CURRENTS

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THE GLOBAL ENVIRONMENT

nzaid

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Cover image: *A view from the Polar ice rim. UN Photo – Mark Garten*

Opposite page: *Workers unload bottled drinking water donated by the World Food Programme for the distribution to the victims of the tropical storm "Hanna" in Haiti in 2008. UN Photo – Logan Abassi*

NZAID is the New Zealand Government's international aid and development programme within the Ministry of Foreign Affairs and Trade.

Our priorities

The NZAID programme supports sustainable development in developing countries in order to reduce poverty and to contribute to a more secure, equitable, and prosperous world.

Reducing poverty is inherently linked to economic growth and trade. Broad-based sustainable economic development must also be underpinned by investment in human development, good governance, and the protection of the environment and natural resource base.

Economic development provides the resources needed to achieve and maintain the internationally agreed health, education, and other poverty reduction objectives set out in the Millennium Development Goals.

Where we work

More than half of the NZAID budget is spent on development programmes in the Pacific. This is a part of the world where New Zealand has the scale, resources, people, and relationships that can influence positive, real change and make lasting differences in people's lives.

There are also NZAID programmes in Asia, Latin America, and Africa.

Global development efforts are supported through funding from the NZAID programme to international agencies. The NZAID programme also responds in times of man-made and natural emergency.

Who we work with

The New Zealand Government places a high priority on building strong partnerships and works in conjunction with partner governments, other governments' aid agencies, and non-government organisations.

New Zealand has a strong history of working with multilateral agencies to make sure aid gets to those who need it the most.

Budget

In 2009/10 New Zealand's official development assistance budget is $500 million.

For more information about NZAID please visit
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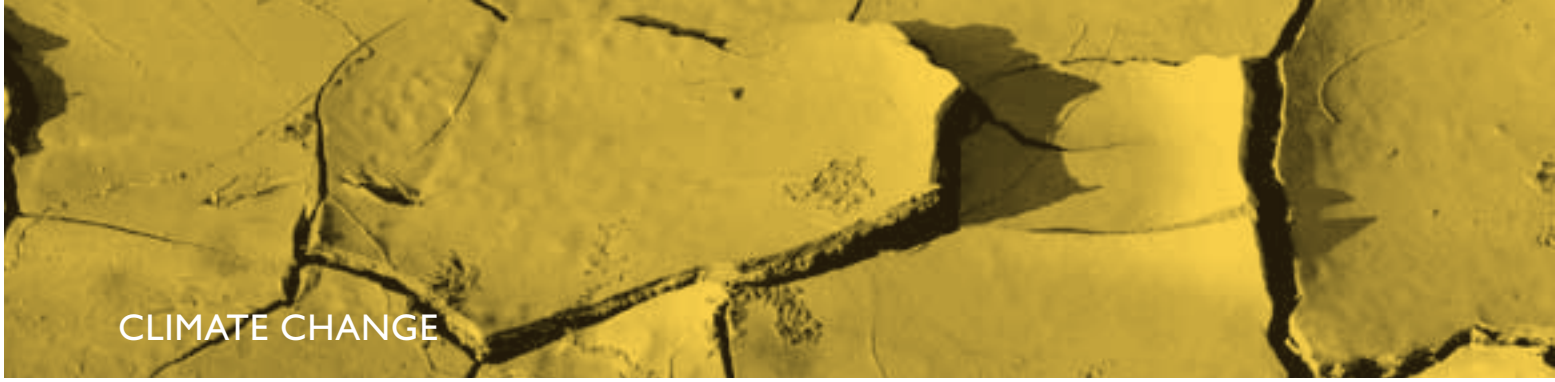

GLOBAL WARMING, GLOBAL RESPONSIBILITY

Global warming is fast emerging as the defining environment, development, and economic issue of our time. Pip Robertson looks at current international efforts to address global warming and some of the specific issues for developing countries, including New Zealand's close Pacific neighbours.

Scientific opinion is clear that the projected effects of global warming will have consequences throughout the natural world and human society. The Intergovernmental Panel on Climate Change (IPCC), a scientific body that assesses and reviews scientific data from around the world, has found that the global temperature has risen 0.74 degrees from 1905-2006, and that environments are already changing. In its publication, *Climate Change 2007*, the IPCC states that:

> "Warming of the climate system is unequivocal, as is now evident from observations of increases in global air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level."

If projected temperature rises continue, follow-on effects are potentially wide ranging, and include changes in ecosystems, altered food production, the spread of tropical diseases, and extreme weather events becoming more frequent and more intense. Climate change could lead to local and international conflict as water and food scarcity becomes a potential security issue. Shortages of food and water could also lead to wide-scale migration and, combined with future projections of sea-level rise, cause some Pacific island countries to have understandable concerns about their future viability.

The rise in temperature has coincided with the industrial age, and is widely attributable to human activities that produce greenhouse gases. The IPCC has a "very high confidence that the global average net effect of human activities since 1750 has been one of warming". (Very high confidence indicates that the IPCC believes it has at least a 9 out of 10 chance of being correct).

