiencing adverse changes. Therefore, what else has to happen to convince governments to take meaningful action?



figure: map_SOA_UN.pdf (United Nations Cartographic Service)

Box 1: Tuvalu

Tuvalu, formally a British colony known as the Gilbert and Ellice Islands Colony, is an independent constitutional monarchy in the southwest Pacific Ocean, located halfway between Hawaii and Australia.

Tuvalu means "group of eight," referring to the country's eight traditionally inhabited islands. Today it consists of nine small islands, six of which are atoll islands (with lagoons) - Nanumea, Nui,

Vaitupu, Nukufetau, Funafuti (the capital) and Nukulaelae - and three which are raised limestone reef islands - Nanumanga, Niutao, and Niulakita. Tuvalu is one of the world's smallest and most isolated island nations. All together the islands have a total of 26 square kilometers - which is one quarter the size of the city of Bonn - none of which rise more than three meters above sea level.

Facts and Figures

Population (2003)	11,305 (Germany: 82,398,326)
Population density	347 people/sq.km (Germany: 231 people/sq.km)
Population Growth Rate	1.42 % (Germany: 0.04 %)
Life expectancy at birth	female: 69, male: 65 (Germany: female: 81, male: 75)
Adult literacy rate (age 15 and above)	98 % (Germany: 99%)
Real GDP per capita/annum (2000)	US\$ 1,157 (Germany: US\$ 26,200)
Official Development Assistance (ODA) received (net disbursements) total (2001)	US\$ 9.5 million
ODA received (net disbursements) per capita (2001)	US\$ 920.1

(source: CIA 2003, UNDP 1999, UNDP 2003; years in brackets refer to reference year of data)



Vaitupu Island;
a roof collapsed
due to a storm.
(photo: McQuarrie)

Funafuti, Lagoon Beach; With only 26 km², Tuvalu is one of smallest states worldwide. It consists of 9 island groups. One of these is the capital Funafuti (photo: Mc Quarrie).

Box 2: The IPCC

The Intergovernmental Panel on Climate Change (IPCC) was established in 1988 by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) to assess scientific, technical and socio-economic information in an effort to further understand climate change, its potential impacts, and options for adaptation and mitigation.

Every five years it summarizes the scientific literature in a consensus report, which is discussed and agreed on by hundreds of scientists worldwide. The IPCC is open to all members of the UN and the WMO.

For further information see: www.ipcc.ch;
<http://www.germanwatch.org/rio/bpipcc01.htm>
#Arbeitsweise

The Sea Determines Life on Tuvalu - Sea Level Rise as Well

Many small islands do not protrude more than 3 to 4 meters above the present mean sea level at their highest point. Tuvalu's highest point is not higher than 3 meters. It therefore comes as no surprise that the IPCC concludes that of all the threats facing small island nations as a result of climate change, sea-level rise is "by far the greatest," both economically and socially (IPCC 2001, pp. 847 and 855).



Funafuti Atoll, February 2000. "Children playing soccer in a flooded area during spring tides. The 3.2 meter high tides sparked the world's concern as they threatened to inundate the country" (Bennetts/ Wheeler 2001; photo: Bennetts).

Tidal gauge data show that the global average sea level rose between 0.1 and 0.2 meters during the 20th century. According to the Third Assessment Report of the IPCC, the sea level is projected to rise another 0.09 meters to 0.88 meters by the end of this century at the rate of 5 mm an average per year, which is two to four times higher than that of the past 100 years (IPCC 2001, pp. 3 and 847).

The impacts of such a development will be tremendous and are already partially perceptible; these include the loss of coastal lands, flooding and soil salinization in addition to harm to crops, ground water sources, and land and marine biodiversity (IPCC 2001, pp. 847 and 855; UNFCCC 1999, p. 21). As most island homes, infrastructure, and commercial activities are along the coasts – which is to be expected, since Tuvalu at its widest point measures 400 meters - sea level rise is a high risk to the life and health of the inhabitants (IPCC 2001, p. 847).

The sea is inextricably linked to Tuvalu's natural and social system and it has always maintained life on the islands. A change in sea level is therefore not an abstract risk but a challenging task to the every day life of Tuvaluans.

Box 3: Sea Level Rise

Why does climate change cause the sea levels to rise?

