

SPC
Secretariat
of the Pacific
Community

Applied Geoscience and Technology Division (SOPAC)

Cook Islands Investment in Disaster Risk Management



April 2011



Samantha Cook
Disaster Reduction Programme

ECONOMIC REPORT (PR23)





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Our Mission

The mission of the SPC is “to help Pacific island people position themselves to respond effectively to the challenges they face and make informed decisions about their future and the future they wish to leave for the generations that follow.

Our Goal

The goal of the Applied Geoscience and Technology Division is to apply geoscience and technology to realise new opportunities for improving the livelihoods of Pacific communities.

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Acronyms

CPI	Consumer Price Index
DALA	Damage and Loss Assessments
DM	Disaster Management
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
EMCI	Emergency Management Cook Islands
EM-DAT	International Disaster Database
GDP	Gross Domestic Product
HDI	Human Development Index
HFA	Hyogo Framework for Action
IPCC	International Panel for Climate Change
LHS	Left Hand Side
NAP	National Action Plan
NDMO	National Disaster Management Office
NPP	New Policy Proposal
NZD	New Zealand Dollar
OPM	Office of the Prime Minister
PDRMPN	Pacific Disaster Risk Management Partnership Network
PICs	Pacific Island countries
RFA	Regional Framework for Action
RHS	Right Hand Side
SOPAC	Applied Geoscience and Technology Division, Secretariat of the Pacific Community
TC	Tropical Cyclone
UNECLAC	United Nations Economic Commission for Latin America and the Caribbean
UNISDR	United Nations International Strategy for Disaster Reduction
VAT	Value Added Tax

Prologue



Image courtesy of Samantha Cook

Since 1950 natural disasters have affected approximately 2.5 million¹ people in the Pacific region, causing 1,975² reported deaths. This has cost the Pacific Island Countries (PICs) around USD1.6 billion (in nominal terms) in associated damage costs (EM-DAT, 2010). In September 2009 a tsunami hit Samoa, American Samoa and Tonga. This gave the region a distressing reminder that the Pacific is one of the most natural disaster prone regions of the world.

According to PNG DSP (2010), rising sea levels that result from climate change will force several coastal communities to be relocated, with the associated costs of resettlement being very costly and raising the risk of conflicts. For example, the estimated cost of the Caterat Island Refugees is around Kina 7 million, and for the Lombrun Naval Base communities this will be around Kina 26 million. Resources in this area are not currently available and the PNG DSP (2010) prioritises the need to make such resources available by 2030, in addition to increasing research and data collection (such as improved tidal monitoring stations).

The Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report has emphasised that if the planet's surface temperature increases by 2°C above pre-industrial levels, a catastrophic collapse of ecosystems becomes possible with unforeseen, non-linear impacts on poverty and disaster risk. The IPCC has also confirmed that the geographic distribution, frequency and intensity of these hazards are already being significantly altered by climate change. This has strong implications for the Pacific. For example, a rise in the mean sea level of 1 metre at the upper range of estimates for the next hundred years will have drastic consequences for many coastal communities (Dow and Downing, 2007). Evidence of rising sea levels has already emerged in the Pacific after 2,000 inhabitants were forced to relocate after their homes were washed away by high tides and storm surges. Rising seas also forced the inhabitants of Tégua, Vanuatu, to abandon their island in December 2005 (Dow and Downing, 2007).

With the climate trend models for the Pacific indicating increased extreme weather conditions and increased climate variability (IPCC, 2007), PICs have little choice but to develop comprehensive risk management plans for the hazards that they will face.

The objective of this report is to present a high level desk based assessment of the potential economic costs of a disaster and to identify the level of investment in Disaster Risk Management (DRM). This will be used to draw attention to the benefits of investing in Disaster Risk Reduction (DRR) versus the cost of a disaster.

¹ excluding Papua New Guinea and the Overseas Countries and Territories. SPC Pocket Handbook 2010.

² excluding Papua New Guinea and the Overseas Countries and Territories, EM-DAT 2010.

Defining Disaster Risk Management



Image courtesy of Litea Biukoto

To ascertain the level of investment in Disaster Risk Management (DRM) as a whole it is important to understand exactly what is comprised underneath the heading of DRM itself.

A disaster does not stem from a country's lack of capacity to respond to a hazard but rather from its inability to cope with any resulting damage. For example, the occurrence of a cyclone is not a disaster in itself, it is merely a hazard. It is a country's (or a community's) lack of resources to be able to deal with the effects of the hazard that will turn the event in to a disaster. If a cyclone hits a country but that country is able to cope with the after effects of the cyclone then no disaster has occurred.

Disaster Risk Management describes;

“The systematic process of using administrative directives, organizations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster.” (UNISDR)

An important component of DRM is Disaster Risk Reduction which is;

“The concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to Hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events.” (UNISDR)

The other integral component of DRM is Disaster Management (DM) which according to The Asia Foundation and United States Agency for International Development is the component which involves the planning, leading and controlling of activities related to the management of disasters in any of its phases and stages.

Regional Context



Image courtesy of Samantha Cook



The Hyogo Framework for Action (HFA) was adopted in 2005 with an expected outcome of “The substantial reduction of disaster losses, in lives and the social, economic and environmental assets of communities and countries.” In the Pacific, the HFA formed the basis for the development of the Pacific Disaster Risk Reduction and Disaster Management Framework for Action (Regional Framework for Action or RFA). In 2005 at the 36th Pacific Islands Forum the leaders of the Pacific Island Countries endorsed a coordinated approach on an ‘all hazards’ basis would significantly improve the capacity of the Pacific island nations to reduce their vulnerabilities and to better manage disasters when they occurred. The ultimate goal is to see “DRR and Disaster Management (DM) policies mainstreamed in to national policies, planning processes and decision making at all levels”. The RFA outlines the major policy imperatives needed in the region to support the management of disaster. Additionally, the Pacific Plan, which is the overarching strategic development policy document for the Pacific region, emphasizes the need for improved disaster risk management practices and policies to enhance sustainable development.

