Islands are lost even before the sea-level rises

Islands are lost even before the sea-level rises the impacts of climate change on small island states

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contents

Friends of the Earth (FoE) Australia's Climate Justice Campaign focuses on the impacts of climate change on small island states of the Pacific.

Although these nations are responsible for only 0.06% of global greenhouse gas emissions, they are recognised by the Intergovernmental Panel on Climate Change (IPCC) as amongst the most vulnerable to climate change impacts.

This report highlights international opinion on climate change and the specific impacts occurring in the culturally diverse Pacific Islands.

Island communities are lost before the sea-level rises I contents

part one

Global Climate Change

Climate change on a global scale is affecting the lives of people around the world. The impacts of global warming on climate systems will produce irreversible changes to peoples' homelands and cultures.

In the Artic Circle, Inuit elders are concerned about the loss of ice and a delayed freezing season, seriously affecting their ability to hunt.[1]

Far away in the Pacific, small island states are also fearful of losing their ability to provide food for themselves as sea levels rise and soils become too saline for food crops.

In 1988, the World Meterological Organization (WMO) and the United Nations Environment Programme (UNEP) established the Intergovernmental Panel on Climate Change (IPCC) after recognising the then 'potential' problem of global climate change.

The role of the IPCC is to objectively assess the scientific, technical and socio-economic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts and options for adaptation and mitigation.[2] The resulting scientific reports have been used in establishing the Kyoto Protocol.[3]

The Third Assessment Report (TAR)[4]

This latest IPCC report, completed in 2001, finds that there is newer and stronger evidence that most of the warming over the last 50 years is attributable to human activities. The report states that:

> Emissions of greenhouse gases and aerosols [dust] due to human activities continue to alter the atmosphere in ways that are expected to affect the climate.[5]

It is also recognised that anthropogenic change will persist for many centuries even if greenhouse gas (ghg) emissions are stabilised, now. The United Nations Framework Convention on Climate Change (UNFCCC) calls for a

> stabilisation of ghg concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.[6]

In 1997 at the third Conference of the Parties (COP) of the UNFCCC the Kyoto protocol was adopted and it tried to establish such a level that would halt dangerous changes to the global climate system. The Kyoto Protocol unfortunately does not adequately address the issues and is currently not ratified by both Australia and United States of America. As we continue to debate climate change the IPCC's TAR details observed changes and impacts already occurring.

A summary of emergent findings from TAR:

- Atmospheric concentrations of ghg and aerosols (dust) have increased since the pre-industrial era.
- The global average surface temperature increased over the 20th century by 0.6°C.
- Temperatures have risen during the past four decades in the lowest 8km of the atmosphere.
- Rain and snow patterns have changed – increased by 5 to 10% over the 20th century in the northern hemisphere and parts of Australia, and decreased in some regions. In some regions, such as

[1] "Welcome to the Greenhouse" Gordon Laird, HQ August 2002

[2] www.ipcc.ch; The IPCC is a body of several thousand scientists from approximately 120 countries.

[3] The United Nations Conference on Environment and Development (Earth Summit) in Rio de Janeiro 1992, established the United Nations Framework Convention on Climate Change (UNFCC). In 1997, the Kyoto Protocol was initiated and in November 2001 after the seventh Conference of Parties (COP) in Marrakech, the protocol was ready for international ratification.

[4] The First Assessment Report (FAR) completed in 1990 was uncertain of factors causing greenhouse warming; the Second Assessment Report (SAR) in 1996 found 'the balance of evidence suggests a discernible human influence on global climate'; There is an increased confidence in scientific evidence and a greater understanding of climate change in the TAR.

[5] IPCC TAR "Climate Change 2001: The Scientific Basis" Summary for Policy Makers. A Report of Working Group I.

[6] Article 2 of the United Nations Framework Convention on Climate Change (UNFCCC)

part one

Global Climate Change

parts of Asia and Africa, the frequency and intensity of droughts have increased in recent decades.

- Snow cover and ice extent have decreased.
- Global average sea level has risen and ocean heat content has increased.
- Warm episodes of the El Nino Southern Oscillation (ENSO) phenomenon (which consistently affects regional variations of precipitation and temperature over much of the tropic and sub-tropics and some mid-latitude areas) have been more frequent, persistent and intense since the mid 1970s compared with the previous 100 years.
- Evidence indicates that regional changes in climate, particularly increases in temperature, have already affected a diverse set of physical and biological systems in many parts of the world. Examples:
  - shrinkage of glaciers
  - thawing of permafrost
  - later freezing and earlier break-up of ice on rivers and lakes
  - lengthening of mid- to high-latitude growing seasons,
  - pole-ward and altitudinal shifts of plant and animal ranges
  - declines of some plant and animal populations
  - earlier flowering of trees, emergence of insects, and egg-laying in birds, and
  - increased incidence of coral bleaching.
- Weather-related economic damages have increased.