The main cause for rising sea levels is the expansion of water due to an increase in water temperature and is thus a mere physical phenomenon. Additional factors are the thawing of mountain glaciers and the ice covering in Greenland, resulting from an increase in temperature of the earth's atmosphere. An increase in rainfalls and the subsequently growing Antarctic ice cover can also cause the sea levels to fall. The influence of the Antarctic, however, is small in relation to other factors, so that in general a rise results.

Regional differences

Sea levels do not rise identically in every geographical region. Therefore, in some regions sea levels are expected to rise slightly more than in others as the increase in temperature within the

different (vertical) layers of water takes place in different stages. Independent of global warming, changes in regional sea levels can also result from continental drifts. For example, land in some river deltas subside by several millimeters per year because sediments collapse. In these cases, a rising sea level intensifies the existing regional effects. In other regions, a rise in sea level remains unnoticed because the land is rising to the same extent or even more than that of the sea level itself.

How can the sea level be measured

In the past, the rise of sea level was measured solely by fixed measuring positions ashore. As measuring positions did and do not exist at every point along the coast, the web of data collected was rather wide-meshed. Since the 1980s, satellite technology has facilitated the collection of more comprehensive data.

Many Small Islets no Longer Exist - Storm Surge and Flood Risks

Tuvalu has always had to fight with extreme weather events like storm surges and floods. But as a consequence of climate change and sea level rise, the frequency and magnitude of these weather events are intensified. Even a very minor rise in the sea level would have "severely negative effects on atolls and low islands" (IPCC 2001, p. 856) and would increasingly threaten areas with inundation. Additionally, the effects of storm surges and floods are exacerbated due to the fact that natural breakwaters, like coral reefs, are decreasing because of global warming e.g..

Paani Laupepa, former assistant secretary at Tuvalu's Ministry of Natural Resources, Energy and Environment, told BBC News in 2001 that possibly "the most pronounced effect of climate change that



Paani Laupepa in front of Tuvalu's sea level monitoring gauge (photo: Bennetts)

we are actually seeing is the flooding of low-lying areas." The flooding has never been as bad as it has in recent times, he said (Kirby 2001). Former Prime Minister Koloa Talake has also complained that many small islets on which he used to play when he was a child no longer exist. "Flooding is already coming right into the middle of the islands, destroying food crops and trees, which were there when I was born 60 years ago. These things are gone" (Field 2002).

As Tuvalu is near the cyclone belt, it is always at risk from the tropical storms and cyclones (UNFCCC 1999, p. 13). The capital of Funafuti, for example, could be flooded as a result of a cyclone prompting a one-in-ten year's wave, the result of which the

existing coastal infrastructure would not survive. Meanwhile, the chances of such an extreme event could be doubled if the sea were to rise only 0.5 meters (Rabie 1997).



And such a potential event is what, among all possible climate change scenarios, seems to be causing most of the concern among the population. Tuvaluans still remember Cyclone Bebe, the worst cyclone in living memory, which hit the islands in October 1972, leaving 800 people homeless and the Funafuti atoll devastated.

Funafuti-Atoll; stormy waves hit the beach at Va-iaku (photo: Mc-Quarrie)



Funafuti Atoll, April 2000. "Meleane Pese was the meteorological observer at the time of Cyclone Bebe, in 1972. She saved the lives of a woman and her child by holding them to a coconut tree as a tidal wave washed over" (Bennetts/Wheeler 2001; photo: Bennetts)

Coral Reefs - Rainforests of The Sea

For many tropical islands, coral reefs are among the most important natural resources (see Box 4). Scientists have found, however, that of the existing sum of living coral reefs, which is about 255,000 -

1,500,000 km², 58 percent are thought to be at risk from human activities, both climate and non-climate related. Due to their low tolerance for temperature change, some species already are living at their thermal limits and, within the next few decades, as a result of sea-surface-temperature increase, "the thermal tolerance of reef-building corals will be exceeded" and the incidence of bleaching will "rise rapidly" (IPCC 2001, p. 858).

Since the reef growth rates in Tuvalu are on the slow side, at about 2 mm per year, Tuvalu does not expect the rate will be able to tolerate the projected sea-level rise, not to mention the change in surface temperature and increase in CO₂ concentrations in the water (UNFCCC 1999, p. 28).



photo: International Coral Reef Information Network

Box 4: Coral Reefs

Coral reefs are complex ecosystems with a remarkable diversity of life, often called "rainforests of the sea." About 4,000 species of fish and 800 species of reef-building corals have been discovered today. But coral reefs are important not only for the biodiverse life they support, but also for the human population as well. Reef-associated plants and animals provide people with (World Research Institute 1998):

► **Seafood:** In more than 80 developing countries, countless communities rely heavily on coral reefs for income, security, and nutritional sustenance. One square kilometer of healthy coral reefs can produce 15 tons of food per year – enough for more than 1,000 people.