In 2006 the Pacific Disaster Risk Management Partnership Network (PDRMPN) was established to support capacity building in DRM in PICs. The Partnership assists the development of National Action Plans (NAPs) for Disaster Risk Management consistent with the RFA and other linked regional and international policy instruments for DRM and climate change adaptation. NAPs are the vehicle through which PICs actively pursue the mainstreaming of disaster risk and climate risk considerations into their national and sectoral planning processes and budgets. This ensures that the relevant measures are introduced to reduce the potential impact of future disasters to their national economies. NAPs have been developed for, Vanuatu (2006), Republic of Marshall Islands (2007), Cook Islands (2008), Palau (2009) and Tonga (2010). At present there are also discussions underway to establish NAPs in Palau and Tuvalu at present. Major donors such as the European Union and AusAID are providing dedicated funding through organisations like SOPAC to support the development and implementation of these NAPs.

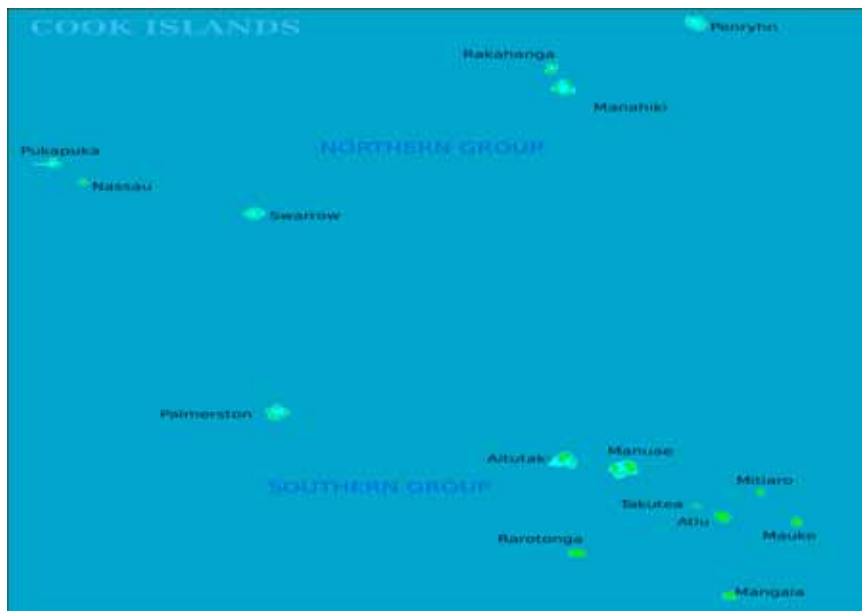
Country Context



Image courtesy of Samantha Cook



The Cook Islands is comprised of fifteen islands, thirteen inhabited and two uninhabited. These islands are spread across nearly two million square kilometres of territorial waters (see below). The Northern islands, commonly referred to as the Northern Group includes the atoll islands of Pukapuka, Rakahanga, Manihiki, Penrhyn, Nassau and Suvarrow. The Southern Group is of volcanic origin and contains the islands of Rarotonga, Aitutaki, Mangaia, Palmerston, Manuae, Mitiaro, Mauke, Takutea and Atiu.



Source: SOPAC Division, Secretariat of the Pacific Community

The majority of the population live on the capital island, Rarotonga (67 km²), it's main commercial centre. Rarotonga is the centre of Government and is a popular tourist destination. The national airline – Air Rarotonga – operates scheduled flights connecting Rarotonga with the other islands in the Southern Group. However, islands in the Northern Group are difficult to reach given the vast distances and absence of regular connecting transportation. As a result they remain relatively less developed and rural in nature. The geographic spread of the Cook Islands poses logistical problems for any necessary post disaster relief and response efforts.

The resident population of the Cook Islands in 2008 was estimated at approximately 15,750 people of which approximately two thirds live in Rarotonga. The population has been in decline since 1965 as a result of outward migration. The 2001 National Census revealed that all islands except Rarotonga suffered a decline in population since the previous census in 1996 - Atiu, Mangaia, Nassau, Rakahanga and Penrhyn all experienced declines of over 30per cent in five years. Issues relating to the continuing outward migration of Cook Islanders is a major priority for Government, to the extent that outward migration is listed as a major threat to sustainable development. Aitutaki is the most populous outer island in the Southern Group reflecting the impact of the development of the tourism industry on that island and Pukapuka remains the most populous island in the Northern Group.

Methodology



Image courtesy of Samantha Cook

There are commonly three sources of funding for DRM investments; National Government funding, Provincial Council Expenditure and Donor funding. In the Cook Islands, it was only possible to focus on one of these, National Government funding. It was not possible to identify expenditures on DRM at the Provincial level or those provided by donors.

The broader economic analysis was conducted by doing a desk review involving data collection for the statistical analysis.

National Government Funding

To capture data on the level of investment in DRM the annual budget allocation (commonly known as an appropriation) from the National budget to Emergency Management Cook Islands (EMCI) and the Meteorological Services was analysed. In addition to this, any supplementary funds (those funds which are released due to unforeseen events to cover additional costs) that may have been released in response to a disaster were also analysed. Given the predominance of recurrent expenditures (those which occur every year such as salaries and wages) in the budget appropriation of both departments it was not felt necessary to analyse the difference between appropriation and expenditure.