The challenge now is how to address it. Science is still learning more about climate change effects, and priorities differ as the issue is examined through the lenses of business, agriculture, conservation, international relations, and global responsibility. While debates continue it is clear that a coordinated international approach is needed. In the words of Ban Ki-moon, Secretary-General of the

United Nations (UN), at the opening of a UN Summit on Climate Change in September last year,

"The science demands it. The world economy needs it."

Seeking consensus in Copenhagen

The UN Framework Convention on Climate Change (UNFCCC) conference in Copenhagen in December 2009 was the culmination of two years of international talks on the details of a new climate treaty needed to follow on from the Kyoto Protocol, under which emissions reduction commitments expire in 2012. While the conference was not ready to agree on a treaty, it did result in the Copenhagen Accord. This agreement was negotiated by world leaders including the Presidents of the United States and China. It was supported by most countries, and 'taken note of' by the 193 countries present. 'Approval' would have required unanimous support, and a few countries remained strongly opposed on mainly procedural grounds.

Negotiations towards a new international agreement are continuing.

The key points in the Accord are that temperature rise should be limited to not more than 2 degrees Celsius above pre-industrial levels; developed countries should make pledges to reduce carbon emissions and these pledges will come under "rigorous, robust and transparent" scrutiny in the UNFCCC; developing countries will implement mitigation actions in the context of sustainable development; and that $US30 billion in financial

1 A Mongolian family uses solar energy to power their ger, a traditional Mongolian tent. UN Photo – Eskinder Debebe

ADDRESSING THE CAUSE AND THE EFFECTS

Mitigation means reducing the greenhouse gases that are added to the atmosphere causing temperature rise. Mitigation actions include changing household and industry behaviour, or using alternative technologies, to reduce the use of fossil fuels and replace them with low emission or carbon-neutral energy sources, like wind and solar power, and hybrid cars. It also includes 'carbon sinks' – reservoirs that absorb carbon and remove it from the atmosphere. Along with oceans, trees are the most effective carbon sink, so preserving and replanting forests is key to global warming mitigation.

Adaptation refers to actions taken to moderate, cope with, or take advantage of actual or expected changes in climate conditions. Adaptation is about building resilience to the adverse impacts of climate change, and includes better management of natural resources, changing food production techniques, and designing and developing infrastructure to withstand climate change and weather events.

support to assist with mitigation and adaptation in developing countries will be provided in 2010–2012 with a goal of mobilising $US100 billion annually by 2020.

Finance for the frontline

The urgency to mobilise financial support recognises the seriousness of the effects of global warming on developing countries and the responsibility developed countries bear to assist them. At the Climate Vulnerable Forum in November last year, President Nasheed of host nation the Maldives spoke of the gravity of global warming to the most vulnerable developing countries: "For us, climate change is no distant or abstract threat; but a clear and present danger to our survival… We are the frontline states in the climate change battle."

Developing countries' infrastructure is less able to withstand extreme weather events and climatic change. They do not have ready access to the finances, and in many cases the technical capability, needed to upgrade infrastructure and put in place other adaptations essential for their viability.

Industrial and economic development have in the past been closely linked to fossil fuel use. Historically, developing countries have contributed very little of the greenhouse gases that are currently in the atmosphere, although rapid economic growth over the last decade in many of the larger developing countries is changing that balance. Developing countries wish to build their economies and lift their populations out of poverty, and need assistance in adopting 'cleaner' technologies for energy production. The Copenhagen Accord recognises the challenge faced by all countries whereby "a low-emission development strategy is indispensable to sustainable development".

Current funding levels are insufficient to support this low-emissions development and the adaptation required in developing countries. The two targets in the Copenhagen Accord of the initial $US30 billion by 2012 scaling up to mobilisation of $US100 billion a year by 2020 are a breakthrough. While clear systems around distribution and governance are still needed to ensure that funding is effective, the Accord recognises that financial support to

1 The chimney of an industrial complex emitting polluted smoke into the air in New York City. UN Photo – Michos Tzovaras

2 A farmer in the drought-affected area of Senegal watering plants. UN Photo – Carl Purcell

3 Secretary-General Ban Ki-moon during the final hours of the UN Climate Change Conference in Copenhagen. UN Photo

4 Dead trees form an eerie tableau on the shores of Maubara Lake in Timor-Leste. UN Photo – Martine Perret

directly address the effects of climate change and minimise future temperature rise is vital. It further signals that adaptation funding "will be prioritised for the most vulnerable developing countries, such as the least developed countries, small island States and Africa."

A Pacific perspective on a changing world

The Pacific is home to many small island States, and some of these countries are among those most directly threatened by global warming. Sea level rises are particularly perilous; Tokelau, Kiribati, and Tuvalu all have their highest points just a few metres above sea level.

Even those countries that have much more elevated areas are highly vulnerable, as populations are concentrated around coastal areas and livelihoods are often closely linked with the environment. Increased frequency and severity of weather events in a region that is already prone to cyclones is potentially devastating.

On May 21, the Pacific Small Island Developing States (Pacific SIDS), a group that is made up of 11 countries, wrote to the UN Security Council to express their deep concern at the potential effect of climate change on their very existence. The Security Council is charged with threats to international peace and security and the Pacific SIDS say that climate change has the power to devastate like an invading army. The letter states, "Climate refugees, conflict over increasingly scarce resources and the loss of territory are all impacts caused by climate change that will threaten global peace and security."