These observations are clear indications of climate change. TAR then goes on to predict expected changes and impacts.

Due to past and current greenhouse gas emissions, and the fact that emissions cannot be reduced to zero overnight, we know we are already committed to future warming and sea level rise.

TAR's Global Climate Change Predictions:

- Human influences will continue to change atmospheric composition throughout the 21st century. By 2100, models project CO_2 (carbon dioxide) concentrations to increase somewhere between 90 - 250% above pre-industrial concentrations. To stabilize CO_2 concentrations requires global amount of CO_2 emissions created by people to drop below 1990 levels.
- The globally averaged surface temperature is projected to increase by 1.4 to 5.8°C from 1990 to 2100.
- Global mean sea level is projected to rise by an average 5mm per year over the next 100 years. This is primarily due to thermal expansion and loss of mass from glaciers and ice caps.
- Global average precipitation is projected to increase, though at regional scales both increases and decreases are projected.
- Some extreme weather events, e.g. droughts, floods, heat waves, avalanches, and windstorms, are projected to increase in frequency and/or severity.
- Glaciers are projected to continue their widespread retreat.
- Increased threat to health through loss of life in floods/storms; indirect changes in range of disease vectors (e.g. mosquitoes); water-borne pathogens; water quality; air quality; food availability and quality. Expected to be detrimental impacts to health, particularly in lower income populations, predominantly within tropical/subtropical countries.
- Ecological productivity and biodiversity will be altered by climate change and sea-level rise, with an increased risk of extinction of some vulnerable species.
- In most tropical and subtropical regions, potential yields of cereal crops are projected to decrease for most temperatures increases.
- Climate change will exacerbate water shortages in many water-scarce areas of the world.
- Changes in Gross Domestic Product (GDP) will be negative for many developing countries and mixed for developed countries.
- Populations that inhabit small islands and/or low-lying coastal areas are at particular risk of severe social and economic effects from sea-level rise and storm surges.

Anthropogenic change will persist for many centuries even if greenhouse gas emissions are stabilised.

- Global mean surface temperatures and rising sea level from thermal expansion of the ocean are projected to continue for hundreds of years after the stabilisation of ghg concentration (even at present levels) owing to the long timescales on which the deep ocean adjusts to climate change.

All of these factors considered, indicates that we must make deep cuts in ghg emissions **now**.

part two

Pacific Island Countries

There are 22 Pacific Island states and approximately 7 million people inhabit these islands.

The inhabitants of small island states have a common concern, that climate change will make their homelands uninhabitable. Climate change and sea level rise are serious threats to Pacific Islands and although the Pacific Islands contribute the least to global greenhouse gas emissions (0.06% of the world's current emissions), they are among the most vulnerable to the effects of global warming.[7]

The consequences of climate change are not simply environmental, but also social, cultural and economic. As the following examples highlight, the Pacific Islands are already being affected by extreme weather events, and broader changes in climatic conditions that affect the health, food and water supply, infrastructure, economy and the general well being of people in Pacific Island countries.

Food Security

It is recognised that an island becomes 'lost' long before the water level covers the island but rather at the point where the rising water level gets into the food chain rendering the traditional crops such as Babai or Taro, breadfruit, bananas, etc. inedible.[8]

In Tuvalu increased salinity is forcing families to grow their root crops in metal buckets instead of in the ground.[9] On the Cateret Islands, garden crops were destroyed after huge tidal waves struck the island and left pools of salty water inland.[10]

Also being affected are an island's coral reefs – a major food resource for island communities. With increased incidence of coral bleaching, artisinal fisheries are being depleted according to fishers in Samoa[11].

Health

Warmer temperatures lead to increased incidence of malaria. In the highlands of Papua New Guinea and Solomon Islands, which previously were too cold for mosquitoes to survive, there have been reports of malaria. There have also been cholera outbreaks over recent years in the Federated States of Micronesia and Marshall Islands and this has been linked to El Nino cycles.[12]

Water Resources

Water resources remain very critical for many of the Pacific Island countries and are most vulnerable in the atoll[13] states, where rainwater is the major water source. A thin layer of fresh groundwater that sits atop the saltwater layer, used as a reserve water source, is threatened by reduced precipitation rates and sea level rise.