The primary source of information for identifying expenditure in DRM was the national budget documentation from 2001 onwards. The focus of this paper is therefore driven by the appropriations from the central Government to EMCI and Meteorological Services.

The Cook Islands has a Reserve Trust Fund (RTF) which, as an ongoing policy, accrues 0.5 per cent of annual tax revenues. This fund may be called upon during a hazardous event. In the budget year 2009-10 NZD2.2 million from the RTF was used to aid the recovery efforts on Aitutaki following Tropical Cyclone Pat. However, as the RTF is not exclusively for disaster purposes and has often been disbursed for other National needs it was not considered in the analysis.

It was not possible to identify appropriations or expenditures at the sectoral level as the Budget is a high level document and does not drill down to the level of detail required for such analysis. Examples of indirect expenditures at the sectoral level would include the integration of disaster awareness in to the school curriculum. This does not mean such initiatives do not exist but merely that they are difficult to track with the current financial management systems in the Cook Islands.

Donor Funding

It is recognised that donors will invest in several DRM measures in a country at any one time. However, unless the money goes through the Ministry of Finance and Economic Management (MFEM), Aid Management Division, it becomes very difficult to attain detailed figures. For example, community based DRM measures funded directly by donors are almost impossible to track as the outcomes are often not communicated to those who are not directly involved.

This reinforces the point that in most instances the costs of mainstreaming DRM in a project, whether Government or donor funded, can therefore not be explicitly observed. This makes progress in this area very difficult to track.

Desk Review

To facilitate the general economic and statistical analysis involving the calculation of losses data was collected from the Cook Islands Statistics Office, and the MFEM. The desk review also involved reviewing several key papers on DRM in the Cook Islands. A full list of references can be found at the end of this paper.



Image courtesy of Litea Biukoto

Past Events and Their Costs



Image courtesy of Charles Carlson

There is no doubt that the economy of the Cook Islands is particularly vulnerable to natural disasters. In 2005 in the 2 months February and March, cyclones Meena, Nancy, Olaf, Percy, and Rae swept the country. Four of these cyclones reached the maximum category five rating causing massive damage to infrastructure and agriculture (Cyclone Recovery Committee 2006). This section is aimed to help with the recognition of disasters as a development issue by discussing the costs of past disasters.

Since 1955 the Cook Islands has experienced a total of 28 natural disasters which have resulted in 34 deaths and cost in the region of USD47.6 million, equivalent to approximately NZD65.4 million (see Table 1). These figures identify costs associated with damage only. They do not account for any economic losses which will have occurred as a result of the damage caused by the disaster. Such losses include foregone wages to the individual and loss of tax revenue to the Government.

Table 1: Summary of Disasters 1955-2010

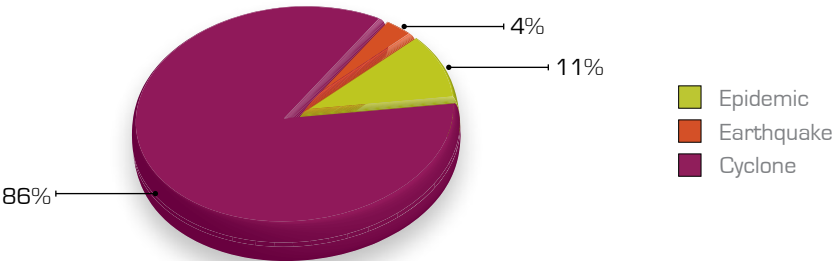
	Number	Damages (USD millions)	Deaths
Cyclone	24	47.63	27
Epidemic	3	-	7
Earthquake	1	-	-
Total	28	47.63	34

Sources: PDN, EM-DAT, GLIDE, APCEDI, DRM Consultant Joe Barr

Nb. – depicts no data available

Cyclones account for 86 per cent of past disasters (see Chart 1) in the Cook Islands, as compared to epidemics and earthquakes which account for 11 per cent and 4 per cent, respectively. It is interesting to note that the costs of disasters presented above reflect only 10 events all of which were cyclones. If we extrapolate from this it means that on average a cyclone costs the Cook Islands USD4.7 million (approximately NZD6.5 million).

Chat 1: Disasters by Type 1955-2010



Sources: PDN, EM-DAT, GLIDE, APCEDI, Joe Barr

Nb. Numbers may not sum due to rounding

There are however, always exceptions to the average, for example, in February 2010, Tropical Cyclone Pat struck the island of Aitutaki, affecting 78 per cent of houses and devastating the local agriculture sector (Cyclone Recovery Committee 2010). The recovery and reconstruction program for Tropical Cyclone Pat which hit Aitutaki in 2010 is estimated to cost NZD9.5 million³. This equates to 4per cent of GDP in current prices. This has large cost implications for future events for an area known as the 'Cyclone Bucket' and reiterates the need to better prepare for future events.



Image courtesy of Litea Biukoto

³ This amount is for recovery and reconstruction only and does not include any estimate for loss of employment or forgone tax revenue from the government in terms of income tax, corporate tax and VAT.