Due to concerns over the significant impacts of climate change expected on small islands, the Alliance of Small Island States, to which most Pacific island States are members, is calling for more stringent emission reductions than those expressed in the Copenhagen Accord. Pacific

island countries also express their concerns and aspirations on climate change through regional processes. These include the annual meeting of regional leaders at the Pacific Islands Forum, which in 2008 resulted in the Niue Declaration on Climate Change – the first ever climate change declaration for the Pacific region. This highlighted climate change adaptation as a development priority; encouraged Pacific island countries to address the impacts of climate change; and called on international partners to undertake "immediate and effective measures to reduce emissions, use cleaner fuels, and increase use of renewable resources".

New Zealand recognises the unique vulnerabilities of Pacific island countries to climate change, and the need to build resilience to adverse impacts through its aid programme. This is done through developing alternative energy sources so there is less reliance on fossil fuels and rebuilding and improving infrastructure to withstand potential climate change related weather events.

Financial support for climate change is available to Pacific island States from other Pacific donors and also from a number of multilateral funds such as from the Global Environment Facility, an international agency that provides development grants for a range of global environmental issues including climate change. Understandably, Pacific island States can be easily overburdened meeting the administrative requirements for international financing. Along with other donors, New Zealand is working to help ensure that small Pacific countries get fair and equitable access to the international finance they are entitled to. This role will be particularly important in coming years, as the funding agreed in the Copenhagen Accord begins to be distributed.

Scientific knowledge around climate change is improving and as more information becomes available projections about its effects will become more accurate and the response more targeted. What is already clear is that no country is completely insulated from the effects of global warming, and developing countries are particularly at risk. A global response is imperative.

1 Like many communities in the Pacific, this community in Solomon Islands is located on a low-lying coastal area and relies on the sea for its transport and livelihoods.

2 Nukunonu atoll, Tokelau, is one of the regions of the world vulnerable to the impact of the climate change. UN Photo/ Ariane Rummery

3 A view of the Middelgruden offshore wind farm. The wind farm was developed off the Danish coast in 2000 and consists of 20 turbines. Pacific states are calling for developed countries to switch to non-fossil fuel energy sources, such as wind turbines. UN Photo – Eskinder Debebe

4 The narrowest point on Funafuti atoll, Tuvalu. The highest point of Tuvalu is just metres above sea level.

KIRIBATI

RESTORING BIODIVERSITY, ONE ISLAND AT A TIME

2010 is the International Year of Biodiversity but evidence from the United Nations shows biodiversity is in a perilous state of decline. Nadine Koszler looks at how Kiribati is taking steps in the right direction to conserve the Pacific island nation's unique environment.

Biodiversity supports the ecosystems that we rely on for food and freshwater, health and recreation, and protection from natural disasters. However, globally we continue to lose biodiversity at a rate never witnessed before. Habitat changes, pollution, over exploitation of natural resources, invasive species, and climate change – the five fundamental pressures directly driving biodiversity loss – remain either constant or are increasing in intensity.

Although it is a global issue, often it is the poor who most directly depend on these ecosystems for their lives and livelihoods. Current trends in biodiversity loss put development gains of recent years, such as a reduction in poverty levels and healthier populations, at risk.

Convention on Biological Diversity

The international community has made a commitment to maintaining biodiversity as a part of sustainable development. The UN Convention on Biological Diversity is a multi-national treaty with three main goals: conservation of biodiversity; sustainable use of biodiversity; and fair and equitable sharing of the benefits that arise from the use of genetic resources (genetic material of plants, animals or micro-organisms that are a valuable resource for future generations).

The convention came in to force on 29 December 1993, and New Zealand is one of 193 countries to have ratified it. In April 2002, the parties to the convention committed themselves to achieve by 2010 a significant reduction of the current rate of biodiversity loss at a global, regional, and national level to help alleviate poverty and for the benefit of all life on Earth.

A new biodiversity report, the third edition of Global Biodiversity Outlook, was released by the lead UN environmental agencies in May this year. The report concludes that we have fallen short of the 2010 target and unless swift action is taken to conserve biodiversity, the natural systems that support our daily lives and operations are at risk of failure.

More positively the report commends the rise in the number of protected areas and the efforts made to tackle some of the direct causes of ecosystem damage, such as invasive species. Kiribati is one country moving in this direction. The Pacific nation has recently become a global conservation leader by establishing the world's largest marine protected area – an area similar to the size of California.

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Moving in the right direction

Kiribati's Phoenix Islands Protected Area (PIPA) consists of eight coral atolls and two underwater reefs, and is home to unique marine and seabird species. Protecting the Phoenix Islands means restricting commercial fishing in the area, resulting in a loss of revenue that the Government of Kiribati would normally gain from issuing commercial fishing licenses. PIPA partners, the New England Aquarium and Conservation International, have helped Kiribati design a funding system that will cover the core management costs of PIPA and compensate the Kiribati Government for loss of license revenues.

The Phoenix Islands provide a remote refuge for nesting seabirds, but rats and rabbits have had detrimental impact on seabirds and plant life. An extensive bird monitoring survey completed in 2006 showed that several populations had either declined or virtually died out over the past 40 years.