► **New medicines:** Scientists are turning to the oceans in the search for new cures for diseases. Coral reef species offer particular promise because of the array of chemicals produced by many of them for self-protection. Corals are already being used for bone grafts, while chemicals found within several species appear useful for treating viruses.

► **Tourism Industry:** Coral reefs are a major draw for snorkelers, scuba divers, recreational fishers, and those seeking vacations in the sun. Caribbean countries, which attract millions of visitors annually to their beaches and reefs, derive, on average, half of their gross national product from the tourism industry, valued at \$8.9 billion in 1990.

► **Coastal protection:** : Coral reefs protect shorelines from wave action and the impact of storms. The benefits from this protection are widespread, and range from the maintenance of highly productive mangrove fisheries and wetlands to the supporting of local economies built around ports and harbors.

A study estimated that the costs of destroying just one kilometer of reefs range from about \$137,000 to almost \$1.2 million over a 25-year period, when fishery, tourism, and protection values alone are considered (Cesar 1996). But coral reefs cannot be replaced by money and are as such of inestimable value.

Tuvalu Shrinks

"Tuvalu has a coastline which, encompasses extremely limited terrestrial, near shore, and natural resources," emphasizes the South Pacific Applied Geoscience Commission (SOPAC, S.9; see box 5). The island state is thus endowed with a small buffer only when it comes to the question of coastal erosion due to rising water levels. Tuvalu already is experiencing land losses although in part due to anthropogenic factors.

"There have been rapid changes in the coastal geography associated with exploitation of aggregates such as beach sand and reef coral and blasting of reef passage or boat channels, which have caused coastal instability and beach erosion," the commission says. Although mining of sand from beaches e.g. is not permitted, the lack of proper enforcement has led to unmanaged mining. "Besides, coastal pollution destroys reef biota" (SOPAC, p. 9). And, when the reef is in a deteriorating state, the speed of beach erosion increases (which it already is), due to the fact that carbonate beaches, on many atolls, are persevered through the sand produced by the reefs (IPCC 2001, p. 857).

These problems will only worsen with the rise in sea level. Tuvalu itself says that the projected rise in sea level of 50 cm to 95 cm could amount to one meter of shoreline loss per year (UNFCCC 1999, p. 21),

a problem since Tuvalu at its widest point is only 400 hundred meters across (Price 2002a). The island nation already has lost in recent years alone one meter of land around its largest atoll (ACFnewsources 2001).

The loss of land runs counter to the rising need for permanent houses and infrastructure of an increasing population.



Tuvalu at its widest point is only 400 meters across (photo: www.sydhav.no)

Box 5: AOSIS, SOPAC, SPREP

AOSIS - Alliance of Small Island States

The Alliance of Small Island States (AOSIS) is a coalition of small island and low-lying coastal countries that share similar development challenges and concerns about the environment, especially their vulnerability to the adverse effects of global climate change. It functions primarily as an ad hoc lobby and negotiating voice for Small Island Developing States (SIDS) within the United Nations system.

AOSIS has a membership of 43 states and observers, drawn from all oceans and regions of the world: Africa, Caribbean, Indian Ocean, Mediterranean, Pacific and South China Sea.

For further information:

<http://www.sidsnet.org/aosis/>

SOPAC - South Pacific Geoscience Commission

The South Pacific Applied Geoscience Commission (SOPAC) is an intergovernmental, regional organization dedicated to providing services to promote sustainable development in the countries it serves. Member states and further information: <http://www.sopac.org.fj>

SPREP - South Pacific Regional Environment Programme

SPREP is a regional environmental protection organization established by the governments of the Pacific region. It has grown from a small program of the South Pacific Commission in the 1980s, into the region's major intergovernmental organization charged with protecting and managing the environment and natural resources.

Further information: <http://www.sprep.org.ws/>

At risk: Food Security

For Tuvalu, healthy ecosystems are extremely important because subsistence agricultural production, as well as cash crop agricultural production, are essential to the economical, societal, and dietary welfare. (IPCC 2001, pp. 859 and 860). About 80 percent of the population 15 years and older participate in agricultural production and fishing. The remaining population generally has paid jobs either in the public or private sector on urban Funafuti or Vaitupu.