Resulting Budget Allocation



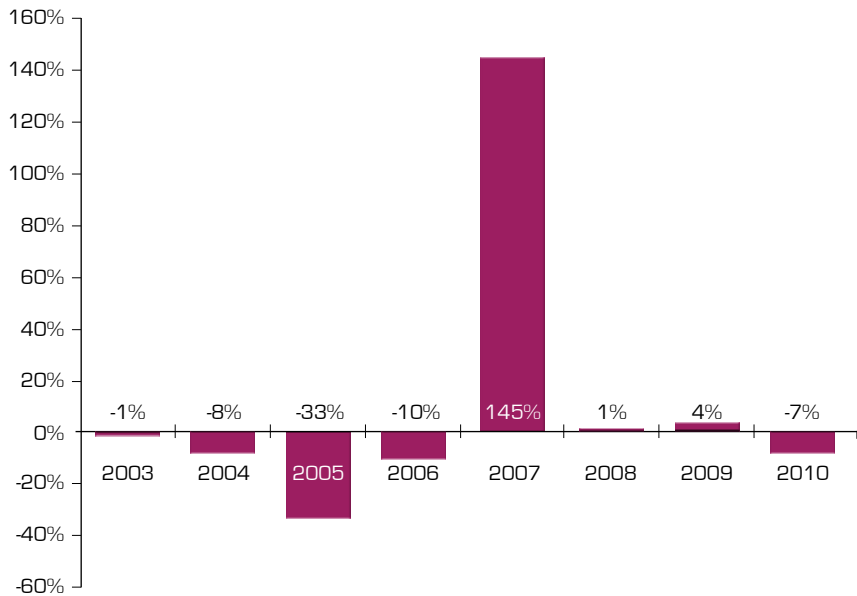
Image courtesy of Samantha Cook



Since 2001 the budget allocation for Emergency Management Cook Islands (EMCI) has increased by almost 30 percent, from NZD76,303 in budget year 2001-2002 to NZD99,050 in the current budget year 2009-2010. In 2007, EMCI was moved from the supervision of the Police to the Office of the Prime Minister (OPM). This move gave EMCI more political visibility than before. The EMCI budget allocation more than doubled from almost NZD46,000 to a much healthier NZD102,000 (see Chart 2) in 2007.

Given the jurisdiction of EMCI, laid out in the National DRM Arrangements 2009, this is a small contribution to DRM from the Government of the Cook Islands. In the past three budget cycles EMCI applied for additional funding, but requests required further work and as a consequence were not placed as a priority by Cabinet for new monies. In the process of establishing the total budget allocation in the Cook Islands, it became apparent that total Government expenditure on DRM is not fully visible. This is largely because the output-based accounting used for the budget process does not detail expenditure at a budget line level. As a result this budget analysis was conducted focussing on the two departments with direct responsibility for DRM, EMCI and the Meteorological Services. Even when the budget allocation for these two departments is combined it equates to less than one percent of the total gross expenditure (see Chart 3) detailed in the annual budget.

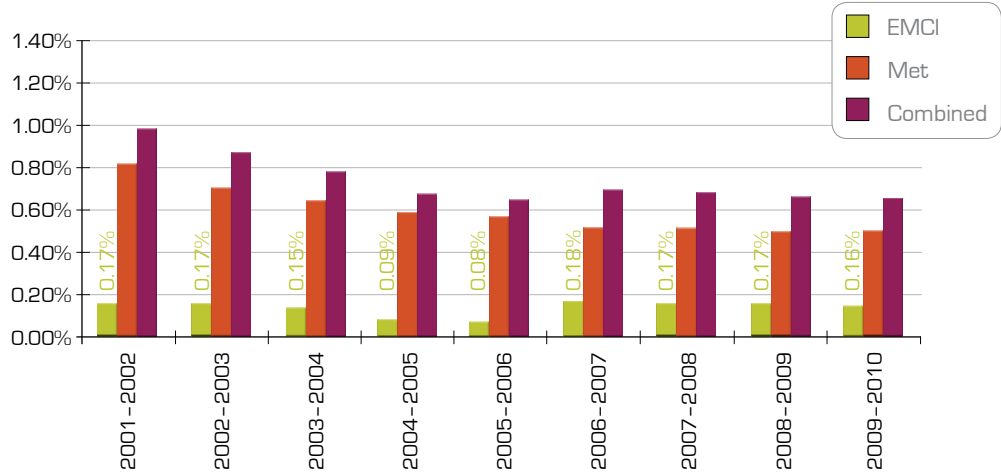
Chart 2: Annual Growth in EMCI Budget Allocation



Source: MFEM

It should be acknowledged that there are pressing development priorities (infrastructure, education, health, water and sanitation, etc) competing for the same pool of government funding as DRM issues. However, considering the overall responsibility of the two departments, there appears to be significant disconnect when deciding on budgetary allocations. For example, the Meteorological Services receive over three times the budget allocation of EMCI for providing, among other things, monitoring systems for early warning systems. This means that comparatively few resources are allocated to EMCI which is, among other things, responsible for supporting disaster risk reduction activities and co-ordinating disaster response efforts.

Chart 3: Budget as a percentage of Total Gross Expenditure



Source: MFEM



Image courtesy of Litea Biukoto

The costs resulting from Tropical Cyclone Pat (TC Pat) could undoubtedly have been reduced through a higher level of front-end investment in EMCI for projects relating to DRR. To restate the discussion earlier, the recovery and reconstruction program for Tropical Cyclone Pat is estimated to cost NZD9.5⁴million . This equates to 4per cent of GDP. In comparison the budget allocation for EMCI, the key agency for the disaster risk reduction part of the program that is heavily involved in the recovery program, receives a mere 0.04 percent of GDP. Even if this could have reduced the costs of the disaster by 5per cent that would be a saving of almost NZD500,000, more than five times the 2009/2010 budget of the EMCI.