The Government of Kiribati and the PIPA Administration Office recognised the urgent need to conserve the biodiversity on the islands but lacked the capacity to do so. They sought the support of Conservation International and partner organisation Pacific Invasives Initiative, and New Zealand's Department of Conservation (DOC). Funding from the NZAID programme's State Sector Development Partnerships Fund helped establish the Phoenix Islands Restoration Project, which has seen pests eradicated from select islands within the PIPA and Kiribati Government staff trained in effective invasive species management.

1 Waste from a nearby village collects on the shores of a Timor-Leste river which then spills into the sea. UN Photo – Martine Perret

New Zealand individuals and organisations have extensive experience in pest management due to the measures taken to protect New Zealand's own distinct biodiversity. Sharing that knowledge with the international community reflects New Zealand's commitment, by ratifying the convention, to help cease the loss of biodiversity worldwide.

Restoring the Phoenix Islands

Including both marine and land elements in the PIPA is unusual. DOC's Keith Broome, the Project Manager for the Phoenix Islands Restoration Project, believes the Kiribati Government's holistic approach to the PIPA is far more sensible from a biological point of view. "The land and marine components of the protected area are inextricably linked. What happens on one affects the other."

Expeditions in 2008 to two islands in the PIPA saw the eradication of rabbits from the Rawaki atoll and Asian rats from the McKean atoll. Kiribati is a small country spread over a vast ocean, and pre-expedition planning, coordination and communication between stakeholders were challenging aspects of the project. Keith puts the distance in perspective, "I figured out the Phoenix Islands are about 4,000 kilometres from my desk in Hamilton – that's twice the distance from North Cape to Bluff. But if you travel from one side of Kiribati to the other you cover a similar distance – 3,200 kilometres."

Integral to the sustainability of the project was developing the skills of Kiribati officials to effectively manage the islands and others like them in the future. The project team ran training workshops with staff from key Kiribati government agencies involved in managing the islands (Wildlife Conservation Unit, Quarantine, Customs, Police, and Phoenix Island Administration). Capacity building exercises were a cross government, non-government and community organisation effort to ensure Kiribati officials were taught international best practice. The workshops have led to the agencies working collaboratively to develop Kiribati's biosecurity system.

Training workshops had a 'learn by doing' approach, which had unplanned benefits. On Kiritimati (Christmas Island, the location of the

administration base for the PIPA), for example, eradication training exercises cleared pests from 23 small islands in the lagoon, more than doubling the area of pest-free land in the island's lagoon, and greatly enhanced the status of many threatened seabirds on the island including petrels and shearwaters.

Two Kiribati officials also joined the 2008 expeditions to McKean and Rawaki where they had one-on-one training in key eradication tasks including expedition preparation, laying out bait grids, establishing vegetation monitoring points, and seabird and land crab monitoring.

When members of the project team made a follow-up visit to Kiritimati in 2009 they found the dynamic had changed. Instead of Kiribati officials assisting DOC staff, it was the other way around. "The Kiribati officials were essentially setting the priorities, they were doing the planning, and we were giving some guidance along the way where they needed it. That really showed they were able to shift along that continuum towards self-sufficiency," says Keith.

Since the initial stages, the project team has also been working at a community level and with the wider Kiribati Government to raise awareness about the importance of biosecurity and the ecosystems on the islands. With every expedition to the islands a visit was made to Kanton, the only inhabited island in the PIPA, to discuss the project with the local village. Keith says there is still plenty to be done, but the Government understands the risks posed by invasive species and is beginning to make changes to ensure the PIPA is more secure, including restricting access to the islands – only people with a legitimate reason will be able to land on the islands.

Monitoring in late 2009 confirmed that pests had successfully been removed from both islands with striking results. Keith says the most dramatic difference has been the response in vegetation.

On McKean many of the threatened seabirds have expanded their nesting area over the island's improved habitat, while on Rawaki the increasing number of juvenile birds indicates nesting success.

1 The 'desert' of Rawaki atoll in 2008. Vegetation has been devastated by grazing rabbits. Photo - DOC

2 Wildlife Conservation Unit Officer Katareti Taabu in the same area in 2009 after pest eradication activities. Photo - DOC

1 DOC Ranger Mike Thorsen helps survey crew ashore on Rawaki Pacific Expeditions MV Bounty Bay in background. Photo - DOC

2 Agriculture Division Officer Nautonga Anterea and Wildlife Conservation Unit Officer Uriam Anterea erect poison warning sign on Rawaki. Photo - DOC

3 Expedition Leader Dr Ray Pierce and Wildlife Conservation Unit Officer Uriam Anterea monitor seabirds on Rawaki. Photo - DOC

Continuing support

The NZAID programme has granted DOC further funding for the next three years to maintain connections and further enhance capacity. The next stage can be characterised as a 'behind the scenes' project, with DOC project staff providing a mentoring and support role to Kiribati officials with biosecurity responsibilities. Keith explains the reason for the next phase, "It keeps them involved in a broader network – a place to turn to for assistance and we can respond."

Keith believes the success of the programme to date stems from the supportive, collaborative environment that was created during the project. "It's more than the sum of the parts. When you look at the project, you couldn't just pick it up and replicate it somewhere else without that supportive environment and expect the same thing to happen."