The entire population, however, relies on the ocean's natural resources as its primary source of protein (UNFCCC 1999, p. 16ff). Besides this, Tuvalu's population nourishes itself on pulaka (see box 6), coconuts, pandanus fruit, and bananas. Many of these resources are endangered (some are becoming scarce) due to climate change, newly established commercial fishing, and overexploitation. Between 1970 and 1995, for example, plots of land were cleared to conduct the mono-cropping of coconuts (UNFCCC 1999, pp. 19 and 23; IPCC 2001, p. 863).

Higher climatic temperatures and the increase of carbon dioxide (CO₂) have strong effects on crop productivity and biodiversity. Some of the ecosystems will face difficulties coping with the changes because they are already vulnerable.

A great threat to food security is the rising sea level, which leads to the salinization of the soil and ground water. This is detrimental to taro (pulaka) and other crops because of their low capacity to take in salt (IPCC 2001, p. 863). Above all, it threatens the scarce fresh water resources on the islands.



"Nukufetau Atoll, May 2000: Coconut crabs. "Tuvaluans love their food, perhaps because, in the past, food supplies were not always guaranteed. In fact food on these small and densely populated atolls could be frighteningly scarce at times. Frequent cyclones and droughts could wipe

out months of supplies. Even now, cyclones, droughts, and, more prosaically, delays in the inter-island shipping schedule, can leave outer atolls short of foodstuffs. The only resource that's (almost) guaranteed is fish." (Bennetts/ Wheeler 2001; photo: Bennetts)."



Funafuti Atoll, July 1999. Already in 1995, Tuvalu established the Funafuti Conservation Area, which prohibits fishing in specific areas in hopes of preserving stocks .The islet lies

across the lagoon from the capital and is a great success. People visit the islet to picnic (Price 2003; UNFCCC 1999, p. 16; Bennetts/ Wheeler 2001; photo: Bennets).

Box 6: Pulaka

Pulaka, or giant swamp taro, is a gigantic rubber plant, that can grow up to 4 meters high with corms up to a meter long and weighing up to 100 kg. The entire plant (leaf, stalk, corm) can be consumed (RIRDC 2003).

Pulaka is the main taro of small pacific islands like Tuvalu. Given the lack of land availability and the nature of the land on the islands it is not surprising that special techniques have been developed for

its production. It grows in pits that are dug deep into the coral down to the fresh water lens (see box 7). It can take four years to mature but can stay in the pits for up to 15 years. Pulaka trees, however, cannot tolerate saltwater, and in recent years an increasing number of pulaka trees have been rotting in the ground because seawater has seeped up into the pits (Knox 2002).



(Foto: McQuarrie)

Shortage of Potable Water

Naturally, with a sea-level rise, salt-water intrusion and the increasing insecurity about more or less frequent rains, the problem of water resources arises. As an atoll state, Tuvalu relies on rainwater and is therefore sensitive to precipitation patterns and changes in storm tracks. In the tropics and low-latitude regions of the Southern Hemisphere, precipitation inconsistency is foremost connected to ENSO (El Niño/Southern Oscillation) events. This is also the case for Tuvalu where many droughts are provoked by ENSO. Increased and more unwavering ENSO events will pose an additional stress on the potable water sources, which already are deficient under current weather patterns (IPCC 2001, p. 861).

If rainwater were to become insufficient, the residents of Tuvalu would have to turn to the very limited ground water supplies. These reserves are located in the so called freshwater lens (see box 8). The prospect of salinity intrusion into the freshwater lens due to rising sea levels is a matter of great concern for many small island states in general (IPCC 2001, p. 860).

A journalist, visiting Tuvalu's airstrip in the late afternoon in February 2002, describes such a "strange thing" during spring tide. "Water is beginning to bubble up through holes in the ground. At first it only makes a few salty puddles. But by 6 p.m. much of the side of the airstrip is underwater. It's knee-deep around the Meteorological Office and lapping at people's houses in several parts of the island" (Lynas 2002).

The issue of water, unfortunately, will get worse, not only because of climate change related factors, but also as a result of the local pollution, stemming from Tuvalu's growth in population combined with other factors such as its poor environmental management. The most popular dumping sites are beach areas and "borrow pits" (SOPAC, p. 8). The latter were originally dug out of the coral ground by the US Army Corps of Engineers during World War II to build an airstrip.

The increase of both, the solid and liquid wastes, is threatening to contaminate the underground drinking water and the adjacent sea water, which would increase algal cover, algal blooms, and coral loss (UNFCCC 1999, p. 29).