The recovery and reconstruction work following TC Pat is still ongoing and it is envisaged to be quite a long process before Aitutaki returns to it's pre-TC Pat state. The recovery program is heavily dependent on inputs from EMCI in terms of labour. During the 2009-2010 budget year NZD2.2 million was provided for the Aitutaki Cyclone Recovery Reconstruction Plan as a POBOC under the Ministry of Finance to help with the aforementioned recovery and reconstruction programme. In the budget year 2010-2011 NZD200,000 was provided as a social responsibility project by Te Aponga Uira (SOE Power Company) for the provision of a Tsunami Warning System for Rarotonga, this is not included in Met or EMCI Budgets.

The response work on TC Percy in 2005, TC Pat and TC Oli both in 2010 helped to formulate the draft MFEM policy for DRM and develop the rationale of being able to cope with a disaster internally as opposed to being heavily reliant on donors going forward. Included in the draft MFEM Policy for DRM is a recommendation that 2 per cent of the national budget be set aside for an Emergency Fund during a disaster in the Cook Islands;

This would be equivalent to approximately NZD1.6 million (2 per cent of the 2010 Budget) or almost four times the budget of EMCI and only a quarter of the cost of TC Pat.

In June 2011 the Cabinet approved the establishment of an emergency fund for disaster response allocating an initial one off payment of NZD200,000. EMCI & MFEM are now looking at viable options to establish a source for annual contributions in to the fund to ensure its growth over time. The following has been suggested;

“Government shall in principle agree to a tentative ratio of the total appropriation within each financial year which, can be drawn upon to assist with immediate emergency response requirements of the country. The amount shall be no more than 0.2% (NZD200,000) of the total appropriation in the financial year Section 70(3)(b) of the Constitution” (Draft MFEM Policy for DRM, 2010).

⁴ This amount is for recovery and reconstruction only and does not include any estimate for loss of employment or forgone tax revenue from the government in terms of income tax, corporate tax and VAT.

Current Economic Climate



Image courtesy of Samantha Cook



The Cook Islands is among the best performing Pacific economies with GDP per capita around NZD9,308 in 2009 (see Table 2). In 2002 the Human Development Index (HDI) for the Cook Islands was 0.789, placing it first in the Pacific region (Human Development Report 2002). This figure reflects the high adult literacy, 99 per cent, and the high life expectancy of 71 years old (Asian Development Bank, 2010). These combined strengths have seen the Cook Islands develop a good standard of service delivery throughout the country and establish a long history in heavy investment in health, education and welfare.

Table 2: Cook Islands: Development Indicators

Key Development Indicators	
Population	15,708
GDP Per Capita [2019]	9,308
Annual Growth Rate in the population [%]	0.5
Life Expectancy	71
Adult Literacy Rate [%]	99
Population in urban areas [%]	72

Sources: SPC, Human Development Report and ADB

Growth in real Gross Domestic Product (GDP) has averaged 3.3 per cent per annum since 1996 (see Chart 4).The economy of the Cook Islands is driven mainly by tourism, an industry significantly impacted by the global economic crisis. However, visitor arrivals in to the Cook Islands remained strong during this period and increased by 4.6 per cent to 104,100 visitor arrivals to date in the fiscal year 2010-2011 (Half Year Economic and Fiscal Update 2010-2011). However, GDP data recently rebased in to 2006 prices shows that the economy peaked, in terms of growth, in 2007 at NZD306.5 million. Following this the economy has contracted by NZD22.5 million or 7.1 per cent, and was valued at NZD283.8 million in the fiscal year 2010-2011. During these two years wholesale and retail trade declined by 18.8 per cent while transport and communications declined by 12.9 per cent. It would appear that while tourist arrivals have been increasing the tourists have been spending less in country than in previous years.

Chart 4: Real gross Domestic Product 2006 prices [NZD'000s]

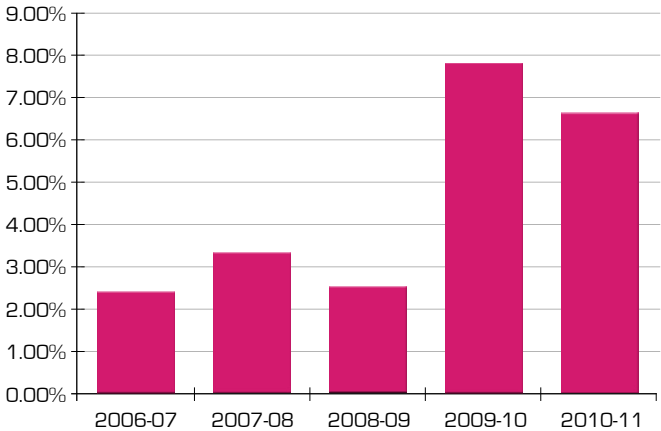


Source: Ministry of Finance and Economic Management

Other threats to sustained economic growth include environmental vulnerability, infrastructure constraints and an emerging labour shortage while capacity constraints, weakening policy, planning, and project preparation, also impede development. The economy is particularly vulnerable to natural disasters.

The Consumer Price Index (CPI) measures the rate of inflation or the cost of living, by creating an index based on the prices of goods and services typically purchased by consumers. It is a particularly important variable for small island states like the Cook Islands who are net importers.

Chart 5: Consumer Price Index (CPI) annual percentage change 2006 prices



Source: Cook Islands Statistics Office

In the five years since 2005 annual inflation has averaged 2.45 per cent per annum. In 2008 the CPI peaked at 7.83 per cent reflecting the high global prices for food and fuel, as the global financial crisis struck in the last quarter of 2009 the growth in CPI reduced to 6.65 per cent in annual terms. As the majority of imports for the Cook Islands originate out of New Zealand it is expected that prices will trend towards those in New Zealand. The MFEM believes that there is a time lag of between 2-3 months between a price rise in New Zealand affecting the economy of the Cook Islands.