PACIFIC INVASIVES INITIATIVE (PII)

Launched in 2004, following initial funding from the NZAID programme, the goal of the PII is to reduce the spread and impact of invasive species in the Pacific in order to conserve biodiversity and ensure the sustainability of people's livelihoods.

The PII provides long-term capacity building support to government agencies, non-government or community based organisations who are working on invasive species management projects in the Pacific. Support includes project planning assistance, technical advice, peer review services and training workshops.

The NZAID programme has provided funding of up to $1.2 million over three years to the PII (2007-2010).

OPERATION CLEAN UP

In an effort to promote Niue as a niche tourist destination, the island is getting a spring clean. Adham Crichton looks at the work being carried out by the Government of Niue to make 'the rock' cleaner and safer for residents and tourists alike.

1 Some of the old cars and car parts collected as part of Operation Clean Up.

Given the small size and relative isolation of Niue, dealing with the inorganic refuse that builds up over time is always going to be a challenge. Rusty roofing iron, old cars and even hazardous asbestos are some of the items cluttering villages. Aside from the obvious environmental impact of this rubbish, it is also potentially damaging community health and Niue's image as a niche tourist destination.

Operation Clean Up is a Government of Niue initiative to make the environment cleaner and safer for local residents and tourists. The campaign, which began in mid-March, aims to clear villages of rubbish and demolish unsafe empty houses, as well as making improvements to tourist signage and infrastructure including the country's only airport.

Tidying up villages

New Zealander William Peet is currently the Infrastructure Co-ordinator for the Government of Niue and has been overseeing Operation Clean Up. At the village level this involves clearing away unwanted items such as old fridges and other whiteware, scrap metal, and other rubbish, including a 2.5 metre x 2.5 metre bakery oven, air compressors, bikes, and many old cars and car parts.

While this is clearly linked to creating a better visual environment for tourists, William is quick to point out that it is also about improving the lives of locals. "It's like your home; when you want to improve your home or house, you must tidy it up first."

So far eight of Niue's 14 villages have started their tidy up and the campaign is set to be completed in June.

An important part of ensuring that the operation runs smoothly is communication with the residents of villages to get their support for the work being carried out. To this end meetings have been held with Village Councils and newsletters issued to advise people of the Government's plans, especially around the issue of what to do about abandoned and dilapidated houses.

1, 2 Abandoned properties are a potential hazard on Niue, as well as being unattractive. They are being cleared as part of Operation Niue.

Abandoned properties

Clearing villages of unwanted junk is a major part of the operation but in order for the work to be effective the Government also needs to address the issue of abandoned and unsafe houses.

In some cases when people emigrate from Niue the family home is left uninhabited and unmaintained. These houses can eventually become not only an eye-sore but potentially hazardous as they can harbour rodents and pose a risk as they rot and become structurally unsafe.

Operation Clean Up will see these abandoned homes pulled down unless their former residents return to repair them and make them safe.

All demolitions will be coordinated by the Departments of Health, Public Works and Justice, Lands and Survey to ensure the work carried out is done in the interests of public health, while recognising the rights and responsibilities of landowners. New Zealand, through its relationship with Counties Manukau District Health Board, is assisting with the provision of Auckland Regional Public Health Protection Officer Paul Fakalago, who will be in Niue for three weeks to assess houses that represent a public health risk.

While this has been a sensitive issue for some, the Government believes that the work is critical to the ongoing health and safety of the community and Niue's future development as a tourist destination. It is also unfair for villagers who are forced to live next door to houses that are falling down.

Niue Health Minister O'Love Jacobsen has held a round of consultations with Niueans in New Zealand in an effort to get families to agree and approve demolition of houses before public demolition orders are issued.

The clean-up has encouraged some families to consider upgrading some of these homes to be utilised as tourism accommodation.

NIUE – QUICK FACTS

Niue is a small, isolated country 550 kilometres southeast of Samoa. There are about 1,500 people in 14 villages on the island and village life remains the focus for Niue's cultural and political organisation.

Niue has been self-governing in free association with New Zealand since 1974 and all Niueans are New Zealand citizens.

The country consists of one single raised coral atoll of 260 square kilometres.

Population decline is a key concern for Niue. Over 20,000 Niueans (either born on Niue or of Niuean descent) reside in New Zealand drawn by educational and employment opportunities and family ties.

The economy is fragile due to its small population base, shortages of skilled professionals, relative isolation, and a small private sector.

The New Zealand aid programme's assistance to Niue in 2008/09 was approximately $21.5 million. This includes a $5 million contribution to the Niue International Trust Fund, the aim of which is to provide Niue with an independent source of revenue in the future.

1, 2 Niue can offer tourists the drawcard of outdoor activities in a unique landscape.

Asbestos

Prior to Cyclone Heta hitting Niue in 2004 many homes on the island had roofs made of asbestos. Asbestos was a commonly used building material prior to the 1980s when it was discovered to pose a health risk.

There are still large quantities of asbestos on Niue and Operation Clean Up is also about ensuring that this material is stored and disposed of in a way that does not pose a risk to the environment or people's health.

The operation provides personal protection equipment and packaging materials for the safe removal and temporary storage of asbestos.