Drinking water is scarce on Tuvalu. Not only the intrusion of salt water into the freshwater lens is a problem but also the dumping of waste pollutes the water.
(Foto: McQuarrie)

Box 7: Cloud hunting, Mr. Abera Timea's capability to predict

Record of Mr. Abera: during the long drought in 1967-1968 he displayed the kind of knowledge he had. When his supply of rainwater became low, he sailed off in his 9 meter long canoe on a 2-4 day trip to an area in the open sea where he predicted it would rain at a certain time. He sailed away to his selected area, collected his rainwater and sailed back home. He was well stocked with rain

water even though he did not have a rainwater tank at his home.

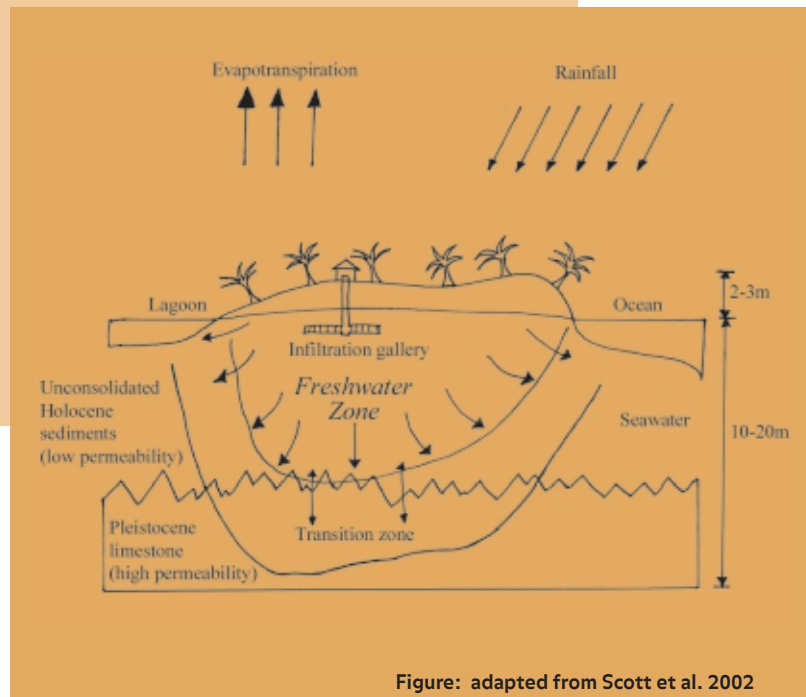
(Adapted from a study on Traditional Knowledge of Tungaru (I-Kiribati) people on their weather conditions forecasts in relation to the scientific views on climate change and sea level rise (Scott et al. 2002 after UNESCO, 1997)).

Box 8: Freshwater lens

Freshwater lenses develop from rainfall seeping into ground. Due to its lighter weight, freshwater "floats" on top of salt water. Thereby the formation of a lenticular water reservoir in the unconsolidated sediments develops. The area between freshwater and saltwater is marked by a transition zone of brackish water (a mixture of freshwater and saltwater).

Smaller coral and limestone islands particularly rely on these sources of freshwater in order to secure their drinking water supply. As a result, the frequent drilling or digging of wells take place. When the digging goes too deep, the transition zone is penetrated, whereby the saltwater contaminates the freshwater. Consequently, valuable sources of freshwater get lost.

These sources of freshwater are also at the risk of salt water intrusions through the infiltration of seawater caused by storm surges or the increase of the sea level.



Human Health

Such changes in the condition of drinking water create health risks for the population. Already numerous tropical islands are encountering a prevalence of diseases spread by insects to human beings and water-borne diseases, many of which are sensitive to the warming and flooding of water. In the Pacific, outbreaks of dengue, for instance, are on the rise. Malaria and dengue are sensitive to the warming and flooding of water, while other illnesses could prevail as a consequence of a dysfunction of sewage and water systems caused by flooding.

Health risks will be intensified by insufficient health care facilities and by the general poorer health of the populations (IPCC 2001, p. 864). The latter is also related to a change of eating habits. "The overall population has shifted its food diet from traditional food to imported food, particularly on Funafuti," Tuvalu's government says. "This is due to limited land for subsistence agriculture and the increased purchasing power of the employed population. As a result, an increase in lifestyle diseases has occurred" (UNFCCC 1999, p. 22).