The Operating Balance reflects the financial performance of the Government by demonstrating whether the Government is in surplus or deficit. The Operating Balance is the balance of operating revenues minus operating expenditure. In 2010-11 the Operating Balance is estimated to increase from the originally forecast NZD0.6 million to NZD1.4 million reflecting the better than expected performance in revenue.

Table 3 shows that the Government is expected to remain in surplus the coming years. This demonstrates the current strong fiscal management and the commitment of the Government to sound financial practises where less is spent than earned. It is important to relate this to the fact that the Cook Islands is vulnerable to natural disasters and, as a result, adverse economic developments. This vulnerability means that the Cook Islands should aim for a lower debt level than normal to provide a buffer against shocks.

Allocating an annual contribution to the newly established Disaster Management fund would help improve response times and lessen the period over which economic losses occur.

Table 3: Net Operating Balance (NZD millions)

	2009-10 Estimate	2010-11 Budget	2010-11 Estimate	2011-12 Projection	2012-13 Projection
Total Revenue	100.1	101.8	102.6	107.6	112.2
Total Expenditure	102.7	101.2	101.2	107.4	109.8
Net Operating Surplus/(Deficit)	-2.7	0.6	1.4	0.2	2.4

Source: Ministry of Finance and Economic Management

Economic Outlook

The economic outlook for the Cook Islands is positive with real GDP expected to grow by 1.1 per cent in 2010-2011 and to further increase by 6.5 per cent and 4.5 per cent in the subsequent two years.

The CPI is projected to remain at 1.8 per cent in 2010-2011 then as global fuel prices are expected to increase as global demand returns in the wake of the global financial crisis the CPI is expected to rise to 2.8 per cent in 2012-2013.

The growth in real GDP will be underpinned by strong growth in visitor arrivals of 4.6 per cent in 2010-2011. Visitor arrivals are expected to grow by a further 13 per cent in 2011-2012 and by 6.8 per cent in 2012-2013. This is in line with the current Government strategy and resource commitment towards the tourism industry including investment in the following new direct flights Rarotonga – Sydney, Los Angeles – Rarotonga and Nadi – Rarotonga.

The expected increase in tourism and associated revenues will help to keep the Government of the Cook Islands in surplus although 2011-12 is expected to have a lower surplus than average, NZD0.2 million, due to the increased expenditure in establishing the new flight routes. This cost is expected to have been absorbed by 2012-13 where we see the surplus increase to NZD2.4 million.

Potential Losses



Image courtesy of Litea Biukoto



It is critical for Governments to consider indirect losses to the economy as well as the direct damages resulting from disasters. Currently across the Pacific, only direct damages are assessed and little is done to try and estimate the economic losses resulting from a given hazard which can often be of greater cost to the community.

The United Nations Economic Commission for Latin America and the Caribbean (UNECLAC) have developed a Damage and Loss Assessment (DALA) methodology define direct damage as that which refers to damage to property that occurs as a direct result of the natural disaster. In some cases of damage, the damaged asset must be demolished before re-construction work can commence. The demolition is also considered to be a part of direct damage.

Indirect losses come from the loss of production flows of goods or services and income that result from a natural disaster. Indirect damage includes the increased cost of provision of goods and services that result from the disaster. The added cost of operation is reflected in higher fuel bills for automobiles, greater transportation and maintenance costs and the loss of rental incomes accruing to landowners who suffered loss. Consequently, indirect damage may be measurable for some time after the disaster. To obtain the total cost of a disaster indirect effects should be added to direct damage.

Consider the example of a hotel that has been damaged or even destroyed as a result of a hazardous event. First, the damage should be assessed and reconstruction costs to return the hotel to its pre-disaster condition should be estimated. Second, economic losses would arise from the closure of the hotel as the result of a hazardous event. The hotel would be closed during the rebuild phase, incurring economic losses from lost revenue as well as the foregone wages for the staff who cannot return to work during the rebuild phase. Additionally, the hotel would possibly incur the cost of making alternative housing arrangements for staff that normally live on-site. Such losses would then pose a secondary tier of indirect effects to the Government through foregone tax revenue while the staff and the business are no longer liable for income and corporate tax, respectively. The rebuild could also pose inflationary problems for the economy as when the hotel re-opens the expense there is a risk that the cost of the rebuild may be passed on to the consumer.

Demonstrating Losses



Image courtesy of Litea Biukoto

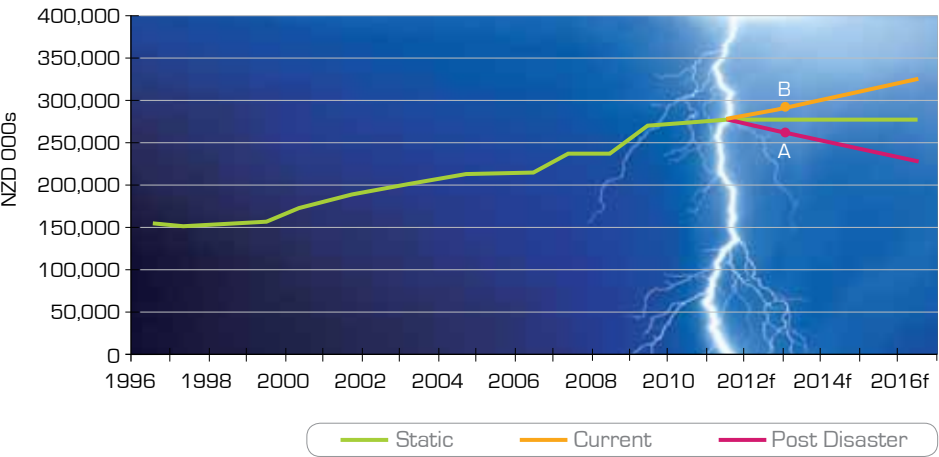
Economic losses incurred may continue for some time after an event. This could extend the recovery period of the economy in trying to return to its steady state of growth. Such losses are generally difficult to quantify and there are some elements that should not be quantified at all, perhaps for ethical reasons, such as the value of a human life. The motivation behind attempting to quantify risk is so that it can be mapped in the hope that investment can be made to lessen potential risks in the future.