The Government of Niue has recently made a formal decision to have hazardous asbestos material removed from villages and stored safely on the island, before being shipped to New Zealand for permanent disposal in a hazardous waste landfill. New Zealand is pleased to be able to provide funding for this project through the aid programme.

Tourism for sustainable economic development

Niue's unique and scenic landscape makes it a potential tourist hotspot and the Government has identified developing the tourist industry as a key driver of future economic development.

New Zealand, through its aid programme, is actively working to support tourism development in Niue by earmarking funding for the sector. It is assisting to renew the partnership between the Niue Government and Air New Zealand to ensure a regular and reliable air service to Niue. This agreement provides the tourism industry in Niue with the level of security and consistency crucial for the private sector to continue investing in this growing industry.

Whale and dolphin watching, cycling, diving, and fishing are just a few of the activities Niue has to offer. With outdoor activities being the main drawcard to Niue, it is essential that tourists are impressed with the state of the environment on their arrival.

Operation Clean Up is an important reminder that while the Pacific is widely known for its natural beauty, concerted efforts are required to protect island environments. This helps tourism to drive local economies, and ensures the health and wellbeing of the people who call the islands home.

POWER TO THE PEOPLE

Pip Robertson looks at alternative energy sources that are being investigated across the Pacific as environmentally and economically sustainable solutions to expensive fossil fuels, and bringing benefits to people's everyday lives.

Across the Pacific, a lack of infrastructure limits communities' potential for economic growth. In some areas power supply is very limited, restricting the technology and communication available to the communities who live there. Where electricity supply does exist, diesel generators are the main source.

Like many resources used in the islands, the diesel is shipped vast distances, often to very small populations, at considerable expense. These transport costs make Pacific countries particularly exposed to spikes in fuel prices: when the fuel is more expensive the cost of transporting it also increases. This vulnerability to international markets was starkly obvious in 2008, when people in many Pacific countries saw the peak in world fuel prices reflected in sharp increases in the costs of basic items.

It is no surprise then that alternative energy sources are increasingly being turned to across the region.

Pacific island countries are very aware of the projected effects of global warming; part of the motivation for renewable power is therefore to find carbon neutral energy sources as part of global efforts to slow climate change.

The most immediate effects, however, are the economic benefits and sustainable supply that alternative energy sources can provide.

Several Pacific countries are developing sustainable energy plans, and sustainability is a central criterion to infrastructure development and upgrades. Solar power is a particularly appropriate choice, making good use of the Pacific islands' plentiful sunshine.

CASE STUDY

A 10-YEAR PLAN IN TUVALU

The challenges that Tuvalu experiences with its power are typical of many Pacific island countries. It has one of the smallest populations in the world, spread across an area of thousands of kilometres, and diesel is the main source of its electricity generation. In 2008, 1.587 million litres of diesel were consumed across Tuvalu's nine islands. The cost of fuel, subsidised by the Government of Tuvalu, is a significant charge against the annual budget.

This dependency on imported diesel has made Tuvalu extremely vulnerable to volatility in the international fuel markets. The significant fuel cost increases experienced in the first half of 2008 had negative flow on effects throughout the Tuvalu economy, and price increases redirected government revenue away from social and economic development programmes.

The Tuvaluan Government is committed to reducing this dependence on imported fuel, with the goal of 100 percent renewable energy for power generation by 2020. The Tuvalu Electricity Corporation has developed a 10 Year Renewable Energy Master Plan in support of the Government goal, and is taking a multi-faceted approach to the challenge of sustainable energy supply.

The Government is planning for staged installation of renewable energy units in the coming years. Wind assessments have taken place over two years and the data has been analysed by Ecology Management from Denmark with an average wind speed of 5.79m/s. Solar power has already begun operating. A grid connected solar unit of 40kw on the main island of Funafuti saved 25,075 litres of diesel and 71 tons of CO_2 in its first 18 months of operation from February 2008. A similar setup at the Motufoua Secondary School with a capacity of 46kw with storage anticipates saving 42,600 litres of diesel and 289 metric tons of CO_2 per year, and more are planned.

Reliability of supply can be an issue with renewable energy sources. The Government is therefore investigating options including

1 A solar panel powers a water pump in the remote Koevavaku region, Solomon Islands.

2 Solar power on Mitiaro Island, the Cook Islands.

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batteries and bio-fuel for back-up generation when renewable isn't an option (for example at night, or if there is an extended period that is overcast or has no wind).

The plan does not look only to new technology to meet Tuvalu's power challenges; it is also aiming for a 4 percent reduction in household consumption through managing power demand. Making sure appliances such as fridges are running efficiently is part of this. Changing behaviour is also important, with people encouraged to be mindful and use power responsibly. The Government is leading by example, with all electrical equipment turned off in Government offices when they are not in use. The Tuvalu Cooperative Society, the country's main trading company, was also requested to switch off its refrigerated container during the peak evening time. In the 12 months from September 2008 the power demand management had measureable success: 105,307 litres of diesel and 301 tons of CO2 were saved by these simple actions.

CASE STUDY

POWER FOR AN ISOLATED COMMUNITY

A small, isolated community in Solomon Islands is experiencing the practical benefits of sustainable power technology.