Water shortages have also been experienced on higher islands as rainfall patterns (influenced by inter-annual variations or ENSO) become more variable. Drought in Papua New Guinea, Federated States of Micronesia, Marshall Islands and Fiji is a manifestation of such variations in climatic and oceanic conditions.[14]

Infrastructure

Coastal roads, bridges and plantations are suffering increasing erosion, even on islands that have not experienced inappropriate coastal development.

Increased occurrences of climatic extremes, e.g. more intense storms and floods, impact on housing and community infrastructure including socially significant sites such as cemetaries.[12] In Majuro, seawalls have been constructed to try to protect existing infrastructure and halt the impacts of erosion.[15]

[7] ACFOA (2001) Development Issues Paper: Australia and the Pacific: "Update on current trends and issues".

[8] Simpson, V. (2003) "Climate Change and the Pacific" Australian Conservation Foundation.
[9] Price, T. "The Canary is Drowning" Tom Price http://www.guerillanews.com/globalization/doc891
[10] "Climate Change in the Pacific" talk by Nic Maclellan at Climate Justice forum in Melbourne, Australia 21 March 2001
[11] Torrice, Andrea (2000) "Rising Waters" available from www.itvs.org

[12] Simpson, V. (2003) "Climate Change and the Pacific" Australian Conservation Foundation.
[13] Atolls are ring-shaped coral islands enclosing a lagoon. Kiribati, the Maldives, the Marshall Islands, Tokelau and Tuvalu are made up of low-lying atolls.
[14] Pers com Jim Salinger, Senior Climate Scientist for National Institute of Water & Atmosphere Research Ltd (NIWA)
[15] "Climate Dangers and Atoll Countries" Jon Barnett and Neil Adger, Tyndall Centre for Climate Change Research, October 2001, Working Paper 9

part two

Pacific Island Countries

Land Losses

With large coastal areas compared to total land area, coastal erosion is a common problem, previously attributed to coastal development, eg mining, infrastructure construction, pollution, and now exacerbated by storm and wave action.

There have been reported losses of sandbanks and shorelines in Tuvalu (the motu of Tepuka Savilivili), the Cateret Islands since the 1960s, and some islands in Fiji retreated 30m in the past 70 years.[14]

In Kiribati the motu[16] of Tebua Tarawa, once a landmark for fisherman, is now under water.

Ecosystems

Coastal ecosystems are lost as shorelines and reefs that fringe the islands are eroded. Globally, there has been an increase in the warming of ocean surface temperatures, and warmer temperatures have led to the bleaching of coral reefs.

The 1997-98 El Nino[17] saw substantial bleaching (90% of all live reefs on some islands[14]) of coral reefs around the Pacific, much more severe than in the past leading to secondary impacts on surrounding ecosystems and tourism.

Over the past decade, bleaching has hit reefs in Polynesia (French Polynesia, Samoa, Tahiti, Tuvalu) and Micronesia (Palau, Federated States of Micronesia) and parts of Melanesia (PNG and the Solomon Islands).

Isolated reefs of the Cook Islands and Tonga also are affected. In 2000, Fiji suffered severe coral reef bleaching because of abnormally high water temperatures.[10]

Environmental Refugees

The latest reported data show that the number of people in Oceania region affected by weather-related disasters has soared by 65 times over the past 30 years. By the end of the 1990s, the Red Cross estimated that 25 million environmental refugees had fled natural disasters, far outnumbering those fleeing conflict. Cyclones, droughts and floods threaten to make life unviable on many islands long before rising seas swallow them up.[12]

In Cateret Islands about 15 families were resettled at Hanahan on Buka, in 1996 and in Papua New Guinea there has been forced relocation of islanders from the Duke of York atolls.[10]

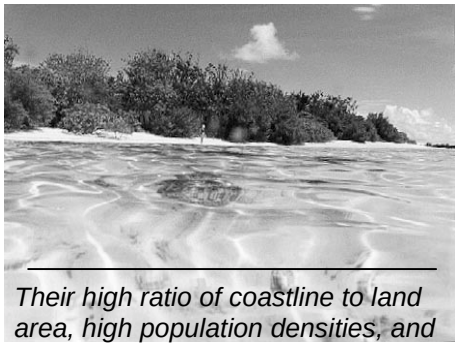
Kiribati has begun an internal resettlement program, moving people from the urban center of Betio on Tarawa to outlying islands. In Tuvalu, seven families have moved from a low-lying atoll to Niue. Half of the Tuvalese population will relocate to New Zealand over the coming decades.