To help conceptualise potential losses, the vertical line in Chart 6 represents a time when a disaster has occurred. There are three scenarios in which the economy could move forward;

- 1. it could continue along its current growth path growing at a rate of 3.3 per cent per annum,
- 2. there may be a reduction in the rate of growth, or;
- 3. it could be that the economy remains static at the current levels of GDP.

The second scenario suggests the possibility that after the occurrence of a hazardous event the economy begin a downward spiral as production levels begin to fall as a result of the damage incurred. The decline shown in Chart 6 is equivalent to 3.3 per cent decline in GDP per annum. Not only would this take some time to rectify but it would also mean that the economic recovery would begin from a much lower point. For example, if the economy contracted by 3.3 per cent in one year it would reach point A in Chart 6. This means that for the economy to return to its average pre-disaster growth rate of 3.3 per cent per annum (shown at point B), a gap of 7 per cent of current GDP would need to be filled. This is equivalent to approximately NZD 18.3 million based on GDP levels in the Cook Islands in 2009.

Chart 6: GDP growth post disaster



Source: Government of the Cook Islands & SOPAC

In scenario 3 if the economy remained static and continued on the current growth path a gap of almost NZD9 million would need to be filled, equivalent to 3 per cent of current GDP.

To illustrate potential losses consider a situation where an earthquake results in a reduction of the number of businesses and formal employment (see Table 4). The numbers shown demonstrate losses to employment and registered businesses at the conservative levels of one, two and five per cent. These levels were chosen for illustrative purposes only, as it was not possible to ascertain these impacts from past events. Going forward it may be possible to improve the figures demonstrating potential losses as the Pacific begins to use a standard format for damage, loss and needs assessments which will create a benchmark for comparison. It is possible that the losses resulting from a natural disaster could be higher than demonstrated.

Table 4: Business and Job losses

	1%	2%	5%
Employment	106	212	531
Number of businesses	13	26	65

Source: Cook Islands Statistics Office & SOPAC

The latest information on Value Added Tax (VAT) registrations in the Cook Islands suggests that there are approximately 1,300 businesses operating. If 5 per cent of these businesses were lost or unable to operate post-disaster then this would equate to 65 businesses and approximately 531 people becoming unemployed.

To obtain estimates on foregone wages as a result of the disaster, the average annual rural and minimum wage had to be estimated. At present the minimum wage in the Cook Islands is NZD5 per hour, this equates to approximately NZD9,600 per annum. As no average income could be found in the 2006 Census or the Household Expenditure Survey an average has been created by taking the midpoint of the bandings obtained in these documents and taking the average of these numbers, resulting in an average wage of approximately NZD17,500 per annum. Similarly, to obtain an indication of the average rural wage the midpoint of the bandings for the Southern and Northern Island groups was taken. Averaging these numbers, resulted in an average rural income of approximately NZD11,250. Due to the majority of formal employment being based in Rarotonga the largest urban area in the Cook Islands the value of the average wage across the country is assumed to be the same as the average wage for Rarotonga.

The numbers generated in Table 4 were multiplied by these indicative wages. For example, if employment declines by 5 per cent 531 jobs would be lost. If this number is multiplied by the average annual wage of NZD17,500, this would indicate losses of NZD9.2 million. However, if the hazardous event hit one on of the more remote islands, where most people earn the rural wage, lost wages are more likely to be in the region of NZD5.9 million (see table 5).

Table 5: Potential losses to wages (NZD)

	1%	2%	5%
Average Wage	1,858,850	3,717,700	9,294,250
Rural Wage	1,194,975	2,389,950	5,974,875
Minimum Wage	1,019,712	2,039,424	5,098,560

Source: Vanuatu Statistics Office & SOPAC

The loss of wages will in turn have an impact on Government tax receipts. Revenues from VAT, income, import, company and departure tax will decline as businesses remain closed, tourist numbers decline, and unemployment increases. Table 6 focuses on demonstrating the associated potential losses.

Table 6: Foregone Tax Revenue (NZD)

	1%	2%	5%
VAT	306,155	612,311	1,530,776
Income	222,070	444,141	1,110,351
Import	89,410	178,820	447,051
Company	77,866	155,731	389,328
Departure	52,981	105,962	264,904
Sub- Total	748,482	1,496,964	3,742,411

Source: Cook Islands Statistics Office & SOPAC

To keep things simple the estimations on foregone tax revenue were calculated at the one, two and five per cent level of the 2010 revenues. It is important to note that the decline in VAT returns is likely to be higher than demonstrated in Table 6 as individuals hold on to cash as they are unsure when they will receive their next wage. This is also known as the savings ratio.

The sub-total for foregone taxes at the five per cent level is almost NZD3.7 million comprised of approximately NZD1.5 million in VAT, NZD1.1 million in terms of income tax, NZD0.4 million in import tax, NZD0.3 million in company tax and NZD0.2 million in terms of departure tax.