Koevavuka community is located on North West Choiseul Constituency, Choiseul Province. The community totals five households with about 50 people. No roads lead there; access is via boat only. In early 2009 the community was assisted by the New Zealand High Commission Head of Mission Funds for a solar water pump and water system.

Previously at Koevavuka water was scarce due to insufficient storage facilities. So although there was sufficient rainfall, this good quality

1, 2, 3 The Koevavaku community is benefitting from a new water system that uses a solar powered pump and rainfall collection.

rainwater was saved for drinking purposes. The other source was shallow ground water from a poorly formed well that was prone to contamination from surface runoff during heavy rain and seawater intrusion during dry season. The community had been using mostly this groundwater and springs at the shoreline during low tides for washing and bathing.

The community requested assistance for a solar water pump and groundwater improvement. Expertise from the water resource division of the Ministry of Environment provided technical advice. A trained family member based in Honiara travelled home to Koevavuka and installed the well and solar pump.

The positive outcomes from the new system are various. The water is now accessed from a standpipe rather than a bucket down a well. The time savings of a more efficient, easily accessible water system are felt across the community, and particularly for children and elderly people who struggled with the old system. Rainwater storage facilities were also improved. Good quality water is available every day thanks to a large storage tank collecting rain water from household roofs.

The new system has also had health benefits for the community. The improved water quality has resulted in a noticeable reduction in skin diseases. The number of malaria cases has decreased, as there is less stagnant water attracting mosquitoes.

Sustainability into the future has been factored into the new water system. There are clear water management rules in place to save or conserve water and lessen pumping times on a daily basis. Responsibility for the water system is shared; a roster is published to ensure cleaning and maintenance duties are performed. Each family in the community is charged a $10 monthly fee to cover future maintenance.

Kirsty Burnett, who manages the New Zealand aid programme on the ground in Solomon Islands has visited the project in Koevavuka and sees it as a resounding success for the community. "We were impressed. To date there has been minimal maintenance of solar pumps and no energy expenses to fund – the sun is free!"

WATER FOR LIFE

The UN has declared 2005-2015 the International Decade for Action – Water for Life in recognition of water as a serious issue for developing countries. Melanie Heaphy looks at the reasons behind this, and profiles two projects hoping to make a difference in the Pacific.

The importance of water cannot be overstated; survival would be impossible without it. Only 2.5 percent of the world's water is fresh and of this amount two-thirds is locked up in glaciers or permanent snow cover. This leaves a very small amount available for the world's population to use on a daily basis. Global warming threatens to create greater water scarcity, and this will have ramifications world wide.

No country can take water supply for granted. In New Zealand most people have easy access to good quality water to meet their needs, but our economy is very dependent on water for two major economic sectors. Water is essential for agricultural production, and our reputation as a clean green island nation with plentiful lakes and rivers is the backbone of our tourism industry.

But for millions of people in developing countries worldwide, access to water is a matter of life or death. Unfortunately for many, the water they do use is of poor quality and has negative impacts on many aspects of their lives.

Access to safe drinking water and basic sanitation are closely linked with health, social development, and economic sustainability, and are seen as vital to achieving each of the eight Milennium Development Goals.

Water and health

Thousands of people die every year from water-related diseases as a result of contaminated water. UN statistics estimate that nearly two people out of every ten (around one billion people) have no source of safe drinking water.

These people get by using about five litres a day, which is one-tenth of the average daily amount used in rich countries just to flush the toilet. To put this in context, the UN recommends that every person should have 20-50 litres of safe fresh water a day to meet their basic needs for drinking, cooking and cleaning.

Similarly, over 2.5 billion people live without even basic sanitation, such as sewage treatment facilities.

Unsafe water, inadequate sanitation and lack of hygiene claim the lives of an estimated 2.2 million children under the age of five every year, making it the second-leading cause of death in children

worldwide, after respiratory diseases. Of these deaths, 1.5 million are due to diarrhoea, which is greater than the combined number of deaths due to HIV and AIDS, malaria, and tuberculosis.

Water-related natural disasters such as floods, tropical storms and tsunamis also claim thousands of lives every year, and cause suffering for many more. Food security becomes an issue when crops are destroyed by these events. At the other extreme, drought all too often afflicts some of the world's poorest countries, exacerbating hunger and malnutrition, and again claiming many lives.

Sustainable economic development

As a resource, water is critical to sustainable development. It is necessary for the agricultural sector, which at the moment is facing the seemingly impossible challenge of producing more food of better quality while using less water per unit of output. In some countries water is a central part of transport networks, and is also vital for many industrial processes. In some parts of the world it is a major source of energy, while in others its potential as an energy source remains largely untapped. Good management of water resources means applying clean technologies so that these economic sectors can be not only much more productive, but also environmentally sustainable and allows them to contribute to building a healthy ecosystem.

Access to clean water and basic sanitation services such as sewage treatment facilities directly benefit the poor by improving their health, saving both time and health care costs. This in turn allows people to put money and energy into education and livelihoods, giving them the chance to improve their lot in life through increased income and a better standard of living. When a person's daily focus is getting enough to eat and drink to survive,

1 Children gather around a water source in Kiribati.

1 A woman is on her way to the water distribution site in Tora, Northern Darfur. Water is being distributed in Tora by an African Union-United Nations Hybrid operation in Darfur (UNAMID) contingent from Rwanda. The closest water source is 1.5 hours away and donkeys are regularly used to transport water to the village. UN Photo – Olivier Chassot

livelihood choices and educational opportunities take a backseat. In many countries it is common for women to spend many hours a day carrying often contaminated water from its source back to their homes. And so the poverty cycle continues.