Box 9: The ".tv"-domain

In 2000 the government of Tuvalu made an effort to reduce its dependence on foreign aid and sold the country's top-level-domain ".tv." That deal guarantees Tuvalu US\$4 million per year up to a total of US\$50 million, a gigantic sum for a country whose previous annual national budgets seldom exceeded US\$5 million (Bennetts/ Wheeler 2001).

With the additional money, Tuvalu joined the United Nations (on Sept., 5th 2000) and the Pacific Island Climate Change Assistance Program (PICCAP), in part to address climate change (ACFnew-source 2001). The new income also allowed Tuvalu to improve its health and education systems in addition to its local infrastructure.

Last Exit: Migration

Most of the previously mentioned adverse effects of climate change overstrains atoll countries like Tuvalu. They do not have the capacities to react and adapt in an adequate manner. This results from a combination of different factors including limited access to capital and technology, human resources and technology or simply relates to the size of the country. In many cases the only possible option is migration, both internal and external (IPCC 2001, p. 864).



Funafuti Atoll, July 1999. Already in 1995, Tuvalu established the Funafuti Conservation Area, which prohibits fishing in specific areas in hopes of preserving stocks. The islet lies across the lagoon from the capital and is a great success. People visit the islet to picnic (Price 2003; UNFCCC 1999, p. 16; Bennetts/ Wheeler 2001; photo: Bennetts).

Many Tuvaluans already have to move to Fongafale on Funafuti - a narrow sliver of sand and palm trees measuring just 2.8 square kilometers (1.1 square mile) - from outer islands. By the end of 1999, Funafuti was the home to 40 percent of the total population, giving the area a population density of 347 people per square kilometer (ADB 2002; UNFCCC 1999, pp. 14 and 27). To Compare: Germany's population density is 231 people per square kilometer.

This internal migration, coupled with the expected population increase of up to 26,000 by 2050 (UNFCCC 1999, p. 5), is anticipated to increase the demand for the already less available land and resources. It is expected to result in the overexploitation of both the land and the sea for resources, force an importation of food, and therefore increase solid waste pollution. The resulting changes or damages to the ecosystems, would only intensify Tuvalu's vulnerability toward the effects of inundation, flooding, and erosion (UNFCCC 1999, pp. 22 and 29).

The internal resettlement, however, may not be the most extreme case. The worst-case scenario for Tuvalu is that the citizens will have to abandon their islands entirely.

Box 10: Tuvalu Takes Action

Although Tuvaluans may be powerless when it comes to reducing a large enough quantity of greenhouse gas emissions to alter the fate of their islands, they are, nonetheless, taking some actions on the local, national, and international level to help mitigate impacts:

- ▶ The small island nation also wants to eliminate the use of the higher polluting Sport Utility Vehicles (SUVs) and establish the land as an ecotourism destination.
- ▶ On a larger scale, Tuvalu has begun a renewable energy program, with the help of Norwegian consultants. The government is discussing the possibility of eventually shifting the country's energy usage from fossil fuel to the consumption of 100 percent renewable energy (ICE-PAC).
- ▶ Tuvalu has ratified the Kyoto Protocol and plans on increasing energy efficiency, utilizing new energy sources, and promoting carbon sinks, in

addition to decreasing vehicle emissions and using new devices to help to encourage greenhouse gas emission reduction (Faavae 2002).

▶ On the international level, Tuvalu, along with 35 other island nations, formed, in 1990, the Alliance of Small Island States (AOSIS, see box 5), specifically to lobby for their interests regarding climate change.

Furthermore, Tuvalu has introduced measures to protect the environment and natural resources like the following:

- ▶ One effort the islanders have taken is the collection of rainwater for drinking to help conserve the groundwater.
- ▶ The Environment Unit and the Funafuti Kaupule (local island council) are working with the South Pacific Regional Environment Programme (SPREP, see box 5) and other organizations to address the growing waste problem (UNFCCC 1999, p. 27).

World's First Climate Refuges?

Perhaps the most unique endeavor Tuvalu has embarked upon, to save its citizens in the case of a total loss of their country, is its attempt to provide them the option of being environmental refugees in New Zealand or other countries. The Ministry of Pacific Island Affairs of New Zealand has already raised the issue, postulating, that "New Zealand will be required to respond to the 'environmental refugees' who will find themselves homeless" (MINPAC 2001).