Economic

Droughts, linked to El Nino, have hit important export crops in many Pacific countries including Federated States of Micronesia, Fiji, the Marshall Islands, Papua New Guinea, Samoa and Tonga.

Changes in weather patterns have left many Pacific Island countries with substantial reductions in their tuna catches. Changes in tuna migratory patterns mean they can move in and out of a nation's jurisdiction by leaving the 200-mile Exclusive Economic Zone. This is important for Pacific jurisdictions that see tuna fisheries are a vital economic source (70% of the world's catch of some types of tuna, worth nearly $2 billion annually, are caught in the Pacific).

The economy of small island states will also be impacted on by the cost of adaptation and mitigation measures. Already in the Marshall Islands: atolls are facing coastal erosion, but costs of preparing sea walls and preventative measures are enormous, for example, over $A140 million for sea wall construction in Majuro, which is one of 22 inhabited atolls.



Their high ratio of coastline to land area, high population densities, and low level of adaptive capacity renders atoll countries the most physically vulnerable of all small island states to sea-level rise. It is not sea-level rise per se, but rather projected increases in sea-surface temperature that poses the greatest risk to atoll morphology. Raised sea surface temperature events cause coral bleaching and the death of reef and motu building corals. Without coral bleaching, reefs would probably be able to grow at a pace with rising sea-levels.[15]

[16] Around the rim of coral reefs that form atolls are islets called motu approx. 2 metres high.

[17] "Episodic" warming of the ocean surface, as occurs in El Niño years, leads to significant coral bleaching. The major coral bleaching episodes in the past 20 years were found to be associated with periods when ocean temperature were about 1°C higher than the summer maximum.

part three

Towards a fair share of environmental space

The future of Pacific Island states seems bleak, however many communities are hopeful that they can adapt to climate change and its effects without losing their cultural and national identities.

In Tuvalu a renewable energy program using wind, sun and seas, will be launched.

The Assistant Minister for the Environment, Paani Laupepa says "We want to put our money where our mouth is – when we say renewable energy, climate change, we're serious about it, and we want to demonstrate our seriousness by removing diesel completely."

FoE believes in equitable and sustainable use of resources across a fair share of what we call "environmental space".

Environmental space encompasses energy, water, atmosphere, non-renewable resources, agricultural land, fisheries and forests.

By extension, a "fair share" of environmental space can be defined as the amount of these resources that each person can use without causing irreversible damage to the Earth.[18]

This principle, along with striving for environmental equity (equitable access to the Earth's resources by all nations and all peoples), drives FoE's position on climate change.

FoE Australia seeks global solutions to the threat of climate change, based on a fair share of environmental space for all peoples. We believe that the following principles are a necessary part of the solution:

1. Wealthier peoples must consume less

In industrialised countries the per capita ghg emissions remain far above those of developing countries (currently 60% and as high as 80% in the past). Consequently a reduction in consumption of ghg intensive energy sources in industrialised countries will have a dramatic positive effect in mitigating climate change.

Australia is no exception, responsible for the highest ghg emissions per capita in the developed world. Strong, forward looking policies are required from the Australian government to effect positive change, such as:

- The reduction of financial and political support for coal-reliant industries such as the aluminium industry.
- The elimination of subsidised development of shale oil and coal.[19]
- The provision of substantial long-term funding programs for renewable energy research and development.

2. Commit to a policy of 'Contraction and Convergence'

The idea of contraction and convergence is based on the fundamental premise that everyone on earth has an equal entitlement to the atmosphere. Basically it refers to the need for developed nations to "contract" emissions (reduce) and for all emissions to "converge" by a designated time at equitable per capita and ecologically sustainable levels.

FoE believes that all people have the right to a fair slice of the world's emission "pie". In the first instance, this requires people in developed states to reduce emissions now. This allows developing states some room for attaining basic quality of life with increased economic stability of ecologically sound industrial development.

The two-stage process of contraction and convergence sets a "contraction" target first and the second stage of the process is for all countries to agree on a "convergence" date. That is a time by which each country can, consistent with the global emissions budget, meet their national per capita allocation.

[18] Adapted from 'From Environmental Space to Ecological Debt' (2001) - Dr. Martin Rocholl, Director of Friends of the Earth Europe

[19] http://www.greenpeace.org.au/climate/archive/nonewoil/government.html

part three

Towards a fair share of environmental space

3. Recognise environmental refugees

The forced relocation of people around the world because of environmental factors is clearly growing. These ecologically displaced people become both internally displaced in their country of origin and externally as refugees and asylum seekers.