These indirect costs must be added to the direct costs such as damage to buildings and cash crops in order to obtain a more accurate reflection of the total damage and losses that have occurred.

Table 7: Estimated losses (NZD)

	1%	2%	5%
Total Losses	2,607,332	5,214,664	13,036,661
as a % of GDP	0.95%	1.91%	4.76%

Source: Cook Islands Statistics Office & SOPAC

To obtain the total losses shown in Table 7 the average wage was used and added to the sub-total in Table 6.

Table 7 demonstrates that a disaster which destroys 5 per cent of registered businesses may cost the economy the equivalent of 4.76 per cent of GDP. These figures only include those businesses registered for VAT payments and subsequent effects from the losses of such businesses. It is worth remembering there are many businesses operating that may not be liable to VAT either because their revenue is too low to incur VAT or because they are informal operations.

The analysis shows that substantial losses can be generated post-disaster. At this point it should be noted that the figures demonstrated here relate to losses only, such losses must be added to the estimated damage cost to obtain an accurate reflection of the disaster impact. This means that the total economic cost of a disaster is likely to be far higher than the numbers demonstrated here. For example if we add the total loss figure in table 7 to the total cost of the recovery and reconstruction programme for Aitutaki for the damage caused by TC Pat (NZD9.4 million) we reach a total of NZD22.5 million equivalent to 8 per cent of GDP in 2010 for damage and loss together.



Image courtesy of Litea Biukoto

Benefits of Investing in **Disaster Risk Reduction**



Image courtesy of Samantha Cook

The costs of disaster can be reduced by investing in DRR measures such as the implementation of building codes and early warning systems. For example, in the Cayman Islands following Hurricanes Gilbert and Mitch both in 1998 the preparedness and community resilience was improved. The Government made changes in the rules and governance of hurricane risk accompanied by changes in the early warning systems. As a result the economic and ecological impacts of hurricane Ivan in 2004 were reduced (Adger et al 2005).

According to the World Bank and the US Geological Survey, if USD40 billion had been invested in physical or engineering DRR type measures such as ensuring adequate design of buildings, then USD280 billion of economic losses worldwide from natural disasters would have been avoided in the 1990s (World Bank 2006).

It is estimated that the USD3.15 billion expenditure on flood control measures in China over forty years helped to avoid losses in the region of USD12 billion (World Bank, 2004).

It is important that risk reduction projects in the Cook Islands continue in order to reduce the damage and losses from future disasters. This is why it is recommended that the fund be for both risk reduction and disaster management purposes.

Summary

The objective of this report was to present a high level desk based assessment of the potential economic costs of a disaster and to identify the level of investment in Disaster Risk Management (DRM). Potential costs from a hypothetical disaster were calculated to demonstrate that disasters can have profound impacts on economic development, consequently long term investments in DRR should be made.

Since 1955 the Cook Islands has experienced a total of 28 natural disasters which have resulted in 34 deaths and cost in the region of NZD65.4 million. However, it is important to note these figures identify costs associated with damage only. They do not account for any economic losses which will have occurred as a result of the damage caused by the disaster. Such losses include foregone wages to the individual and loss of tax revenue to the Government.

The recovery and reconstruction program for Tropical Cyclone Pat which hit Aitutaki in 2010 is estimated to cost NZD9.5 million . This equates to 4 per cent of GDP in current prices. This has large cost implications for future events for an area known as the 'Cyclone Bucket' and reiterates the need to better prepare for future events.

The hypothetical disaster demonstrated that substantial losses can be generated post-disaster. Using the figures obtained from the five per cent level such losses were in the region of NZD13 million. If the costs of the recovery and reconstruction programme (which only looked at damage costs) for Aitutaki of NZD9.4 million are added to this a total of NZD22.5 million for damage and loss together is attained, equivalent to 8 per cent of GDP in 2010.

The current budget allocation appropriated to EMCI predominately covers recurrent costs such as staffing and leaves little spare budget to engage in any project work for either response or risk reduction. However, the newly established disaster management fund shows increasing recognition of the good work undertaken by EMCI and will enable the EMCI and other key ministries to mobilise much quicker than is currently the case following a disaster. This will help improve response times and help aid the damage assessment and consequently lessen the period during which losses can occur.

Considerations

There are certain considerations to be taken in to account with regards to improving sustainable DRM in the Cook Islands, such as;

- Improve the financial reporting process to enable greater transparency in DRM expenditures
- Consider the use of financial tools to establish a DRR fund to coexist with the Disaster Management fund,
- Introduce risk assessment in to the budgetary/planning process,
- Increase the use of NAP to request/guide donors to expenditure areas with the greatest need,
- Establish good baseline data to help facilitate post disaster assessments,
- Increase knowledge at the community level and encourage provincial councils to enable better tracking of their expenditures in this area.



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Conclusion

The Cook Islands is vulnerable to natural disasters and, as a result, adverse economic developments. This vulnerability means that the Cook Islands should aim for a low debt level to provide a buffer against shocks. Allocating an annual contribution to the newly established Disaster Management fund would help improve response times and lessen the period over which economic losses occur. This recommendation is made following this study of a hypothetical disaster and the resulting economics costs in terms of higher unemployment, lost wages and decreased tax revenue presented in this paper. Since such effects can have long term negative effects on any given economy, prompt action to avoid these costs will be critical in achieving long term poverty reduction and sustainable development objectives

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Image courtesy of Litea Biukoto



Traditional signs are still being practised in the Cook Islands and one of the beliefs is that if the breadfruit bears 3 fruit instead of one on a branch, this is a sure sign for a cyclone



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