But although New Zealand has agreed to a 30-year immigration program, taking 75 Tuvaluans per year, not every Tuvaluan threatened by sea level rise is allowed to participate. The applicant must be of "good character and health, have basic English skills, have a job offer in New Zealand, and be under 45 years of age" (MINPAC 2002). The program, called the Pacific Access Category (PAC) took effect in July 2002.



Even if Tuvaluans would be accepted as climate refugees and could resettle to New Zealand or any other country, this would imply the irreplaceable loss of the island's unique traditional skills and knowledge, including agricultural technologies and long-established societal arrangements. In Tuvalu and other Pacific atoll countries, connection to the land and sea makes up an indispensable element of local cosmology (IPCC 2001, p. 865).

Paani Laupepa, the former assistant secretary at



The world's first climate refugees? (photo: Bennetts)

Tuvalu's Ministry of Natural Resources, Energy and Environment, expresses the feelings of many Tuvaluans: "We don't want to leave this place. We don't want to leave, it's our land, our God given land, it is our culture, we can't leave. People won't leave until the very last minute" (Price 2002a).

Box 11: Climate Change – a question of responsibility

The 7.1 million citizens in 22 Pacific island countries, including Tuvalu, are responsible for CO₂ emissions of approximately 6.816 million tons of CO₂ per year. In contrast, the global CO₂ emissions arising from fossil fuel combustion alone are 22,620.46 Mt of CO₂ per year. That means the Pacific islands region as a whole accounts for 0.03% of the global emissions of CO₂ from fuel combustion despite having approximately 0.12% of the world's population (IPCC 2001, p. 867).

The wide gap between Tuvalu's global share in greenhouse gas emissions and the consequences it faces because of climate change brought forward the question of responsibility and is one reason why the previous Tuvalu administration discussed the possibility of suing the United States and Australia before the International Court of Justice for their "contributions" to climate change.

Law Suits of the future

The wide gap between Tuvalu's global share in greenhouse gas emissions and the consequences it faces because of climate change brought forward the question of responsibility. The previous Tuvalu administration, under Koloa Talake, discussed the possibility of suing the United States and Australia before the International Court of Justice for their "contributions" to climate change. It also announced plans to sue the United States in domestic courts.

Although the current government under Prime Minister, Saufatu Sopoanga, has dropped the option of taking legal steps against the United States or any other government for climate change, the idea has sparked discussion and speculation among lawyers and legal scholars worldwide. In fact, the issue was even raised at the annual meeting of the World Economic Forum (WEForum) in January, 2003, in Davos, Switzerland.

One of the participants of the WEFForum, Duane D. Wall, a managing partner at the international law firm White & Case in the United States, raised the issue of climate change and liability. With respect to Tuvalu, he reasoned, if for example the port were damaged or destroyed due to sea level rise, damage could easily be established. However, it would be difficult to prove which activity caused the damage. Even though Wall was uncertain as to whether Tuvalu would be able to recover damages and receive a favorable court order, he pointed out that there is case law upon which to base a legal argument to establish liability (Wall 2003).

If liability was established, case law established in the framework of toxic tort and health litigation (asbestos, tobacco) might be used¹. This case law allows suits for damages even if there is not one identifiable specific wrongdoer. Liability could be established on the basis of contribution, i.e. the degree of a country's responsibility in terms of contributing to climate change. According to scientific evidence, that would make both the United States and Europe liable, in part, with regard to greenhouse gas emissions. Wall did not deny, however, the difficulty of winning such a case (Wall 2003; WEFForum 2003).

Other legal experts also have pondered the issue. Rosemary Rayfuse, a senior lecturer in International Law at the University of New South Wales, says that

"claims might arise (in the International Court of Justice, for example) where states that had signed but not ratified Kyoto acted in a manner that undermines the objective and purpose of the treaty. But now that the U.S. (and Australia) has said it will not ratify Kyoto that argument won't work against them" (Rayfuse 2003).

However, other legal scholars have argued that states such as the United States and Australia infringe the Framework Convention on Climate Change – which both have signed - by not reducing emissions of greenhouse gases sufficiently and instead allow emissions to grow. Also, arguments based on customary international law relating to transboundary environmental harm might apply: according to the so called "no-harm-rule," a country may not undertake any action on its own land that would result in harm to another country.

The main problem in international law is that states have to agree for a case against them to be heard in the international court, which would be unlikely in a climate change case (Rayfuse 2003). Rayfuse pointed out that another option could be the U.S. Alien Tort Claims Act², whereby the more direct sources of pollution could be sued, such as oil companies, power plant operators and carmakers. "These are significant and difficult issues of international law, which certainly call out for research and solution," Rayfuse said (Rayfuse 2003).