The reasons for this displacement include natural causes (eg, earthquakes), human-induced causes (for instance, externally funded projects which displace communities eg, hydro dams, conversion of primary forest or agricultural land into plantations, etc) and indirect human-induced causes (driven by the enhanced greenhouse effect, with corresponding impacts on ecosystems and human communities that depend on them eg, floods, droughts).

In 1999, the Red Cross/ Red Crescent publication, the *World Disasters Report*, an annual global survey of humanitarian trends, said that the previous year's natural disasters were the worst on record. The *World Disasters Report 2001*, states "in many cases, nature's contribution to 'natural' disasters is simply to expose the effects of deeper, structural causes - from global warming and unplanned urbanisation to trade liberalisation and political marginalisation. The effects of (human) actions are often evident - many natural catastrophes are un/natural in their origins."

Red Cross estimates that there are currently 25 million people displaced around the world because of environmental causes – making up 58 per cent of the world's total refugee population[20]. It is expected that this figure will continue to grow, with a number of estimates suggesting 150 million people by 2050[21]. Such a massive movement of people would constitute a dramatic human crisis.

Given that those who are being displaced by human induced climate change ('climate refugees') are the largest and fastest growing category of ecologically displaced people, it is imperative that global warming be addressed by all nations as a matter of the utmost urgency.

The global North, as the major greenhouse polluters, bears a significant responsibility for this disruption. Accordingly, we believe that the North must make reparations.

In practical terms, this will mean we must make room for environmental refugees, as well as changing policies that contribute to the creation of more refugees.

Environmental Refugees are currently not recognised under UN structures. Therefore, we call on the Australian government to advocate for UN recognition and make such recognition unilaterally.

4. Increase aid and development funding and improve its delivery

Australia should also consider how its aid program is delivered, and investigate whether there needs to be increased funding available for communities who are adversely affected by human induced climate change.

Australia's foreign aid or ODA (Official Development Assistance) is currently at a historic low under the Howard Government, at roughly 0.25% of our Gross National Income (GNI). This places Australia 14th out of 22 Organisation for Economic Co-operation & Development (OECD) donor countries, and well below half the OECD target of 0.7% of GNI. A number of countries such as the Netherlands and Sweden contribute over 0.7% of their GNI's. In addition, Australia's current aid allocation is declining relative to other donor countries; under current trends, we will soon be amongst the lowest of all OECD countries[22]. In the short term, Australia should increase its ODA to 0.7% of GNI.

In addition, Australia should increase funding for communities who are impacted by climate change as indicated by the *Pacific Island Regional Statement 2000*[23].

Australia should also increase funding for appropriate, renewable energy projects in the Pacific region. This will assist Pacific Island communities to gain a fair share of energy through clean resources.

For more information on aid related issues access the website of FoE affiliate member, Aidwatch, www.aidwatch.org.au

For further climate justice information access
www.foe.org.au (FoE Australia website)
www.foei.org (FoE International website)
www.risingtide.org.uk

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[20] http://www.ifrc.org/publicat/wdr2001/

[21] http://archive.greenpeace.org/~climate/database/records/zgpz0401.html

[22] http://www.acfoa.asn.au/publications&media/submissions/budgetsubmission2003.PDF

[23] Pacific Island Countries: Submission with the Initial national Communication to the united Nations Framework Convention on Climate Change Conference of Parties fifth meeting.

Island Communities are Lost even Before the Sea-level Rises

Glossary

Anthropogenic – human induced, caused by people

Adaptation - those activities which enable communities, now and in the future, to cope with changes resulting from global warming

Contraction and Convergence - developed by a small organisation called the Global Commons Institute (GCI) to avert the devastating trends of climate change. The C&C framework, which has been pioneered and advocated by GCI at the United Nations over the past decade, is based on the thesis of 'Equity and Survival'. It seeks to ensure future prosperity and choice by applying the global rationale of precaution, equity and efficiency in that order. See www.gci.org.uk/contconv/cc.html for more information.

CO2 – Carbon Dioxide

COP – Conference of Parties

ENSO - El Nino Southern Oscillation

FoE – Friends of the Earth

GDP – Gross Domestic Product

ghg – greenhouse gases

GNI – Gross National Income

IPCC – Intergovernmental Panel of Climate Change

Mitigation - those activities which seek to reduce the build up of greenhouse gas and other climate-modifying constituents and thereby reduce the rate and magnitude of climate change.

ODA – Official Development Assistance

OECD – Organisation for Economic Co-operation and Development

UNFCCC – United Nations Framework Convention on Climate Change