Looking to the future

Water challenges will increase significantly in the coming years. Projections identify water scarcity as a likely effect of global warming. Continuing population growth and rising incomes will lead to greater water consumption, as well as more waste.

The urban population in developing countries is steadily growing, generating demand well beyond the capacity of already inadequate water supply and sanitation infrastructure and services. According to the *UN World Water Development Report*, by 2050 at least one in four people is likely to live in a country affected by chronic or recurring shortages of freshwater.

What can be done to assist developing countries in the face of this?

Long-term investment is needed, but results can also be achieved by improved water management. Supporting developing countries to instigate water governance reforms is the first step that will help put in place policies and processes that protect the water they have, while making it as accessible as possible. This will ultimately ensure a higher level of sanitation, better access to clean water, and a decrease in water-borne diseases.

Investigation and implementation of new forms of water management in agriculture and alternatives to water intensive processes will help to ease the pressure on current water supplies, as will the use of renewable energy sources to power irrigation and water supply systems.

Providing people with the resources and opportunities to live healthy and productive lives leads to economic, social and environmental benefits for everyone. Water is an essential element in this equation.

CASE STUDY

TOILETS WITH A DIFFERENCE

Composting toilets are seen as an effective way of solving sanitation and health problems in developing countries because they operate without water – a family with a flush toilet uses at least 100,000 litres of water a year. Nor do composting toilets produce sewerage, which can be a source of pollution if it is not properly treated.

Paul Lewthwaite, a New Zealand VSA (Volunteer Service Abroad) water and sanitation adviser, is on assignment with environmental education organisation Live & Learn in West New Britain, Papua New Guinea. Paul has helped to design a two-chamber composting toilet for teachers at Poinini Technical School, which was built by students at the school as a training exercise. The idea behind the two-chamber design is that one chamber gets filled, and is then left to compost while the other chamber is used.

Paul explains why the school was chosen. "We wanted to build a trial composting toilet in a place where it could 'showcase' the technology. The school was a good location because it is close to Kimbe town, and it had no functioning toilets."

He says open defecation is still the norm for 90 percent of people in the area. The local geography means that building pit toilets is often not an option.

"A lot of villagers live on land with a very high water table and a tidal coast line, which makes pit toilets unsuitable. However, above-ground composting toilets can work very well."

The toilet was part of a larger project which also included building pit toilets for the students.

2, 3, 4 A two-chamber composting toilet in West New Britain, PNG, built for the teachers by their students as a training exercise and to showcase the technology.

1, 2, 3 Greater knowledge about rainfall has the potential to improve agriculture in Vanuatu, with economic and societal benefits.

However, Live & Learn decided to build just one composting toilet, and restrict its use to teachers, to make sure the trial is a success.

"We wanted to make sure it would not be overloaded, so that it would be able to compost properly. Overloading is a common cause of failure in other trials of composting toilets."

The next step in the sanitation project is adding a rainwater catchment to provide water for hand-washing. Live & Learn has also applied for funding to help train more people to build composting toilets.

CASE STUDY

UNDERSTANDING RAINFALL

With better scientific information, the international community has a greater understanding of the valuable services provided by water-related ecosystems, from flood control to storm protection and water purification.

It also provides the opportunity to harness weather conditions and make the most of known and studied weather patterns.

Robson Tigona of the Vanuatu Meteorological Services is currently studying at Auckland University on a New Zealand Development Scholarship. The focus of his research is Southern Oscillation (SO), a global teleconnection pattern in the atmosphere that is characterised by pressure differences between the eastern tropical Pacific and Indonesian regions. The strength of the SO is measured by the pressure differences between Tahiti and Darwin, called the Southern Oscillation Index (SOI). Robson aims to find out the relationship between SO and

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Vanuatu rainfall, and to test the extent to which the SOI can be used to predict seasonal rainfall for the Vanuatu group.

As the first study of its kind for Vanuatu, Robson aims to bridge a knowledge gap in the Pacific islands. He plans to take the knowledge and experience gained from his study back to Vanuatu to contribute to the capacity of the Vanuatu Meteorological Service.

Robson hopes his study of the SOI will be able to provide reliable seasonal (three-month) rainfall prediction for Vanuatu. And this could be used by local farmers, water managers, health managers and other rainfall sensitive sectors to plan and put in place strategies to minimise the effects of high and low rainfall.

Robson is clear that water issues are very important for developing countries. Like many other countries, urban areas of Vanuatu are experiencing a strain on water supplies. Although, as he explains, it is rural areas that are most affected.

"In rural Vanuatu (like other developing countries) the situation is more serious since in most rural settlements there are no proper pipe water supply systems. The main sources of water are lakes, rivers, and streams but some low islands in the Pacific lack these sources. Rainwater is collected and stored mostly in water tanks. Thus, when there are droughts or extreme rainfall periods, the effects are significant for the rural areas in terms of water, agriculture, health, and education."

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