But case law is starting to touch on the matter in the United States. Donald Goldberg, a senior attorney in the Climate Change Program at the Center for International Environmental Law, said "smaller cases that deal indirectly with climate change have to be looked at first to change the mind sets of the courts ... and they are starting to pop up" (see box 12). Goldberg concludes that although a potential case, such as with Tuvalu, would be easier to win today than it would have a year ago, because of the further scientific developments and consensus, the aforementioned types of cases "are much easier to grapple with" for starters, to educate the legal system. Tuvalu would be a "major case directly about global warming" (Goldberg 2003).

And in fact, under the auspices of an international project called the Climate Justice Programme, lawyers worldwide are trying to make use of the existing law to protect the atmosphere (see www.climatelaw.org).

Box 12: Law Suits of Today in the United States

In the United States an increasing number of cases are arising which have components that relate to climate change.

■ For example, the 8th Circuit Court of Appeals concluded recently in a case, in which a rail-line was to be constructed for the single purpose of delivering coal to a power plant, that the impact such a construction would have on climate change must be considered (Goldberg 2003). The three-judge panel "overturned" the Surface Transportation Board's approval of the Dakota, Minnesota & Eastern Railroad's "estimated \$2 billion project" to construct about 280 miles of new rail lines to reach the coal mines of Wyoming's Powder River Basin and to upgrade almost 600 miles of existing lines in Minnesota and South Dakota, due, in part, to concerns over air quality. The judges said the **proposal violated the National Environmental Policy Act**³.

■ On a larger level, environmental groups Greenpeace and Friends of the Earth in addition to the U.S. city of Boulder (Colorado), **filed a lawsuit against the U.S. Export-Import Bank and the Overseas Private Investment Corporation for financing and insuring the overseas projects** of American energy firms to develop oil fields and build pipelines and coal-fired power plants, while ignoring the impact such designs would have on the environment and climate change. In this legal action, the first of its kind, filed in August 2002, at the U.S. District Court in San Francisco, the plaintiffs argue that the federal agencies are required by federal law to make an environmental assessment of the projects⁴. On Dec. 17, the city of Oakland, Calif., also joined the lawsuit.

■ In another case, several states, cities and prominent NGOs filed a petition against the U.S. Environmental Protection Agency's (EPA) failure to regulate greenhouse gas emissions under the Clean Air Act (CAA). The EPA ruled in late August 2003, that carbon dioxide (CO₂) is not a pollutant and thus eliminated the possibility of requiring new pollution controls on motor vehicles. The EPA does not believe that the CAA authorizes regulations to address global climate change, or that Congress has authorized the agency to regulate CO₂ emissions⁵.

"Environmentalists are expected to respond by **suing the EPA** to try to force it to regulate carbon dioxide," Goldberg said. "The real fight is likely to shift to Congress, where some lawmakers are proposing a new law giving the EPA clear authority to regulate emissions of gases linked to global warming" (Goldberg 2003).

There also have been some cases challenging efforts to protect the climate including the following:

■ On June 4, 2003, the Competitive Enterprise Institute (CEI), a conservative think tank in Washington, D.C., filed a petition against the EPA to stop the distribution of its Climate Action Report 2002, saying that it contained "junk science" (CEI).

■ Likewise, in California, a lawsuit tried to hinder a state law, which was enacted in the summer of 2002, to regulate greenhouse gases from automobiles and light trucks (including Sport Utility Vehicles). The lawsuit claimed that federal law overrode state law, but it was quickly dropped (Goldberg 2003).

¹ Toxic tort litigation covers product liability claims for chemical and other substance poisonings.

² The Alien Tort Claims Act allows human rights abuse victims abroad to sue the perpetrators in U.S. courts. This law is unique to the United States. The accused must be in the U.S. to be served court papers, but otherwise neither the victim nor the alleged wrongdoer needs to reside in the United States.

³ The decision can be read online at: <http://caselaw.lp.findlaw.com/data2/circs/8th/021359p.pdf>

⁴ Link to brief: http://www.climatelawsuit.org/2002-08-26_Complaint.pdf

⁵ The decision can be found in the Sept. 8, 2003 Federal Register, p. 52922. Link: <http://a257.g.akamaitech.net/7/257/2422/14mar 20010800/edocket.access.gpo.gov/2003/03-22764.htm>

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